Entering the Economic Models
of Game Console Manufacturers

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Abstract: This paper deals with the video game console market. We are not interested here in portable consoles nor in PC games. Our work focuses on the role of core competencies in console wars, analyzing the way these competencies are activated within the firms' business models. The home console market also exhibits crossed network externalities, which requires console manufacturers the ability to conciliate the interests of both developers and gamers. From a strategic point of view, core competencies are closely related with market performance. Today, Sony's and Microsoft's business models are quite similar. However, Microsoft and Sony remain far behind Nintendo and its Wii, which suggests that core competencies do not discriminate on performance as much as the positioning choices made upstream when the strategy is crafted. The link between core competencies, economic model and strategy is at the heart of this study.

Key words: video game console, business model, core competencies, two-sided market, platform.

T his paper examines the way firms leverage their core competencies in order to achieve market dominance in the video game console sector. Since the end of the 90's, the home console market has become a full-fledged component of the entertainment industry. This cyclical market is characterized by network externalities, the increasing sophistication of video games and game consoles and the surge of strategic marketing. All these aspects are approached in the 1st part, which provides a general description of this market.

Since the beginning of the century, this industry has witnessed major developments: the arrival of Microsoft in 2001 onto the game console segment, a growing interest of game publishers in other platforms, the emergence of new platforms such as smartphones, the development of online services as illustrated by WiiWare, Xbox Live or Playstation Network and more recently video game tournament coverage on broadcast networks. All of these elements have a fundamental impact on the value chain and on the strategies of both the established players and the newcomers.

In the 2nd part of the paper, we introduce the concept of business model (BM), underlying the role of core competencies. We will focuss on Sony's and Microsoft's BMs within a comparative analysis. A business model is a framework to compete in a given industry. It is the set of activities which a firm performs and how it performs them in order to deliver its customers a superior value proposition. Thus, focusing on core competencies helps to understand how this value proposition is crafted.

■ The mutations of the video game sector

In this part, the emphasis is mainly on the three console manufacturers' strategies (Microsoft, Sony, and Nintendo). The strategic directions of game publishers are not analyzed in depth here because of their number. Moreover, home consoles are privileged in this work insofar as they generate a large share of the industry's revenue.

A rapidly expanding market

The market's growth is steady for all segments of the sector, which should reach €48 billion by the end of 2008. Home console sales (and sales of associated software) are mainly responsible for driving the market forward, despite a dip in 2005, at the time of transition between two console generations (IDATE, 2003).

The arrival of new consoles, 2005-2007: the triumph of the Wii

The video game console market is subject to a relatively short technological cycle, meaning the renewal of game consoles every 5-6 years. 2005 is a turning point, as Microsoft was the first to launch a next generation console on the market: the Xbox 360. Because of the gap between the various consoles' launch dates, Microsoft's sales logically overtook Sony's and Nintendo's in 2006. It is thus only in 2007 that the market trends appear more clearly with respect to each next generation console's progression and success (see table 1). The most recent numbers (June 30th, 2008) seem to confirm the trends observed in 2007 and early 2008: Nintendo has sold over 26 million Wii worldwide since its launch in December 2006, as compared to 20 million Xbox 360 and 14 million PS3.

**Table 1 - Geographical distribution of worldwide sales
of Xbox 360, PS3 and Wii since their launch**

	North America		Europe		Japan	
	Launch date	Total Sales *	Launch date	Total sales *	Launch Date	Total sales *
Xbox 360 (Microsoft)	Nov. 2005	11.11 million	Dec. 2005	5.68 million	Dec. 2005	590,000
PS3 (Sony)	Nov. 2006	4.18 million	March 2007	4.47 million	Nov. 2006	1.97 million
Wii (Nintendo)	Nov. 2006	9.66 million	December 2006	7.1 million	Dec. 2006	5.5 million

* These numbers tally the total sales since the consoles' launch to March 1st, 2008.

Source : http://www.vgchartz.com

A cycle reversal?

