

**Trends and Trajectories in the Mobile Gaming Industry:
Innovation, Competition and End-User Preferences**

A dissertation submitted to The University of Manchester for the degree of M.Sc.
in Science and Technology Policy and Management in the Faculty of Humanities.

2007

Hung-Hsuan Denny YEH

Manchester Business School

CONTENTS

1. Designers, Producers and Users in the Innovation Process.....	9
1.1 Introduction.....	9
1.2 Innovation Theory.....	10
1.2.1 Product Innovation.....	11
1.2.2 Innovation Process.....	13
1.3 Organisation of Innovation.....	15
1.3.1 Dynamics of Innovation.....	15
1.3.2 Dominant Design.....	17
1.4 Users in the Innovation Process.....	18
1.4.1 End-users and Innovation.....	18
1.4.2 Factors and Trends in Diffusion and Adoption.....	20
1.4.2 Factors of Adoption for Mobile Gaming Consoles.....	21
1.5 Conclusion.....	23
2. Portable Gaming: Industry Trajectories and Take-up Trends.....	25
2.1 Introduction.....	25
2.2 Actors in the Production and Marketing of Video Games.....	25
2.2.1 Dimensions of the PGC Industry.....	27
2.2.2 The History of Portable Gaming Consoles Industry.....	27
2.3 Current Portable Gaming Consoles Available.....	28
2.3.1 Nintendo®- Dual Screen™.....	30
2.3.2 Sony- PlayStation®Portable™.....	31
2.3.3 Tiger Telematics- Gizmondo®.....	32
2.3.4 Nokia®- N-Gage™.....	33
2.4 Comparisons of Current Popular Consoles.....	34
2.5 Research Questions for Investigations in The Study.....	37
2.6 Conclusion.....	38
3. Methodology.....	40
3.1 Introduction.....	40

3.2	Orientation to the Study.....	40
3.3	Selection and Development of Research Tools.....	41
3.3.1	Population and Samples for The Study.....	43
3.4	Selection of Materials and Respondents.....	44
3.4.1	Background Information with regards to the Interviewees.....	45
3.5	Organisation of Data Collection and Analysis.....	46
3.6	Conclusion.....	48
4.	The Portable Gaming Innovation Processes- The Views from Producers and Retailers.....	49
4.1	Introduction.....	49
4.2	Product and Process Innovation.....	50
4.2.1	Product and Process Innovation at Gizmondo.....	50
4.2.2	Product and Process Innovation at Nintendo	51
4.2.3	Product and Process Innovation at Sony.....	53
4.3	Marketing, Retailing and Diffusion of Portable Gaming Consoles.....	55
4.3.1	Marketing Strategies.....	55
4.3.2	Product features and Diffusion Process.....	57
	The relationship between Producers and Retailers of the Portable Gaming Consoles.....	60
4.5	Conclusion.....	63
5.	Quantitative Research- Online Survey Analysis.....	65
5.1	Introduction.....	65
5.2	The Orientation and Structure of the Study.....	65
5.3	The user demography and Ownership of Portable Gaming Consoles.....	67
5.4	The Appeal of Innovative features to Consumers	69
5.5	Console Connectivity and Network Gaming.....	70
5.6	An Analysis for the Factors of Adoption.....	71
5.7	Selection for Purchase and Recommendations for Future Innovation.....	74
5.8	Other Factors to Consider With Respect to Adoption.....	75
5.9	Conclusion.....	77

6. Synthesis: Networks and Relationships in the Product	
Development Process.....	80
6.1 Introduction.....	80
6.2 Innovative Strategies and Accountability of End Users.....	80
6.3 Interdependent Relationships between Manufacturer and Publishers.....	81
6.4 New Product Development and End User-Led Innovation.....	82
6.5 Conclusion.....	85
7. Conclusion: Embracing Users in Mobile Gaming Innovation.....	87
7.1 Introduction.....	87
7.2 Research Context, Theories and Practicalities.....	87
7.3 Relationships of Actors in Portable Gaming Network.....	88
7.4 Suggestions for Further Study.....	89
Appendix 1: Sample of The Online Questionnaire For End-Users	91
Appendix 2: Analysis of The Online Questionnaire For End-Users.....	96
Appendix 3: Other Information Denoted from the Online Questionnaire.....	97
Appendix 4: The Letter For Interview Arrangements.....	101
Appendix 5: Interview Questionnaires (Retailers).....	110
Appendix 6: Interview Questionnaires (Manufacturers).....	112
Glossary.....	114
References.....	116

Final Word Count: 24,373

LIST OF FIGURES:

Figure 1.1 A dynamic model of the innovation process	14
Figure 1.2 The dynamics of innovation	15
Figure 2.1 The Seven stages and inputs of the video games productions network	26
Figure 2.2 Nintendo Co. Ltd reported revenue in millions of USD at 1 USD = 120 JPY for fiscal year ending 3/31	29
Figure 2.3 Nintendo® Dual-Screen™	30
Figure 2.4 Sony PlayStation®Portable™	32
Figure 2.5 Gizmondo®	32
Figure 2.6 Nokia® N-gage™	33
Figure 5.1 Time Length of Ownership of Current Consoles	68
Figure 5.2 End-Users' Motives for Purchasing Portable Gaming Devices	73

LIST OF TABLES:

Table 2.1 Cumulative Production Shipments of PSP	34
Table 2.2 Tabulated Comparisons for the Current Popular Portable Gaming Devices	36
Table 3.1 Tabulated Data Collection and Organisation	47
Table 4.1 Drivers and Barriers for Innovation	55
Table 4.2 Comparison Between Level of Marketing and Innovation for End-Users	62

ABSTRACT:

There are overwhelming amount of interests in the exploration of business opportunities and commercial profits for gaming markets around the world. More specifically, the abrupt rise of potential profits for portable gaming market has caused incumbents to face tougher battles against teething new entrants competing for the world market share. Therefore it is becoming a much more interesting issue to discuss whether consumers, i.e. the end-users are taken into account regardless internal or external operations of their businesses. This paper aims to investigate in three broad areas which are also interrelated within the industry.

First, to explore the current product and process innovations from various portable gaming devices, especially with respect to end-users. Second, to discover the importance of retailers in its relationships to both the console manufacturers and end-users. Moreover, the benefits which created by the above linkages between manufacturers and retailers for consumers are highlighted. Finally, an amalgamation of views from a collection of gamers are analysed in order to provide alternative and more specific thoughts towards the current developments and future prospects of portable gaming. This paper concludes that there are several similarities in terms of the essence elements for product innovations between the manufacturers and end-users.

However, some technical specifications such as the screen resolution and graphics which said to be ignored by one firm may proved to be costly in terms of their future competitiveness of the market. Overall, this paper provides a taste of views from the three interrelated parties which enable the author to tackle the issues from all angles in order to generate a more balanced approach. Lastly, consideration with regards to end-users should be given prior to, during, and after product design and innovation processes.

DECLARATION:

No portion of the work referred to in the dissertation has been submitted in support of an application for another degree or qualification of this or any other university or other institute of learning.

COPYRIGHT STATEMENT

The following notes on copyright and the ownership of intellectual property rights:

- (1) Copyright in text of this thesis rests with the Author. Copies (by any process) either in full, or of extracts, may be made only in accordance with instructions given by the Author and lodged in the John Rylands University Library of Manchester. Details may be obtained from the Librarian. This page must form part of any such copies made. Further copies (by any process) of copies made in accordance with such instructions may not be made without the permission (in writing) of the Author.
- (2) The ownership of any intellectual property rights which may be described in this thesis is vested in the University of Manchester, subject to any prior agreement to the contrary, and may not be made available for use by third parties without the written permission of the University, which will prescribe the terms and conditions of any such agreement.
- (3) Further information on the conditions under which disclosures and exploitation may take place is available from the Head of the School of Manchester Business School.

ACKNOWLEDGEMENT:

There are several people who I would like to pay tribute to and without any one of them I would have been able to complete this dissertation.

First of all, I would like to thank my mother who is the main driving force of my educational progresses. By doing so she has kept most of her savings available in order to support every aspect of my expenses. Her kindness and love is very much appreciated and I am indebted to everything she has done for me. This dissertation is dedicated to her.

Secondly, I would like to thank my dissertation supervisor Dr Lawrence Green for his invaluable advices and tremendous amount of support throughout the process and eventual realisation of this dissertation. The amount of help which he offered me was incredible and I am very thankful for his generosity.

Last, but not least, I would like to thank Mr James Beaven from *Indigo Peral/Gizmondo*, Mr. Nick Sharples from *Sony Computer Entertainment Europe*, Mr. Yo-Chen Tseng from *Nintendo Taiwan* and various personnel from *Game* and *HMV* for agreeing to be interviewed while sharing their invaluable experiences and expertises without hesitation.

THE AUTHOR:

Hung-Hsuan Denny YEH gained a BSc (Hons) in *Mathematics and Management science* from University of Manchester Institute of Science and Technology (UMIST) in 2004. He then went onto study an MSc in *Science and Technology Policy and Management* from the University of Manchester. After studying various innovation processes-related literature he began to develop interests in this area and decide to write an dissertation based on those concepts. After several discussions amongst his follow students and friends he eventually came out with an idea by linking some interesting innovation theories into practice assisted by his own gaming experiences, which has been accumulating throughout many years.

Chapter 1- Designers, Producers and Users in the Innovation Process

1.1 Introduction

For decades there has been an increase in the level of research being conducted in relation to the issue of Research and Development (R&D). More recently, attention has turned specifically to the dynamics, organisation and outcomes of innovation. Large firms have found themselves under enormous pressure to maintain or increase their competitiveness as they combat rivals and new entrants in an ever-changing and increasingly globalised business environment. Many firms have become more aware of the role of ‘innovation’, and have reconfigured or reinforced their innovation activity in an attempt adjust to rapid rates of product substitution and prevent their market share from becoming diluted by dynamic incumbents and newly established competitors (an approach or strategy that is in line with classical economic theory). At present, almost all firms are committed to engagement in some form of R&D activity and innovation is frequently embedded as a component within business strategising. There is a common understanding within business and management studies that firms, especially manufacturers, will innovate via undertaking R&D (although this is perceived as involving very expensive and risky investment) in order to develop “faster, cheaper and higher quality” products. There is also an understanding that commercial organisations will invest in and roll-out process and service innovations wherever possible as these too are perceived “as a source of competitive advantage” (Tidd et al, p.5).

The research developed below takes these basic understandings as a platform and is designed specifically to investigate one increasingly important theme in the study of innovation management and dynamics. The work is centrally concerned with the innovation process and its dynamics and is configured to examine the role of users (i.e., consumers) in informing or shaping the innovation process. In order to make the task manageable, this examination is focused on one industry, namely, the Portable Games Console (PGC) industry, and is configured to determine the extent to - and ways in - which end-users (in this case PGC ‘gamers’) are a focal point of in the innovative

activities of PGC producer companies. Thus the study poses the question, ‘how are end users engaged in the innovation process, and in what ways do they shape trends and trajectories in the development of new iterations or generations of video-gaming consoles?’ Underlying this study is the notion that the relationship between videogame producers/designers and end users has thus far been relatively ambiguous – little is known about the level and form of interaction between PGC developers and the community of users that they serve. Of course, we are aware that specific videogames or game consoles are rarely if ever tailored to a specific end-users’ needs, though we might expect that producers will operate/innovate with some ideas relating to the characteristics and features that will be favoured by a group (or various groups) of users. What is less known is how these ‘ideas’ are formed, and the extent to which they reflect the reality of users desires. What is also ambiguous is the extent to which user-needs – where these are taken into consideration in the innovation and product development process – are reflected accurately in the products that are released to market: ‘new’ and ‘innovative’ features may or may not be useful from perspective of the ‘mass’ of end users. This study will address these issues and ask how users’ desires and preferences have been incorporated into the PGC development process and with what implications and levels of success. It will also consider the producer-user feedback and communications loops that exist in the PGC industry and examine their significance and effectiveness as a tool for improving (a) console products and user experience, and (b) the competitiveness of console producers.

1.2 Innovation Theory

Tidd et al state that in order for firms to achieve advantage over others they must compete via the introduction of new and improved products (i.e., they must engage in product innovation) (2001, p.5). The increase in competition witnessed in many industries in recent years implies that, in general, products have had reduced life cycle. Firms are coming under increasing pressure to release new products in order to prevent their current range of offerings from being replaced by competitor’s products. The increased urgency can cause less competitive firms to be repositioned (i.e., down-graded) or, in the worst case scenario, driven out of the market. Process innovation can be just as

important as product innovation where an increase in the complexity and sophistication of products has led to increased production costs. Specifically, where a firm is able to introduce process innovations that minimise production costs or ensure that the manufacturing process is made more efficient, then their competitive advantage will be enhanced. Similarly, process innovation that delivers greater productivity, better quality goods or the bundling of goods and complementary services is likely to result in improved competitive advantage.

According to Tidd et al (2001, p.6), 'innovation' is normally associated with "changes", especially "technological changes" – others, for example, Cawson, Haddon, and Miles (1995), assert that innovation is centrally concerned with the production of 'novelty', either 'making new things' or 'making things in new ways'. This latter conceptualisation captures neatly the distinction between 'product' and 'process' innovation. However, recently, the interrelationship between product and process innovation has received more attention and the frequent co-dependence of the two has become more visible. For example, in the online video gaming sector, the inception of the 'mass multiplayer online game' (MMOG) was perceived first as a product innovation, one that had become possible as a result of the invention/diffusion of the internet and the availability of web peripherals. However, the development of associated (ICT-mediated) services in the past two decades has facilitated the production of MMOGs in which the quality of services for assisting online game-play and improving after-sales experience have become crucially important: the ICT and technology infrastructure and the facilitating and enhancing services have become strongly entwined and mutually reinforcing.

1.2.1 Product Innovation

The importance of product innovation initiates from its product life cycle, which "assess competitiveness constantly to existing product adaptation" (Littler, 1994, p.296). The significance of the above definition is that it deviates with respect to technological and customer tastes and preferences. The development of a new product is a part of "product planning processes" which are often being criticised by adopting the traditional marketing strategy. Often, the intrinsically logical and rational analysis of the business

environment means that firms often ignore subjectivity of the analysts, the bounded rationality of decision making, and political context of organisation. Hence there exists uncertainties around decision-making process (Littler, 1994, p.296). Evidently, according to Booze, Allen and Hamilton (1982) only one in seven product ideas will lead to successful product launch. They also perceive that cost of failures is one of the main risks which many firms need to overcome, but are often risk-averse in new product development. More specifically, Freeman (1990) states that there are three main uncertainties associated with new product developments. First, “marketing uncertainties” represent difficulties in predicting the firm’s product appeal and the intensity of competitors within the market. In addition, the reactions of targeted customer can often be unpredictable let along unforeseen technological problems derived from “technological uncertainties”. For example, innovations for specific components of PGCs such as battery technology has taken over a century to develop, which means that the timing and costs of product development can be hampered significantly. Finally, there exists “business uncertainties”, which are the randomness and difficulties to forecast events every business (Littler, 1994, p.297). The uncertainties mentioned above do not stop inventions taken place nonetheless, from an invention to be processed into an ‘innovation’ requires it to be tested by the market. Successful invention in consumer products can only occur when a product or a technology finds its buyers. Historically, there have been many cases where firms who invented or acquired ‘better’ technology but failed in gaming industry. For example, Sega’s Saturn failed to capture the home console market since its superior 128 bit was released. Another example was Nintendo’s success to dominant the portable gaming market when its original Game Boy adopted ‘inferior’ battery technology to enhance duration of game-play.

The processes of which many successful innovations are conducted over time are often derived from progressive iterations. A mature product such as compact-disk (CD) had been imaginatively reconfigured and subsequently ‘re-worked’ from useful marketing intelligence which directly reflect to majority of the users’ needs. For instance, advent of recordable CD in the 1990s is considerable to the importance of post-purchase innovation in CD-based products on the part of users (Cawson et al., 1995, p.296). Therefore the

incorporation of users into innovation processes is important for firms to adjust and configure their technological trajectory in order to generate successful innovation.

1.2.2 Innovation Process

Feedback is a crucial ingredient of the process of innovation itself (not just interpreting the sales figures and diffusion circles of past products). Cawson, Haddon, and Miles (1995) stated that innovation is seen as a “continuous process rather than a series of discrete events” (Cawson et al., 1995, p.242). The above authors aimed to investigate how the relative actors such designers and marketers “incorporate knowledge of consumer markets and consumer behaviour into the process of innovation”. For example, a maturing product such as a tape recorder, is said to be the driving force of radical innovation behind its important incremental innovation. The past experiences and feedbacks are critical in the provision of information for new products development, hence processes of innovation are “iterative” (Cawson et al., 1995, p.245). Moreover, “the concept of the ‘product space’ is useful in defining the boundaries of radical innovation” Cawson, Haddon, and Miles (1995, p. 245). For example, the video game industry is so far seen as multi-platforms. As a new game is being developed considerations are given to whether the game can be configured and marketed onto different formats, which increases its product space to attract larger variety of gamers with different consoles. Many games such as ‘Football Manager’ are available in PC, portable gaming consoles (PGCs) and various home consoles. The process of innovation can be illustrated by Figure 1.1 which is linked with continuous feedback loops with the model containing essential elements of the innovation cycle (from product concepts, designs, through to markets).