The development of game consoles requires huge financial resources, because of their technological sophistication. The transition from one generation to another is always a delicate stage both for console manufacturers and game publishers. Each cycle registers the abandoning of some established firms' activities but also the arrival of newcomers. The next generation brings new knowledge in relation to the previous cycles along four points:

• The shortening of cycles: Microsoft and Nintendo have deliberately accelerated their machines' obsolescence and shortened the cycle to counter Sony. In an interview with *l'Expansion* on March 24th, 2006, Sony Computer Entertainment Studios CEO Phil Harrison said the following:

> "The life cycle (7 years) we have adopted for our consoles is longer than our competitors' […]. Since our arrival on the game console market, we have never been the first to launch the first machine during the transition toward a new console generation […]. We are simply on a different calendar."

• The race for technological performance: until now, each generation was characterized by consoles whose technical performance became ever more powerful and similar (DAIDJ & QUÉLIN, 2005). The consoles' commercial success was conditioned above all by their technical prowess. However, the Nintendo's Wii -launched in 2007- counteracts this trend. It distinguishes itself from its competitors by its more limited technical performances. In order to become the leader, Nintendo bet less on

technological innovation and more on their console's superior "fun factor" over the PS3 and Xbox 360 (cf. next part).

• Market structure: since 1973, the effective launch date of the first consoles by Atari, the console market alternates between phases of monopoly, duopoly and oligopoly, even if the oligopoly tends to become dominant. Until the current generation, all periods have been characterized by a leader who stepped down in favor of another competitor (Atari and Sega). However, the return of "Big N" to the first place on the home console segment (which they already occupied in the 1980s) is a scoop (DAIDJ, 2008b).

• The established model of the "razor and blades": console manufacturers sell their products at relatively low prices while ensuring substantial complementary revenue by selling games developed internally or granting rights to publishers who can in return develop new software:

> "This industry uses the model of the business of razor and razor blades, selling subsidized hardware to win in the software. Unlike other mass media, it does not generate revenue from advertising, it is generated by proprietary hardware and no interoperability, which is a factor that is crucial to competition" (TOMASELLI, DI SERIO, DE OLIVEIRA, 2008, p. 16).

The structural characteristics of the video game console industry

In order to better understand firms' business models in the video game console industry, we will provide a brief summary that explains the main characteristics of this industry. These characteristics entail that the operators must make choices likely to influence their ability to generate revenue, and furthermore, their console's success.

Video game consoles: a platform industry

A platform is a system made up of several physical and/or software modules linked by interfaces (GAWER & CUSUMANO, 2002; BALDWIN & CLARK, 2000). The design of these interfaces can rest on open architecture or not. In the first instance, design is based on the use of open and public standards facilitating interoperability between the various components manufactured by third parties and *in fine* between platforms. In the second case however, design rests on the use of proprietary standards, reducing compatibility between systems. The game console systems available today

– like those of previous generations – are proprietary systems; in other words, there is no interoperability between these systems.

For instance, a game developed for Xbox 360 is not compatible with a game developed for PS3. For a single game, the portability requires specific developments. At this level, architectural choices are very important. They can make developer's jobs easier or on the contrary make it longer and more complex, thereby directly influencing production costs. For example, Sony's choice to equip the PS3 with the Cell processor considerably slowed the work of developers because of a totally different architecture from traditional processors, to the point where IBM was forced to call on several teams of engineers to help developers and enable them to use the Cell's power. PS3 production costs are also higher than that of the Xbox 360 because of the choice of components (cf. part 2). *De facto*, the various elements or modules of a platform are rarely manufactured by the same company. As stressed by GAWER & CUSUMANO (2008):

> "An industry platform involves not only one company's technology or service but also an ecosystem of complements to it that are usually produced by a variety of businesses. As a result, becoming a platform leader requires different business and technology strategies than those needed to launch a successful stand-alone product".

The choice of partners and the components they provide is also important, as are the aspects pertaining to the supply chain management. This requires from manufacturers a global vision of the company's supply flows but also of its suppliers and customers, and the ability to efficiently coordinate these players, whose interests sometimes diverge in particular with respect to production costs.