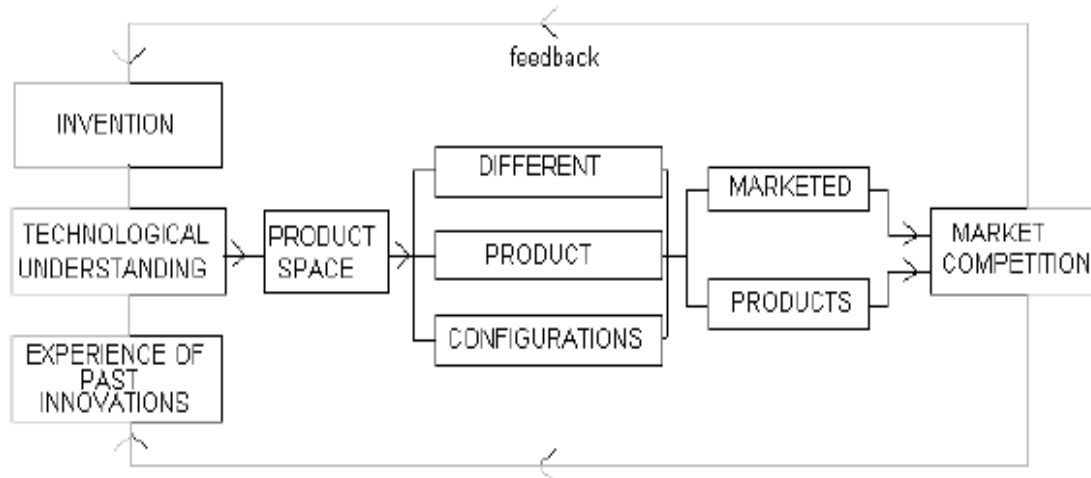


Figure 1.1 A dynamic model of the innovation process (adopted from Cawson, A, Haddon, L. and Miles, I. (1995, p.246))

The model explains that the boundaries of a new product space will emerge after the amalgamations of new ideas and experience of past innovations, which leads to better technological understandings for firms to absorb. At the far right of the model is the market place which is where the existing products are tested by consumers and against each other. The market, according to (Cawson et al., 1995, p.246) is defined as “a set of relationships between producers, and between producers and consumers, which can be shaped by the actions of producers just as it is determined by the decisions of consumers”. What is crucial for a product to be successful is the anticipation of ‘post-purchase’ or ‘re-invention’ from producers by collections of innovation about consumer behaviour, as well as its feedback into reconfiguration or redesigning the products in order to match them closely.

The marketing in traditional sense can mean that pedestrian innovation causes problems such that consumers find it difficult to visualise innovative products based on their experiences (Rosenbloom and Abernathy, 1982). Therefore it is necessary to construct a close liaison with customers. It is believed that marketing must also assume responsibilities for devising a strategy that meets the business’s objectives for the innovation. Formulate total offering by launching and follow on a campaign in order to stimulate acceptable rates of diffusion (Littler, 1994, p.298). For example, Japanese

consumer electronic companies seem not to employ conventional market research techniques. However, their focus, according to Sony, is on the early stages of marketing knowledge is embodied. In doing so they have developed rigorous systems of testing prototype products both with early adopters. Firms which monitor post-purchase use of the products are able to take advantages of consumer-invented innovation and incorporate them onto the knowledge base.

1.3 Organisation of Innovation

After considerations of product innovation and the process that sharpens innovative features of iterations it is crucial for firms to organise innovations efficiently and effectively. Albeit from enormous cost for failure, there are various stages which firms are required to experience in order to reach the standardised prototype of a product.

1.3.1 Dynamics of Innovation

Product innovation can be denoted by the Abernathy-Utterback model (figure 1.2), which describes the three phrases with respect to rate of major innovation.

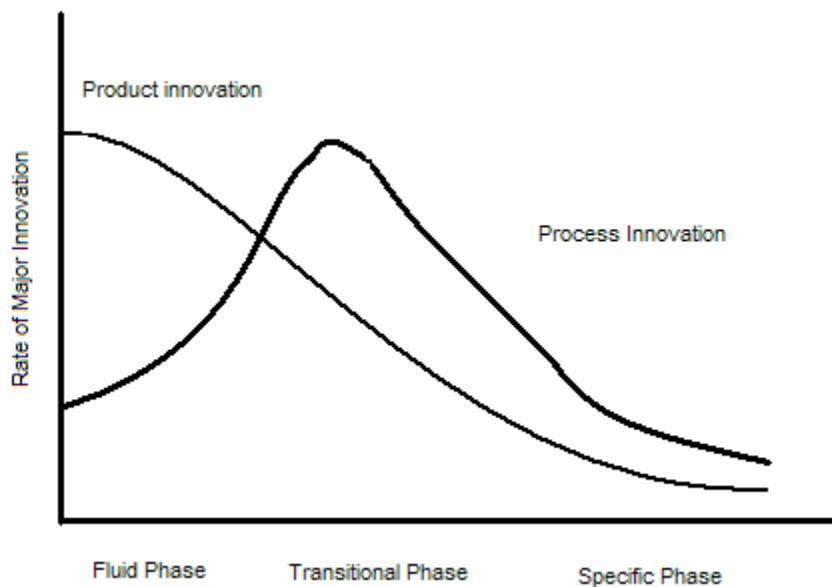


Figure 1.2 The dynamics of innovation (adapted from Utterback, 1996)

According to Utterback (1996), the primary concern for firms at “fluid phrase” is to experiment with trial-and-error in terms of product design. At this stage the process innovation is less rapid as firms are trying to comprehend and from previously gathered

experiences towards the new product development. Once the product is manufactured and it is then released into the market to compete against other competition. When the innovation reaches the “transitional phrase” the product introduced in the competitive market force constantly moulds the product features where innovation process reaches its peak gradually stabilised to decline in line with the variation of the product. From then onwards, according to figure 1.2 the production is the most efficient considering process innovation is at its prime and products become more standardised to best suit customers’ needs. As a result, the speed of production is faster therefore time-to-market becomes more efficient. Lastly, in the “specific phrase” both product and process innovation comes to the end of their cycle. These industries become very focused on “cost, volume, and capacity” (Utterback, 1996, p.17-19). This is where the notion of “dominant design” prevails. According to Utterback, “radical product innovation eventually ends with the emergence of a dominant design” (Utterback, 1996, p.81). Therefore influences from market forces is intimately related to shape product’s features, with respect to firms’ required efforts in product and process innovation. From the product innovation curve above, the future forecasted performance is not certain. The curve declines more rapidly as the market forces which reduce the rate of product change and innovation starts to prevail. As the level of incremental innovation increases innovation-led product performance becomes more difficult due to great “standardisation” (Utterback, 1996, p.82). There are several tools developed by James (2005), Cooper (1988), and Takeuchi and Nonaka (1986) which are used extensively to facilitate product innovation management. For instance, the introduction of product development funnel has been used extensively to conduct innovation. There are three stages starting from ideas generation, project selection, and product development. Feasible projects are determined by probable costs of development, probable income streams, and probable of success—both technologically and commercially. It has a long term perspective and also can be useful to determine competitor’s reaction. In addition, Cooper’s (1988) stage-gate process stretches the route starting from idea generation, feasibility, prototype, development, to implementation. However, despite the efforts for firms to increase their ability in identifying failure at the early stages of new product development the operation

to facilitate sales with other mediums and after-sale services can often be neglected which hinders a firm's ability to achieve dominant design.

1.3.2 Dominant Design

To achieve a dominant design paradigm there Cawson, Haddon and Miles (1995, p.38) state that “complementary assets” and “services” are the main factors which influence the success of firms as innovators or imitators. Therefore, marketing and after-sales support as well as complementary technology are both important. For example, in ICT industry the supply of software is necessary to realise the value of hardware. This explains the interdependence between the two core functions of many IT firms. Moreover, technical capabilities in terms of design and production (reliability and price level) and ‘images’ of supplier can also influence successes for innovation. For instance, even one of the largest corporations such as Sony had to restore confidence of their perspective consumers by making efforts to innovate higher quality and more reliable product in order to eradicate the image of poor quality from the early years of productions. Moreover, imitators can add appealing new design characteristics and also play a key role in shaping the emerging paradigm. In terms of portable gaming, Sony can be a perfect example of a well-established latecomer gaining market dominance without substantial technological advances. For example, despite Sony's PlayStation not being technological superior it was more competitive than other home consoles. This is because their ability to attract more game developers by providing more accessible tools and supports. It is especially the case when Sony successfully facilitated CD-ROM technology in terms of by previously abandoned Nintendo.