An industry characterized by high network externalities

The video game console sector exhibits network externalities (positive) which have important consequences on the market and the players' choices, especially those related to their BMs. Two types of network externalities can be distinguished: direct and indirect externalities. Direct externalities appear when the satisfaction (utility) stemming from the consumption of a product or use of a service directly derives from the number of individuals already consuming the product or using the service. It is thus an intra-group externality. Indirect externalities appear when the demand for a product on a market depends on the offer of another product without which the first cannot function. The appearance of this type of externality is conditioned by

the existence of two complementary products forming a 'system' product or a platform such as game consoles. In this context, two categories of agents are distinguished, and the value of a product for one category is positively correlated to the number of agents on the other side of the market. This is an inter-group externality. Developers will thus have all the more incentive to offer new games (software) for a console as the number of gamers using the console (hardware) grows.

Crossed or indirect network externalities are then observed. They are indeed network externalities in the sense that the value of the product depends on the number of users, but they are said to be crossed because the users in question belong to different categories: developers on the one hand and players on the other. The platform thus internalizes the indirect externalities (ROCHET & TIROLE, 2003), which can usually be divided into two types: membership externalities and usage externalities. Indeed, since there are two interdependent groups of agents, membership externalities mean that the usefulness for group A is an increasing function of the number of agents in group B. This is the *ex ante* incentive for a new agent to join a given group. Usage externalities are a result of the *ex post* interactions between two different groups of agents and originate from the use of the platform itself (the console), and particularly from the intensity of this use. The existence of network externalities has several important consequences:

• Demand doesn't depend solely on price or revenue, but also on the current number of users. The more the product is used, the higher its intrinsic value, but also its relative value in relation to competing products. Of course, the price and the revenue aspects are important too.

• The existence of switching costs and lock-in situations. When the installed user base is large, changing platforms is costly for users. The existence of switching costs can lead to users giving up the idea of changing their consumption and lock the market. From this point of view, with each generation change, the behavior of firms on the market can be seen as a race for early adopters (GALLAGHER & PARK, 2002).

• Finally, when there are economies of scale in production (high fixed costs and low marginal costs), network effects accentuate the market's dynamics: the larger the network, the higher the demand, lowering unit production price, and potentially prices, which further increases demand.

The game console market is a two-sided market

Several works have specified the characteristics of two-sided markets (CAILLAUD & JULLIEN, 2001; ARMSTRONG, 2002; EVANS, 2003; ROCHET & TIROLE, 2006, ARMSTRONG, 2006; CORTADE, 2006; WAULTY, 2008). Two-sided markets are similar on the one hand to network effect markets because of the presence of externalities, and on the other hand to the problem of multi-product firms because of the role played by pricing models. However, they are different from network effect markets mainly because the network externalities are crossed. Network effects spread from one side of the market to another, from one category of agents to another (inter-group externalities), rather than within a given group (intra-group externalities). In such a market, the middleman's (manufacturer's) role is quite complex since their ability to efficiently coordinate the demand of two client groups depends on their decisions. The main challenge is to attract both groups, given that their participation depends on the others' presence.

One way to proceed is to obtain a critical mass of users on one side of the market. This is what usually happens when a new console generation is launched. Manufacturers do not hesitate to lower the sales price of their console, even if this means selling at loss, in order to increase the user base and trigger network externalities on the gamer side. Another way is to invest in one side of the market in order to stimulate its subscription. This is what manufacturers usually do when they provide software development kits (SDKs) and other APIs (Application Programming Interface) to assist second and third-party developers. This is the case with Microsoft's DirectX and Direct3D libraries, respectively used to program multimedia and 3D applications for the Xbox360 (and PC). This is also what Sony does through its subsidiary SN Systems or its partnership with NVIDIA Corporation, which offers the development kit for the RSX GPU that equips the PS3. In both cases, the goal is to offer more assistance to developers, generate network externalities on the developer side and dissuade developers from committing to competing platforms (multi-homing).

The optimal price for both client groups is the one that balances demand between both groups. In other words, in two-sided markets, price can favor a group over another, according to the importance of the (indirect) externalities generated by this group. If group A generates higher externalities for group B than group B generates for group A, then group A can be sponsored and benefit from lower prices (PARKER & VAN ALSTYNE, 2002). This is the case between gamers and developers: by lowering the console's price, the manufacturer hopes to increase the user base and draw in a greater number

of developers. Gamers are thus 'sponsored' over developers. Consequently, the choice of a pricing model must be made after considering the effect of a tariff component on one side of the market, not only on that side but also on the other, *i.e.* taking into account the feedback loop that spreads from one side of the market to the other.

■ The business models of the video game industry

The notion of business model

The Business Model: a matter of choice

If the concept of BM is not yet very well defined in academic literature, the analysis of the various definitions available reveals a number of recurring elements (AMIT & ZOTT, 2001; SHAFER *et al.*, 2005; DEMIL *et al.*, 2004, 2006; VOELPEL *et al.*, 2004; MARGRETTA, 2002) among which: the means of generating revenue, the resources and competencies required, and the ways transactions between participants are organized. Based on these elements, the BM explains how the resources and competencies marshalled by a company allow it to develop a value proposition for its various client groups and how it consequently orders its internal value chain and value network.

At this stage, it is necessary to make the distinction between two cases. Either the company has all the resources and competencies required to develop (in-house) its own value proposition, or it lacks some of them, in which case it will have to select them on the market and appoint them wisely through the choice of relationship strategies. The first case usually refers to vertically integrated firms which have a large variety of resources and competencies at their disposal. In the second case, the company must thus assign resources belonging to other players within the company's value network or external value chain. From this first choice (make or buy) stems a second, which pertains to the organization of the company's internal value chain and its processes. Indeed, the choice of the activities which will make up the company's value chain will be a result of the choices made pertaining to which resources will be assigned internally, but also of the choice of addressable resources on the market, through the company's value network.

The industry's value chain allows the players to identify these various resources and competencies and supplies the framework from which they will develop their own value proposition. The BM supplies the particular framework from which a given player will develop its value proposition for the end-client. While the value chain shows the rules within an industry, the BM shows how each player plays within this industry. The third type of choice is thus linked to the type of relationships with the various partners involved in developing the offer for the end-client.

The resources and skills to be drafted

Resources and skills are elements that actively contribute to creating value and generating revenue (PENROSE, 1959). The manager's role is mainly to combine and coordinate the resources which will allow value added to be generated for customers. This ability to combine and coordinate is a function of accumulated experience and knowledge and reveals general capabilities at the organizational level, *i.e.* skills. These skills reflect the fundamental knowledge at the company's disposal, its central skills (PRAHALAD & HAMEL, 1990) or core competencies. In other words, core competencies reveal the firm's identity, its trademark. They make up what it knows how to do itself, i.e the essence of its activity and its 'raison d'être'. In order to succeed, the firm must thus exploit its core competencies as best it can and wisely marshall those of its partners.

'Internal-external' coherence

In any of these views, the notion of BM reflects a company's choices, which have as a starting point an analysis of the resources and competencies necessary to develop an offer for the end-client, for whom the product is made (not to be confused with those clients who indirectly participate in its development, *i.e*. 'external' clients located outside the boundaries of the company, within its value network). Besides, if the firm's value chain allows the internal value creation processes to be explained, the value network allows the external value creation processes to be explained, making the BM a link between these two areas, internal and external. The BM thus ensures coherence between these three areas and enables the company to manage the value creation process for all the parties, including the end-client.