Incumbents often advertise in established market presence in order to increase product penetration and observability. To challenge established firms with ability to imitate, firms may be able to attain privileged know-how despite lack of complementary assets. The ability to maintain a strong lead in product development to gain market leverage can lead to obtain important complementary assets and therefore establish new models as the design paradigm. The ‘privileged’ information according to Cawson, Haddon and Miles (1995, p. 39) are derived from end users. For many firms end users possess useful

information such as points of purchase and obtain products; access to services, and; even access to the second hand markets. Hence firms can become less competitive if product manufactures' information is imperfect with respect to their end users' 'factors for adoption' (e.g., purchasing decisions, game-playing habits, or even likelihood of modification regarding the products).

1.4 Users in the Innovation Process

Potential users need to be exposed to information about innovation in order to consider adopting it. The more people that have adopted an innovation, the more likely they are to be exposed to information about it. The behaviour of end users' vary widely and their characteristics for adoption distribute widely over the spectrum with so called 'early adopters' at one end and 'laggards' at the other. In terms of diffusion trends early adopters are the best-located in the networks of information flows whereas laggards are much more isolated from first hand-information.

According to Shaw (1994) the role of users can be defined as "the links between users and suppliers which are vital to the effective management of the innovation processes" (1994, p.276). In addition, Rothwell (1977) mentioned that understanding user needs of good internal and external communications are crucial to successful innovation. According to Gardiners and Rothwell (1985) the advantages for innovation involving users are orientated around the manufacturers in both pre-launch and post-launch of their products. Users can assist firms by providing feedback in terms of product performance and game-play experiences where it can be useful for producers to optimise design specifications. In addition, as innovations conducted continuously users in processes of learning experiences in terms of product usage tend to be accumulated and gain acceptance in operating new equipment. Once producer-user relationships are connected and maintained the life cycle of a product can therefore be extended due to continuous flows of user-initiated improvements (Shaw, 1994, p.277).

1.4.1 End-users and innovation

Von Hippel (2005) claimed that users centred innovation computing and communication technologies. He used the word “democratized” meaning “users of products and services are increasingly able to innovate for themselves” (von Hippel, 2005, p.64). Due to technical reasons such as design capabilities users are increasingly aware of various forms of collaborations, combination and coordination via communication (noticeably internet forums, chat-rooms).

Von Hippel (2005) argues that reason for the causes of user-innovators is mainly that the users are not satisfied by the products released from the manufacturers. However, as the producers do not directly in contact with their consumers many information regarding useful user needs are often ignored. Despite acting as a medium retailers are mostly concerned with driving sales promotions but not enough attention is focused on providing the “functional” or “innovative” feedbacks from users (von Hippel, 2005, p.65). Hence more experienced gamers have tendency to make adjustments or even reconfigure in relation to the purchased products. In terms of functionality Riggs and von Hippel (1994) found that “users tend to develop innovation that are functional novel” whereas manufactures tend to focus on the improvements on current existing knowledge. This type of innovation can be seen as incremental. From the summarised finding Urban and von Hippel (1988) drew from the empirical evidences that product modification and product development are amongst the most significant contribution from users. For example, in their finding of cases regarding computer aided drawing (CAD) software, there exists information asymmetry between users and manufacturers (Urban and von Hippel, 1988).

In terms of consumers/end users, Jeppesen believes that they possess valuable productive knowledge which could be important sources of innovation (Jeppesen, 2001, p.7). In addition, the main sources of innovation are believed to be the “active individuals” which are able to generate solutions to problems for themselves and other users. This is seen as a form of new knowledge which can only possibly be spilled over when there exists some kind of interaction between each end users and producers. More specifically, the context can be adopted as the intensity of interaction between end users and producers in the

computer games industry. Similarly, in terms of the degree of end users competences, the level is respectively the same from Jeppesen's findings (Jeppesen, 2001, p.12).

It is important that the end users often have the ability to absorb external information and knowledge- innovative capabilities. As we can see from the early developments of hardware (consoles) or software (video games) the technological innovation trajectory is "path-dependent". Effectively, these represented as the accumulated experiences and knowledge in the past leads to "cognitive structure", which leads to assimilation of new knowledge. Cohen and Leninthal (1990) confers that learning is most effective when innovation is generated from the accumulating knowledge base and hence this type of innovation process is incremental. Moreover, Jeppesen (2001) argues that gamers and game producers in the videogame industry share "similar bodies of knowledge" (Jeppesen, 2001, p.17). The linkages between the two communities have been historically strong.

1.4.1 Factors and Trends in Diffusion and Adoption

The diffusion of innovation can be defined as "the process by which a population comes to adopt new ideas or products" (Cawson et al., 1995, p.23). Many studies such as Kleijnen, Ruyter and Wetzels (2002) have examined diffusion and adoptions of users in mobile gaming industry. Despite a relatively new industry, the total numbers of mobile gamers are predicted to rise rapidly from 43 million in 2001 to 850 million by 2006 (www.arcgroup.com). In addition, Durlacher (2001) added that there are high expectations placed upon mobile gamers to generate around 8.1 billion Euros by 2005 and hence the mobile gaming industry has a potential to become one of the most profitable business in the service sector industry. Even though the portable gaming industry is relatively less researched there are many characteristics which mobile phones and PGCs have in common. The diffusions of 'portable products' are not only just being 'diffused' amongst the users despite the fact that consumers play an important role in promoting products to potential purchasers. As a portable product, PGCs "product visibility" can be even achieved spontaneously by the users and amongst the users themselves (Cawson et al., 1995, p. 52). Nonetheless, product diffusion can be initiated

from window display of retailing stores. Powerful retail chains are often sufficient enough to influence manufacturer's strategies. There are evidences shown by promoting a new product using a major chain can have dramatic influence on its market success. The effect can then be strengthened by hobbyist magazines in newsagents can also be very useful in promotion of products for game publishers.

1.4.2 Factors of Adoption for Mobile Gaming Consoles

According Kleijen, Ruyter and Wetzels (2002) (adopted from Rogers' (1995)) amongst the major factors with respect to the influences in the adoption of mobile gaming applications. These are "relative advantage"; "compatibility"; "complexity"; "communicability" and; "trial-ability". In addition, "critical mass" as well as "payment options" are also included in their research for factors of adoption for mobile gamers (Kleijen et al., 2002). The factors below will also be used to test the significance in reflection to this study.

1. Relative advantage: It is simply not persuasive enough for consumers to adopt new technologies if the amount of potential benefits are not great enough. The barriers of time and space can be removed which many gamers perceive these elements as the main advantages for using a portable gaming console.
2. Compatibility: It is explained by Rogers (1995) as the correlation between the current product innovation and the existing values; past experiences and expectations from potential adopters. The ultimate question to ask is 'whether mobile gaming can become an integral part of gamers' daily activities.
3. Complexity: It is also known as ease-of-use, which can be denoted as "the extend which an innovation is perceived as relatively difficult to understand and use" ((Rogers, 1995, ; Agarwal, 1999, ; Karahanna, 1999, ; Plouffe, 2001, ; Kleijen et al., 2002) cited in (Kleijen, 2002, p.207)). Design is also said to be closely related to hand-held devices. Technological specifications such as use of touch-screen, directional control and navigation are all are all the main determinants of preferences for end-users. More specifically, the above authors also believe that "navigation or manoeuvring ergonomics" are critical in terms of network gaming.

4. **Communication:** The amount of social influences in terms of adoption processes can be as critical as other factors mentioned before. According to Plouffe (2001), this factor can be elaborated as the extent to which an individual believes that an innovation will provide him/her value-added effects such as prestige or status within his/her living community.
5. **Trial-ability:** It is the degree of limited experimentation allowed for en-users with respect to an innovation (Rogers, 1995). In this respect, Rogers (1995) addresses the importance of “consumer preference” by indication the increase popularity of personalised configurations and items such as type of games users like to play. The current latest concept of ‘smart ads’ provided by Gizmondo aims to exploit this factor, which their marketing strategy simply provide only the ‘useful’ information for each individual gamer regarding every end-user’s preferences.
6. **Critical Mass:** According to Fang (1998) it can be described as “the most widely available medium” within users’ communication community. Critical mass is defined by Kleijen (2002, p.208) as “the minimal number of adopters of an interactive innovation for the further rate of adoption to be self-sustaining”. The so-called playground of mobile gaming is expanding to a global level and therefore interactive innovation are (especially in network gaming) are heavily depended on the existing users who have already engaging themselves in the innovation.
7. **Payment option:** It is the final factor which even though it might not currently be a very important factor with respect to portable gaming users it will be affecting many end-users in the foreseen future. On one hand, the support of internet and GPRS enabled properties are becoming more apparent for the encouraging users to play network games. On the other hand, consumers are becoming more aware of the services which can potentially be costly for them if they were to engage in network gaming play. The costs of using these services can be very diverse. They are depended on various factors such as networks, duration, and type of games. Therefore many gamers may be cautious in deciding whether to use the services and may become reluctant to purchase network games if they are put off by additional charges. Hence the choice of investment on product (network gaming orientated) innovation may be questionable if the usage is very limited.