Creating and harnessing value

If the BM explains the value creation process for all participants, it also shows how this value is shared out between the various players, *i.e.* their ability to capture a part of the generated value. There can be a wide gap between value generated and value captured. In our case, about a third of overall turnover goes to development and publishing, the remaining two thirds going to distribution and sales (LE DIBERDER, 2001; LACROIX, 2005). The value harnessed by development (studios) is thus quite low even though these activities are at the root of most of the generated value. The relationships within the video game value chain are unbalanced in favor of the console manufacturers who dominate the publishers (Sony, Microsoft and Nintendo are also publishers) by imposing their prices (DAIDJ, 2007). Publishers in turn dominate development studios. In this context, only one financial model currently governs the industry: that where the publisher fully takes charge of production costs. In return for their role of bankers, publishers impose contracts upon development studios that make them shoulder the risk of production (only about 5% of games produced are profitable) and confine them to a 'make-work' role. In concrete terms, the studios' BM only allows the developers to capture a very small part of the generated value, revealing an inadequacy between the internal value chain and the value network. The developers' BM confines studios to a background role of simple service providers instead of game producers.

Business model and strategy

As summarized by DEMIL *et al* (2004):

> "The BM is not the choice of mission, product/market couplings or the analysis of a firm's competition. In this sense, it is downstream from strategic reflection".

The BM is the counterpart to strategy and covers the implementation of the strategy. It thus refers more to operational aspects. Basically, the BM translates the choices made upstream of the strategic approach into operational terms and is an intermediate level of analysis between a company's strategy and its functional translations. The BM reveals strategic choices made upstream, and articulated around four dimensions associated with clients (what is the value proposition for the client?), expertise (what are the required skills?), network (what are the modalities of collaboration between the various parties?) and revenue (how does the company make money?) which will determine the value created and the share of this value captured by the company.

In the following section, we shall mainly examine the nature of the competencies used by Sony and Microsoft to develop their respective consoles (The PlayStation and Xbox families), as well as the relationships with their main partners, particularly second- and third-party developers. We won't introduce in our analysis Nintendo's BM. Indeed, even if Nintendo's BM share common features with those of Sony and Microsoft, the strategy adopted by Nintendo is a "blue ocean strategy" (KIM & MAUBORGNE, 2005) and by no means can be compared to that of Sony and Microsoft.

Sony's and Microsoft's core resources and competencies

Sony: present all along the media value chain

Originally, Sony was mainly a consumer electronics group, renowned for the quality, originality, design and innovation of its products since its creation in 1946.

The 'PlayStation' family

Sony developed their expertise in the field of electronics to design the first PlayStation (PS1) in 1994. With this launch, Sony was the first to change game formats and offer CDs instead of the old cartridges, thus contributing to the spread of 3D in the video game field. The launch of the PlayStation 2 (PS2) in 2000 marks the appearance of 128-bit consoles. Sony used the same approach they did when launching the PS1. At the time of launch, the PS2 incorporated a number of technical innovations. The old CD-ROM drive gave way to a DVD drive, turning the PS2 into a home entertainment system. The console also integrated two network ports for online gaming. The PS2 game controllers comprised two solenoid motors for better feedback. Finally, the PS2 was backward-compatible with most existing PS1 games (about 95%). The PS2 was an even bigger success than the PS1, selling 130 million units (by March 31st, 2008) while benefiting from a large software catalog. Once again, the PS2 gained the upper hand over the competition (Dreamcast, GameCube, and Xbox). With the PS3, Sony poured all its know-how into the design of this new console. Designed to be a true media center, supporting various audio and video formats, the PS3 is equipped with a Blu-Ray drive (DAIDJ & HAMMOUDI, 2008), a hard drive, a High Definition Multimedia Interface (HDMI) port, 4USB ports, an Internet browser, wireless Bluetooth capability and the new DualShock 3 controllers with motion sensors. Like the PS2, the PS3 allows online gaming

through the PlayStation Network via a Wi-Fi connection. Finally, the PS3 is equipped with a CPU (the Cell) and a GPU (the RSX) offering impressive processing power. Sony has stayed true to its tradition of backward-compatibility, since the 60 GB and 80 GB models of the PS3 are compatible with most PS1 and PS2 games.