Consumers who delay adoption expect price reduction arising from market maturity. They also tend to expect electronic-based products cheapen over time. Both consumers and industrial purchasers may likewise anticipate rate of technological change, and fear their purchases will quickly become obsolete as performance/price ratio improves. In addition, the notion of product compatibility and lock-in can provide a persuasive guidance in terms of purchasing decisions in industries and consumer markets. Therefore it is important for producers to focus on incremental innovations in order to “ensure ‘backward compatibility’ with existing equipment and promise ‘forward compatibility’ with subsequent innovation significant impact on purchasing decisions”(Cawson et al., 1995, p.52).

1.5 Conclusion

Product and process innovation are dynamic and cyclical. Evidently, Utterback’s (1996) dynamics of innovation denotes that product and process are interrelated in the three phrases. Despite the fact that ‘product space’ is a highlight of technology spin-offs and it emergences present opportunities for new products but by no means guarantee successful innovation and has to be tested by consumers and end-users. In terms of consumer markets, organisational structures should collect and interpret data on market characteristics, feedback into the innovation processes. There are, however, difficulties of applying standard marketing research techniques to radically new technologies for consumer preferences and behaviour which are evident in Freeman’s (1982) uncertainties for firms to remain competitive.

James (2005), Cooper (1988), and Takeuchi and Nonaka (1986) gave their views that the in order facilitate managing product development the starting point is from ideas generation, project selection, to product development. In terms of processes of innovation ‘designers’ and ‘marketers’ according to Cawson, Haddon, and Miles (1995) is seen as continuous rather than discreet processes (Cawson et al., 1995, p.242). The resultant accumulation of continuous incremental innovations over time may lead to radical innovation. The past experiences and feedbacks together form critical

contribution in the provision of information for new products development. In addition, Cohen and Levinthal (1990) contends that learning is most effective when innovation is generated from the accumulating knowledge base and hence this type of innovation process is incremental. In terms of consumers/end users, Jeppesen believes that they possess valuable productive knowledge which could be important sources of innovation (Jeppesen, 2001, p.7). However, the difficulty exists when extracting the 'correct' information becomes costly and time-consuming, especially potential users' needs varies widely ranging from 'early adopters' to 'laggards'. Nonetheless, gamers and game producers in the videogame industry share "similar bodies of knowledge" (Jeppesen, 2001, p.17). Therefore good understandings of internal and external communications of user needs are crucial to successful innovation (Shaw, 1994). In addition, Rogers' (1995) five factors and Kleijnen, Ruyter and Wetzels' (2002) additional two factors which found to influence rate of adoption can be useful to examine end users of PGCs.

Lastly, to achieve a dominant design paradigm there Cawson, Haddon and Miles (1995, p.38) indicates that "complementary assets" and "services" are the main factors with significant influence. In terms of PGC industry the important actors are retailers and after-sales support from the manufacturers. Moreover, not only technical capabilities in terms of design and production, the 'images' of supplier can also influence innovative successes. Aesthetics such as 'fashion' can be crucial in terms of adoption and diffusion processes from the 'early-adopters' to attract attention to the 'laggards'. Thus the ability to marketise the product is crucial at the late stages of process innovation.

Chapter 2- Portable Gaming: Industry Trajectories and Take-up Trends

2.1 Introduction

This chapter aims to provide an overview of the nature, dimensions and growth of the PCG industry, and to introduce the current (and currently competing) generation of gaming consoles as manufactured by Gizmondo, Nintendo, Nokia, and Sony. The chapter will discuss the development and functionalities of the various consoles and the marketing and market performance of the main models (expected performance and the factors that might shape performance are discussed for those consoles that were awaiting release at the time of writing). Where possible, the significance and market positioning of each console in terms of its facilities and attributes, sales and targeted user-group is established. Readers may wish to note that the discussion and comparisons in this chapter are founded largely on secondary materials harvested from a variety of sources including industry notice boards, blogs, user commentary boards, and industry journal sites. At the close of the chapter, the key aims of the study are stated in the form of a list of research questions. Each question is explicated in turn and its salience and relevance – in terms of connections with the materials that appear in the previous and current chapters – is established.

2.2 Actors in the Production and Marketing of Video Games

The activities and inputs of the various actors at different stages in the production of videogames is captured neatly by Johns (2006), see Figure 2.1. The Figure shows development routes for the production of both videogame software and hardware. This graphic is useful as the current research is concerned with the organisation of innovation and innovation processes and routes in the development of PGCs. Indeed, as noted above, the study below aims to cover the many aspects of the production process from development, to hardware production to distribution and retailing (of both consoles and

supporting software), to consumption, and these are represented comprehensively by John's diagram. However, we may note that John's configuration presents a somewhat linear view of the innovation process and one that appears to contain little with respect to feedback and interaction loops. As the current study has a particular focus on the inputs of users/consumers at the various stages of development and production, it is worth noting that John's linear model could easily (and beneficially) be expanded to include feedback loops from the far-right box in the horizontal dimension (i.e., the 'consumption' box). Such feedback loops could connect 'consumption' with retailing, production and development activities and the various sub-boxes in the vertical dimension to each of these activities.

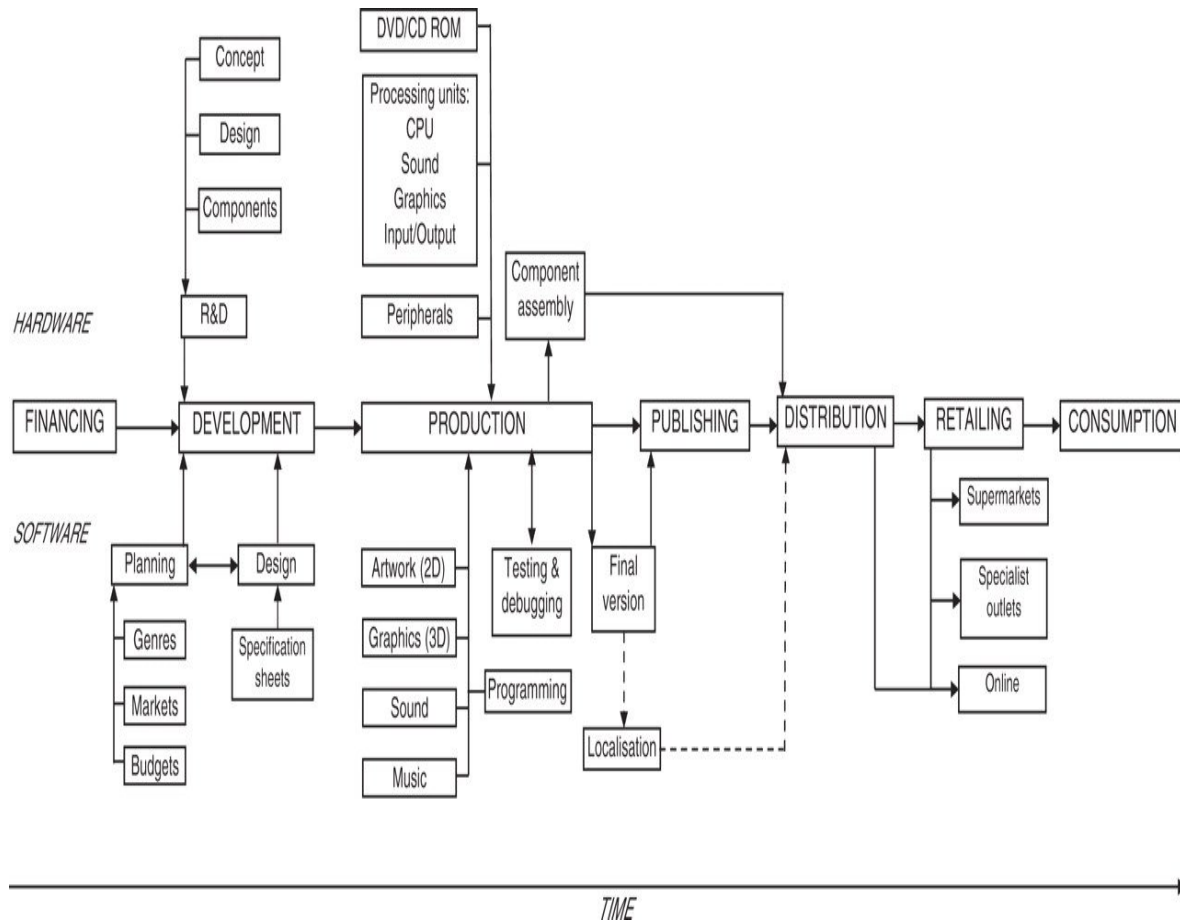


Figure 2.1 The Seven stages and inputs of the video games productions network (Adopted from Jones (2006, p.156))

2.2.1 Dimensions of the PGC Industry

Consumer expenditure on electronic media and entertainment in the UK is forecast to reach £12 billion by 2010 (up from £10 billion in 2002). In the UK, sales of console games increased by 44 per cent in 2003 with over 3.3 million PlayStation, Xbox and Nintendo GameCube boxes purchased (Mindbranch, 2003). Meanwhile, the gaming industry generated over £1 billion in sales, 40 per cent more than cinema box office spending in the same period.

Each generation of video game consoles builds on the past in an attempt to set new a new standard of functionality and user experience. As the company with the strongest heritage of innovation, Nintendo has set itself the goal of raising and meeting expectations for next-generation systems by employing a wide-ranging strategy to attract more classes of gamers to more kinds of games. Hand-held products, whether consoles or phones, are perceived to be likely to become increasingly profitable in the coming years and their consumption is understood to offer important opportunities for both established and entrant brands in the mobile entertainment/utility market. Research by Demos in 2004 indicated that each person in the UK travels on average 6800 km a year. This study prompted one commentator to suggest that “One of the great issues of our time is higher mobility and situational consumption” (Financial-Times, 2004). This observation certainly offered encouragement to the producers of mobile devices. However, such optimism had to be tempered by concerns that the hand-held market, similar to the music industry with its numerous different formats, might be fragmented by the existence of multiple standards (especially where telecoms and storage technologies have been converging and preferences concerning the assemblage of different components and functionalities are far from stable).

2.2.2 The History of Portable Gaming Consoles Industry.

The first portable (previously known as ‘handheld’) game console to use interchangeable game cartridges was the Microvision, designed by Smith Engineering in 1979. A small

screen and small selection of games available has proved unsuccessful two years after launch. The main reason for the failure was poor LCD technology and robustness of the consoles. Despite some improvements in 1983 where Palmtex released Home-Computer Software Super Micro Cartridge System only three games were available for purchase (Wikipedia, 2005).

The challenge in 1990's was the battery life for the PGCs as the improved backlit LCD and colour graphics increases battery consumption. The technological advances of PGCs were therefore hampered by the difficulty to overcome innovation of rechargeable battery technology. For example, the non-backlit with monochrome graphics adopted by original Game Boy was a strategy to minimise battery consumption during game-play. There exists more advanced game consoles of the time but their inability to solve battery problem has caused products such as the Game Gear and Atari Lynx to be forced out of the market. The solution- NiMH batteries, which do not require discharging before recharging, were not released until the late 90's. This is the main reason of Nintendo's dominance in the portable gaming market since the release of the Game Boy in 1989. The original Game Boy including Game Boy Pocket, Game Boy Color, and Game Boy Advance) is the best selling game console with more than 197.55 million units (Nintendo, 2005). Nowadays the current PGCs have adopted rechargeable Li-Ion batteries which not only increases the duration of game-play, other advantages such as battery weights and recharge time have been significantly reduced.

2.3 Current Portable Gaming Consoles Available

As a well established producer in home consoles Sony has become a market leader since the overwhelming success of PlayStation. Sony's first portable gaming console is called PlayStation Portable (PSP) which aims to transform their home console experiences unto a portable level. At the time of research the current market leader in the portable gaming industry is Nintendo, which has dominated the market for many years. Figure 2.2 shows that Nintendo are not only maintaining its dominance in portable gaming industry but the trend shows that the revenue gained has increased quite steadily. The main competitive

advantage for Nintendo over other competitors are the vast experiences they possess as so far there have been five PGCs released since 1989. Both Sony and Nintendo are benefited from an extensive catalogue of first- and third-party-developed game titles. It is a general rule in the video game business that quality game titles drive hardware sales.

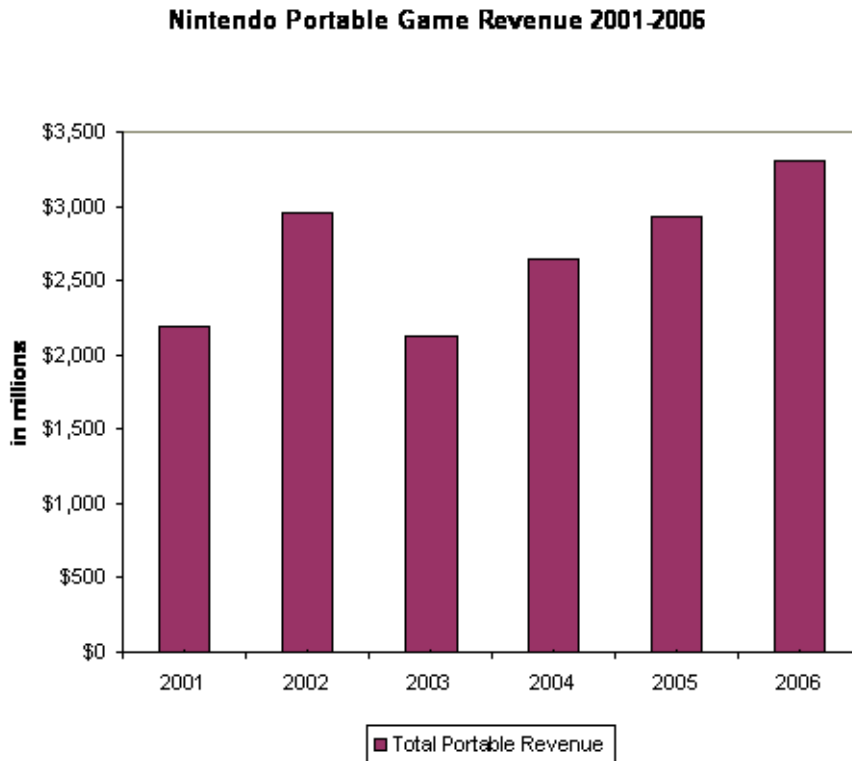


Figure 2.2 Nintendo Co. Ltd reported revenue in millions of USD at 1 USD = 120 JPY for fiscal year ending 3/31. (Adopted from http://www.dfcint.com/game_article/feb07article.html)

Despite the successes Nokia have achieved in the mobile phone industry Nokia have struggled to penetrate the PG market, though the firm has shown the persistency to remain in the mobile games industry. The tasks to transform the game-play experiences of mobile gaming comparable to what PGCs can offer can be daunting. Especially when Nokia's first mobile gaming console did not match the amount of sales with respect to other popular models, which they have achieved without the specifically dedicated gaming features. Lastly, a new entrant Gizmondo formulate their PGCs into the mould of convergence devices, adding additional options in excess of gaming. Despite without functions of Nokia such as receiving phone calls, Gizmondo's capabilities offered a much

wider range of functionalities which a typical PGC do not include. For example, digital audio and video playback, digital image viewing, camera, the Global Positioning System, and so on. Details of current PGCs at the time of study are explored and each is summarised in the following sections.

2.3.1 Nintendo®- Dual Screen™

At the time of research, the Nintendo's Dual Screen (NDS) is the most recent PGCs released by Nintendo in November 2004 (see figure 2.3). The DS incorporates two forms of Wi-Fi wireless networking where multiplayer mode which allows up to 16 players to join. Since company sold its first Game Boy on April 21, 1989 in Japan. Nintendo's worldwide sales of Game Boy, including updated versions of the player called the Game Boy Advance and the Game Boy Advance SP, has totalled 172.4 million in 2005. PGCs sales are significant aspect in terms of Nintendo's source of revenue. Noticeably, the portable gaming hardware and software accounted for 62 percent of Nintendo's revenue in the business year ended March 31 2005.