Three competencies in the service of one family

Sony has at its disposal a real know-how in the field of consumer electronics, which gives it a significant technological advantage. Moreover, Sony is a one of the great vertically integrated industrial groups. Consequently, the firm's industrial organization relies only little on local subcontracting. Local content is high, but this is thanks to a vertical integration of the group's various subsidiaries. In other words, Sony manufactures a large part of the components that make up its various platforms. About 40% of the PS2's components and 50% of the PS3's are manufactured by the group (iSuppli Corp, November 2006). The rest are usually bought ready-made from various manufacturers, and console manufacturing is usually subcontracted to other players. Benefitting from accumulated experience and know-how over 20 years for CDs and 10 years for DVDs, Sony is also the leader in the field of storage media on the European market. Indeed, the Japanese firm owns several subsidiaries which allow it to control the entire electronic device manufacturing process as well as the media value (Sony Pictures Entertainment, Sony Music Entertainment). Aside from the development and publishing of video games, Sony has a hand in content and owns several film studios under the banner of Sony Pictures Entertainment (SPE), in charge of producing and distributing films to theaters, television, video and DVD and the Internet. This aspect is particularly important, as since the mid-1980s there has been a convergence, on the one hand between access networks and content, and on the other between forms of content themselves, as is the case for video games and movies with partnerships between film studios and video game publishers.

Microsoft: from software to game consoles

Founded in 1975 by Bill Gates and Paul Allen, Microsoft is one of the large software publishers in the world, behind IBM. Microsoft's core activity is software engineering, *i.e.* design, development and production of software, mainly the operating systems (OS) that equip PCs. Windows is by far the most widely-used OS in the world on PC platforms. But the company's range

of activities is not limited to operating systems alone. It nowadays covers every field of consumer and professional computing: PC and server OSs, business software, applied platforms, security, and – more recently – video games. The diversification of Microsoft towards the video game sector dates back to 2001, the year the Xbox was launched. Microsoft had two objectives: to break the supremacy of Japanese firms, mainly Sony and its PS2, and to have at their disposal a new point of entry into homes by developing a media center.

The Xbox family

The Xbox console is almost identical to a PC. It is equipped with an Intel Pentium III processor at 733 MHz, and an Nvidia NV2a GPU built from the chip equipping the GeForce 3 (233 MHz). The console is also equipped with 64Mb of DDR Ram, an internal 8 - 10 GB hard drive (WD, Seagate), a DVD drive, a Dolby Digital 5.1 compatible audio system, and a network port to play online through the Xbox Live online service. The OS used by the Xbox is derived from Windows 2000. This is a strategic choice for Microsoft, given that Windows OSs usually incorporate an API library to make the development of multimedia applications easier, known as DirectX. These development interfaces ensure the interoperability between the various software components and improve the quality of graphical and audio applications in Windows. At the time of launch, DirectX was a success with PC game developers. In its console version, DirectX is considered the 'backbone' of Xbox – and later Xbox 360 – development APIs. Consequently, the Xbox benefited at the time of launch from a large software catalog which grew over time. From 2005, with the Xbox 360, Microsoft truly became a competitor to Sony, with undeniable sales performance (cf. table 1). Microsoft has taken several initiatives to boost its console's sales, by tailoring its consoles and their functionality to the target audience, developing new online services with Xbox Live, by offering new games through partnerships, betting on exclusives such as Halo 3 which noticeably increased Xbox 360 sales, and by offering more attractive prices in order to align itself with the competition, and mainly to slow down Nintendo.

Microsoft's core competencies: from PC OSs to Xbox OSs

When Microsoft decided to launch the first Xbox in 2001, the company still lacked experience in the video game field, mainly with respect to hardware. Moreover, it suffered from a fairly negative image linked to its monopoly on operating systems. On the software side though, Microsoft had already tried its hand in 1996 by redeploying its competencies to port

Windows CE to Dreamcast. With the launch of the Xbox 360, the choice of which OS to equip the console with once again had Microsoft's full attention. Indeed, having chosen to equip the next-generation Xbox with a processor based on IBM's PowerPC architecture, the chosen OS could not be Windows XP or even Windows CE, which are incompatible with this processor. Once again, Microsoft managed to apply its software engineering know-how to develop a specific OS for the Xbox 360, based on Longhorn, better known as Windows Vista. This choice presented several advantages. It first allowed Microsoft to lock the Xbox 360's OS, ensuring that no competing OS could be used on the console. Moreover, Microsoft can offer developers DirectX10, which integrates a new version of Direct3D entirely dedicated to 3D graphics. Beyond this, DirectX10 allows for the development of hybrid games, common to Xbox 360 and the Windows family, mainly Vista. However, since Vista integrates a version of Windows Media Center, it becomes possible to use the console as a true media center to read image, video and audio files, watch, and record shows.