Figure 2.3 Nintendo® Dual-Screen™

(Adopted from <http://nintendo-ds.allack.co.uk/Extras/Detail.php?ProductID=160>)

The most innovative feature which NDS has developed is their touch-screen functionality, which is said to “engages, entertains and informs” gamers (Biz.gamedaily.com, 2004). For example, when a football game is played the whole match can be viewed on one screen while the other can focus on close-up action. The additional stylus pen can be used to assist engagement of game-play where the non-action screen displays useful information such as goals scored, time remaining and so on. This means that the game-

play experiences which the firm aims to deliver are unprecedented which increases Nintendo's competitiveness and exclusivity.

2.3.2 Sony- PlayStation®Portable™

Sony's PSP (see figure 2.4), aims to target higher dispensable income groups with sophisticated video gaming and the ability to play music and movies. Sony released its own PG device, the PSP, which they stress the importance, not just gaming, but also along with the capability of listening to music and watching videos. Apart from a PGC dedicated for gaming, it is said that Sony aim to deliver technical strengths from their innovations in electronics. According to an interview with an experienced public relation staff , Sony's PSP represent "a convergence between technologies and hardware from other areas" which means that consumers can expect the console to perform tasks other than video games (Fortunemail, 2004).

Despite stressing that a PSP is much more than a gaming platform, Sony acknowledge that the predominant share of early adopters will be gamers. In terms of sales, evidences have shown that Sony has sold about 1.2 million PSP devices in Japan and with the U.S. launch, hopes to be at a total of 3 million devices worldwide by the end of March 2006. Some of the reasons are believed to be the strengths which PSP leverage from PlayStation's brand, which has benefited Sony start in the portable gaming industry (Ladenburg, 2003) .

The promising feature of a PSP is that it almost matches the graphics-processing power as a PlayStation 2 console, which is amongst the most powerful. In terms of display the 4.3-inch LCD widescreen significantly improves with respect to previous generations of PGCs benefits (small and less robust) gaming visually. However, the most significant innovation claimed by Sony is their universal media disc (UMD) which is able to store 1.8 gigabytes of audio, video, or data. This essentially protects Sony's profits against piracy such as films, music-concert videos, and other copy-protected entertainment for the PSP. In addition, the PSP has built-in 802.11b Wi-Fi networking for surfing or

multiplayer gaming, a USB 2.0 port for transferring files or adding peripherals like USB digital cameras and keyboards, and a Memory Stick Duo storage-card slot. The features of music playing MPEG-1 Audio Layer 3 (MP3) and Memory Stick feature, along with the capacity to handle all kind of video content in addition to the great games, and maybe even more features that involve GPRS modems, location-based (GPS type) software, messaging and other features make it a very handy thing to have and something which will be very fashionable to be seen with (Pesola, 2005).



Figure 2.4 Sony PlayStation®Portable™

(Adopted from: <http://sony-psp.allack.co.uk/Extras/Detail.php?ProductID=184>)

2.3.3 Tiger Telematics- Gizmondo®

Gizmondo Europe Ltd. is a wholly owned subsidiary of Tiger Telematics Inc (TGTL) and is the maker of Gizmondo, a next-generation mobile entertainment device (see figure 2.5). The company has appointed the former Microsoft European entertainment vice-president in order to provide leadership, experiences and knowledge towards the highly competitive portable gaming market.



Figure 2.5 Gizmondo®

(Adopted from: <http://gizmondo.allack.co.uk/Extras/Detail.php?ProductID=76>)

Similar to Sony's PSP, Gizmondo's incorporates wide ranges functionalities including media (music and movies) playability; built-in camera; Bluetooth; enabled sending and receiving short message services (SMS) and multimedia messaging services (MMS) via General Packet Radio Service (GPRS), and lastly, satellite tracking via global positioning system (GPS). The media contents can be stored on secure digital (SD) cards while connections to GPRS can be subscribed via identity module (SIM) card. However, there seem to be doubts over Gizmondo's attractiveness towards potential consumers. The main reason is because of Gizmondo's support from game developers is not fully secured as well as it is retailed at a relatively higher price (£229) than other PGCs (Pocket-lint.co.uk, 2005).

2.3.4 Nokia®- N-Gage™

Nokia's N-Gage QD ("Quaeque Dies", meaning "Every Day") a mobile phone installed gaming device (see figure 2.6). Despite disappointing sales from the first model Nokia have made two major adjustments in the new model. First the device's physical design has been revised to improve the ergonomics around the console. For example, N-Gage QD is smaller and rounder which more is aesthetically pleasant and practically easier to use as a phone and a PGC. The development of a new cartridge slot means that the device does not need to be disassembled when displacing one game to another.



Figure 2.6 Nokia® N-gage™ QD

(Adopted from:

http://ngage.allack.co.uk/NGage_Extras/Buy_NGage_Hardware_Detail.php?ProductID=344)

After the initial introductory descriptions, next section will focus on comparing and contrasting several factors including price, date of launch, number of sales, targeted consumers, and marketing budgets for each console available at the time of the research.

2.4 Comparisons of Current Popular Consoles

As for the mobile market, the Nintendo DS and Sony's PSP are expected to help drive an increase in sales for the portable game market from \$3.9 billion worldwide in 2003 to \$11.1 billion in 2007 (Cole, 2004). The NDS has surpassed the GameCube as the fastest selling console for its first week on the market in the UK history with 87,000 units (Cole, 2004). Nintendo's previously records for PGC sales in the UK Game Boy Advance were estimated at 67,000 unit sales in launch week while Game Boy Advance SP at 47,000 units. The NDS was launched in the UK on March 11th and sold for around £99 while PSP are due to be released in the UK on September 1st for £179 in 2005. In 2004, Nintendo have sold more than 500,000 DS units in the first week of its launch in the US and shifted 460,000 sets in launch week in Japan (<http://www.nintendo.com>). The PSP, meanwhile, has been available only in Japan and the US, but has already sold 2.97 million units (See Table 2.1). The company has achieved sales of 3 million units by the end of March in the US.

Cumulative Production Shipments of Hardware / PlayStation®Portable

2004/12/31	510,000 units (Japan only)
2005/03/31	2.97 million units (Japan: 1.44 million/ USA: 1.53 million)

Table 2.1 Cumulative Production Shipments of PSP (Adopted from http://www.scei.co.jp/corporate/data/bizdatapsp_e.html)

After reducing the price from original £199 to £99 Nokia have sold in excess of 1.5 million units. Moreover, the games retailed for N-Gage has also decrease from £30 to a range between £15 to £25. However, there appears to be lack of games specifically designed for short durations of gaming, which are the essentials to best suit duality of mobility and gaming (Hermida, 2004).

Retailed at the price of £229 at the time of study, Gizmondo are the most expansive PGCs with games initially ranging from £10 to £30. However, TGTL claimed that over

560,000 pre-orders have been received in advance of the commercial launch of Gizmondo in April 2005. As a part of the marketing strategy, Gizmondo introduced a concept of 'smart ads' which they believe to be beneficial for end users and the firm. Firstly, the cost of Gizmondo can be subsidised from the revenue generated by 'smart ads' where "carefully selected" advertisements facilitate greater marketing power for the main actors such as video game retailers and other relevant third parties in the media industry. Secondly, the "carefully selected" advertisements means that customers are allowed to configure the advertisements in accordance to personal taste and interests (Pocket-lint.co.uk, 2005). The new 'smart ads' Gizmondo will be sold for £129 which seems much more affordable in comparison with other consoles available in the market.

Finally, to summarise, the overall comparisons for the current popular consoles can be summed up as the table overleaf (see table 2.2).

	Price	Launch date	Number of Sales	Targeted consumers	Marketing Budgets
<u>Nintendo DS</u>	\$149.99 £99	21 Nov 2004 in the US 24 March 2005 in the UK	4.0 million est. total units sales; Software est. at \$300-\$400 million in 2005	Youth (age group 11-17)	\$40 million multi-faceted marketing campaign in the US
<u>Sony PSP</u>	\$249.99 £179	24 March 2005 in the US 01 Sep in the UK	6 million total units sales world wide. Estimated 15 million PSPs by March 2006	18-35	Multi-Million Dollar Campaign innovative marketing PSP
<u>Gizmondo</u>	£229 Smart Adds model £129	March 19 2005	Pre order 500,000 units	15 and 29	n.a.
<u>Nokia N-gage QD (Quaque Die)</u>	priced between £99 (contract) and £199 (SIM Free)	June 04 2005	1 million (September 10, 2004)	18 plus	£15m in 2004

Table 2.2 Tabulated Comparisons for the Current Popular Portable Gaming Devices

(statistics for Nintendo are Adopted from

[http://www.nintendo.com/newsarticle?page=newsArchive&articleid=4761e002-cb40-4ffd-ae75-](http://www.nintendo.com/newsarticle?page=newsArchive&articleid=4761e002-cb40-4ffd-ae75-94b8cccc3aec&page=archive)

[94b8cccc3aec&page=archive](http://www.nintendo.com/newsarticle?page=newsArchive&articleid=4761e002-cb40-4ffd-ae75-94b8cccc3aec&page=archive))

So far, the majority of console manufacturers and the market information in the portable gaming industry have been closely examined. The use of secondary data resource provides several factors such as price and marketing budget used to compare and contrast

between the current consoles within the competition. However, the richness of information in terms of product and process innovation can only be collected by qualitative techniques such as interviews in order to enhance the detail and focus of the study. Other actors such as retailers and end users will also provide essential information as they are also important inputs of the video games productions network. Considerations of methods for the research will be provided in detail in chapter 3. The next section will state the central research questions which will provide guidances for data collection and analysis.