The creation of the Xbox Next-Generation Architecture (XNA) is another expression of Microsoft's core competencies. Unveiled in late 2006, XNA is a free development framework offered by Microsoft in order to give the public at large access to game development. This decision of developing XNA comes within the scope of a long-term strategy aiming to ensure perennial relations with developers, the key to success in the field of video games. Indeed, XNA is much more than a simple SDK: it is a full-fledged service intended for the developer community in order to reduce development time and costs. Moreover, this framework ensures the backward-compatibility of games with the new generations of Microsoft's platforms. Finally, games developed in XNA are exclusively distributed through Xbox Live, its online gaming service.

Through these examples, it is shown that the value proposition offered to gamers, but also to developers, largely rests on Microsoft's ability to assign its core competencies in the field of in-house software development in an original manner. This value proposition is embodied, for the first group, in a versatile and powerful console with numerous games, and for the second, in services aimed at improving their performance.

Development costs associated with consoles

Today, consoles are hybrid products, halfway between PCs and media centers. Though their main function is gaming, these consoles also allow the

user to watch films, listen to music, look at images, browse the Internet and play online. Moreover, it can be debated whether these 'secondary' functions, in terms of design, will not progressively supersede the primary function. In other words, the value proposition embodied in a console depends more and more on the 'secondary' functions and the uses they cover.

These multiple functions and the associated technologies have a cost, however, which leads manufacturers to make painful sacrifices. Thus, with the exception of Nintendo (Wii), both Sony (PS3) and Microsoft (Xbox 360) sell their consoles at a loss. Manufacturers thus have no other alternative than to compensate losses on hardware sales by gains on software (YOFFIE & KWAK, 2006). This phenomenon feeds the price war between Sony and Microsoft. Indeed, since their launch, the Xbox 360 and the PS3 have both experienced several successive price drops. But these price drops are less a reflection of the protagonists' industrial power than they are of the marketing obligation of stimulating console sales in order to increase the user base, and through a feedback effect, to give incentive to studios to develop more games for their respective platforms. In fact, the price drops consented to on hardware are not the result of economies of scale (at least during the launch phase). They aren't the result of lowered unit prices for internal components either. Some of these components are often developed or co-developed specifically, such as CPUs and GPUs, and are fixed costs.

Once the characteristics of the various components that equip game consoles, as well as their cost, are examined in greater detail, it is easier to understand the difficulties faced by console manufacturers. According to the information provided by iSuppli Market Watch (November 2006), the distribution of costs by component for the PS3 (20 and 60 GB models) in November 2006, *i.e.* at the console's launch in Japan and North America, a 60 GB PS3 sold $599 at the time of launch cost $840 to manufacture, whereas the 20 GB model sold for $499 and cost $805 to manufacture. These numbers are based exclusively on raw materials (excluding marketing costs and software development) and the retail price is that set at the console's North American launch. In other words, Sony lost $241.35 on each 60 GB PS3 sale and $306.85 on each 20 GB PS3. In these conditions, it is necessary for the console manufacturer to compensate its loss by releasing a large number of games, if possible blockbusters.

At the launch of the Xbox 360 (Premium version), the loss on the sale of each console was much inferior to that of the PS3 at the time of launch. Indeed, at the time of launch the price of the Xbox 360 in North America was

$399 whereas its manufacturing cost (excluding marketing and software development) was estimated at around $550. The loss per console was thus only $150, 50% less than the loss on a 60 GB PS3 and 60% less than the 20 GB model.

Game consoles are products with a very high technological content, which incorporate highly sophisticated software and hardware components, often developed specifically. The power of CPUs has a cost for console manufacturers, but also for developers, mainly second- and third-party. Indeed, the complexity of current platforms is such that development costs have literally exploded over the past few years and deadlines have lenghthened.

The design of a video game requires that multiple and rare competencies be drafted. It covers several steps, among which design, preproduction, production, post-production (testing) to lead to a master which will be given to the publisher (and/or console manufacturer in charge of duplicating and packaging). The design process is approximately 12 to 20 months long. Today, the cost of developing a game is somewhere between €5 and 20 million, these costs incorporating development and associated investments (engines, SDKs), duplicating, packaging, marketing and retail and specialized retail distribution. Specialists all admit that the break-even point of a game developed for a latest-generation console and sold €50 (LE DIBERDER, 2001) is at least 100,000 units. The development of a game requires specific software tools: game engines which are pieces of software (middleware) dedicated to video game development and intended to manage the various functions of a game. It is a complete software framework which allows developers to assemble the various creative data: graphics, sound, physical interactions (gravity, deformation) and AI. For each of these elements, there are also dedicated engines. Each game engine is unique.

These various software suites of engines (3D, physics) are usually created by specialized publishers who sell (under licence) their software to developers to create games. Though these engines are usually multiplatform, they are nevertheless developed for a specific console and more or less efficiently withstand porting to others. Indeed, the performance of these engines is intimately linked to the technical specifications of the consoles for which they were developed. *De facto*, the complexity of these engines has naturally followed that of consoles, making game engines complex tools, even for professionals. For a development studio, the choice is thus whether to buy or develop – partly or fully – the engines necessary

for their game.   However, the investment that the development of game engines represents today is constantly increasing, which makes breaking even difficult, sometimes impossible, with a single or even a collection of games. In the face of increasing development costs and cycles, studios have ever more incentive to create multiplatform games (multi-homing). This explains the reluctance of third-party developers to sign exclusive contracts for their flagship games.

■ Conclusion

The video game industry is very peculiar – it is a platform industry characterized by the existence of crossed network externalities, which demands that manufacturers be able to reconcile the interests of both sides of the market: third-party developers on the one hand, gamers on the other. In this perspective, the value proposition made to these communities must be attractive enough to trigger crossed externalities. *De facto*, the console manufacturers' ability to generate revenue depends on their ability to reconcile the interests of two complementary communities of specific players. This explains why Sony's and Microsoft's BMs are quite similar. By contesting Sony's leadership, Microsoft acted like an insider by developing a 'Me-too' offer (PORTER, 1998), *i.e.* an offer that is very similar to Sony's. The core competencies used by Sony and Microsoft are indeed different, and this is normal insofar as core competencies are idiosyncratic and intricately linked with each company's culture and history (context-specific). But overall, the value generating mechanisms brought to bear within the framework of their respective BMs are identical. Similarly, the governing structures and the pricing models set up to manage relationships with the various partners within their respective value networks are similar.

Yet Microsoft and Sony today remain far behind Nintendo and its Wii. Sony's and Microsoft's example illustrates that core competencies do not discriminate on performance as much as the positioning choice made upstream when the strategy is established. Even so, this does not mean that it is impossible to innovate within the business model. Proof of this is the recent announcements by Dell and Acer, who wish to enter the video game market by offering two consoles equipped with open-source OSs, based on various versions of Linux. If these announcements materialize as consoles, not only will the industry's dominant BM be affected, but all the relationships with members of the value network – and mainly developers – will change.

Third party developers will thus no longer have to use development kits and engines specific to each console. The OS no longer being proprietary, it would become possible to develop games indiscriminately for each console. This phenomenon could 'disqualify' Sony's, Nintendo's and Microsoft's offer. Furthermore, second-party developers could also emancipate themselves from the relationships binding them with console manufacturers. In definitive terms, the entire cost structure and distribution of value within the industry would be altered.

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