2.5 Research Questions for Investigations in The Study

Given what we know about product development and users from the literature reviewed in chapter 1, and developments in the gaming industry, the following issues constitute salient questions for research and form the foundation of the study that is described in this document. The central questions that underpin the research are:

1. To what effect and in what ways as producers deploy their development and innovation in order to improve the mobile gaming experience of end users?

At the product development stage firms need to establish the main innovative features which are seen important in relation to benefit users. For example, the development towards user interfaces, controls and buttons are directly linked to the game play experiences of end users.

2. How is the innovation and new product development processes configured to facilitate the views to performances of end users?

This question aims to discover the innovation processes which manufacturers configure and re-define the 'product space' such as Sony's radical PSP's UMD, where the storage can be extended from video games to media files such as films and photos. The conventional users' perception of video gaming is broadened by the ability to store quality audio/video content and playback as an additional feature to target wider markets.

3. How do producers engage with potential end users in the innovation and product development processes?

Producer may consolidate or test their ideas directly or indirectly with potential end users. Techniques such as user surveys can be gathered directly by manufacturer for the next iteration. More realistically, retailers may become the important medium to channel end users' opinions to better use their marketing techniques.

4. What factors affect the adaptation and diffusion of portable gaming consoles?

This question seeks to explore the factors behind adoption of users in the context of PGCs. The audience is targeted as early adopters of this new wave of PGCs and the reasons behind the adaptation and diffusion can be collected to compare characteristics of the users.

5. What are the key features such as functionality and design characteristics sought by end users- which selecting from among competing formats? How are these preferences communicated to producers?

End users, especially early adopters tend to be more sensitive with regards to not only personal taste and fashion trends but also innovative design features and functionalities such device can offer. Obviously these preferences differ from one consumer to another but collectively manufacturers would be interested to receive feedbacks for future improvements but how the information is distributed tends to be less obvious. Moreover, communication of marketing and/or business strategies between the partnerships of manufacturers and their complementary assets such as retailers may crucially lead to the success or failure of product launches.

2.6 Conclusion

Overall, this chapter denotes the significance of production and marketing of video games. This begins with an overview the inputs of production networks for videogames industry, which identifies the important actors such as end-users, console manufacturers, and retailers. These actors are amongst the most important inputs to the flow of videogame industries. The significant of the portable gaming can evidently reflect to the significant amount of consumer expenditure on electronic media and entertainment in the UK. More specifically, PGCs are amongst the most successful selling consoles in the UK. Brief details of the historical developments of PGCs followed by the descriptions of current incumbents and new entrants are also summarised. Next, this chapter also

organises the secondary data with respect to the current portable gaming consoles available in the UK videogame industry. The overall comparisons for the current popular consoles is then summarised with price, launch date, number of sales, targeted consumers, and marketing budgets.

Finally, the main research questions and rationales are stated to cover the main actors of the PG industry. They are then considered and constructed to formulate research questions for quantitative and qualitative analysis for the methodology chapter. The key questions are not only directed to product development manufacturers innovate but also how the process innovation is related towards other important actors such as retailers and end users. Hence the research is more robust and can better inform not only the current innovation across the latest consoles but also the perceptions from early adopters and their characteristics and behaviour towards adaptations of new consoles.

Chapter 3- Methodology:

3.1 Introduction

This chapter presents an overview and discussion of the research methodology and methods selected for the study. The author used a combination of qualitative interviews and more quantitative, online surveying techniques in an attempt to construct a balanced and rounded picture of the issues at the heart of the study. Explanation of the rationale for choices made in relation to the use of research tools, the selection of participants in the empirical phase of the study, and the analysis of various data sets will be discussed. The first section of the chapter will explain the methodological orientation and approach adopted in relation to the study. The second section will move on to discuss the selection and development of research tools used in the investigation. Section three will continue by explaining the selection of respondents for the interview component of the study, and section four will provide an overview of the process of data collection and analysis. The final section will review the practical and organisational issues confronted in the work.

3.2 Orientation to the Study

This study aims to identify innovative features and factors adaptations and diffusions including design and functionalities for mobile gaming devices. More specifically, the research is undertaken with respect to the views of a wide range of stakeholders and actors across the network of video game development and end-users. The research questions derived from Chapter 2 (in relation to product and process innovation of PGCs) will focus at the actors such as manufacturers and retailers using interviews with respect to the relevant personnel representing each firm studied. Hence the first part of the study is to research from a qualitative perspective in order to gain insights on the complexities and processes of innovation in the PG industry. The second part of the study will examine the factors which may influence user adoptions of PGCs. However, under the time constraint the semi-structured interviewing technique was unrealistic to operate for a

significant number of samples. Instead, an online opinion based questionnaire was set up to explore the issues more efficiently despite not being robust enough in comparison to the random sampling technique. All in all the combination of strengths from qualitative and quantitative studies not only facilitate a holistic viewpoint but also generate rich variety of data for analysis in the later chapters.

On the one hand, qualitative methods are according to Densin and Lincoln (1994, p.2) "... involving an interpretive, naturalistic approach to its subject matter" in order to "make sense of the meaning people bring to them" (cited in (Murray, 2003, p.1)). One of the most popular qualitative techniques is the use of interviewing method. Interview questions (especially semi-structured interviews) are constructed to not only maintaining focus on the core questions but also flexible to concentrate each console's targeted innovative aspects accordingly. As the research is conducted with regards to the PGCs which are all released in the same year (2005) not only will the expertise from producers have most updated ideas/concepts with regards of product and process innovation of the specific product, but also how each producer perceive the market information and competition of the PGC industry as a whole. Similarly, the views from the retailers are also important to derive in order to collect information to investigate such as whether the marketing strategies from producers and preferences from consumers are aligned.

On the other hand, online questionnaire surveys incorporating snowball sampling methods can help exploring targeted samples which may be rare and therefore difficult to identify (Barnett, 2002, p.193). Understandably due to the limited time and resources the initial screening to find a robust study population was not possible. Therefore initial samples are identified from the author's living environment who are known of in possession of at least one of the PGCs studied. Invitations are then being forwarded by the initial samples to whom they believed have similar experienced and/or interest in PGCs.

3.3 Selection and Development of Research Tools

According to Berg, interviewing can be defined as “a conversation with a purpose” (Berg, 2007, p.89). Similarly to functions of quantitative survey method as previously described interviews can also gather information but in a qualitative way. Berg organised previous literatures (e.g. Babbie 2001; Merriam, 2001) and summarised three major categories of interviews (standardised, semi-standardised, and un-standardised). The three structures form a “continuum of formality” according to Berg’s model (Berg, 2007, p.93). From one extreme where standardised method are used, wordings of each question during the interviewing process needs to be exactly reflected to the original interview questions, The rationale of this type of method is to generate responses from predetermined questions which are formulated to assume that each question is meaningful for every subject interviewed. In comparison to the rigid standardised interview questions, un-standardised (or unstructured) interviews do not have pre-determined questions and therefore nor do they have expected answers. For the purpose of our study, semi-standardised interview techniques are used. The main advantage is the flexibility which allows the interviewees and interviewers to follow the main interview questions as a guide where the depth of questions and answers can be adjusted during the interviews.

In comparison, an online questionnaire survey for the end users who are conducted electronically with initial samples identified from the gaming communities around the author’s living environment. These questionnaire-based surveys are a useful tool in gathering data with regards to opinion and consumer preferences research according to Bryman (2001). The variety of formats such as face-to-face, by phone, by mail and in this case, online shows that surveys can be conducted in the way that best suits the author’s interests. The majority of the questions are opinion-based multiple choice questions with additional spaces for other information and suggestions. The choice of completing a questionnaire online is also more advantageous than other forms in several ways. First, the online questionnaire allows the surveys to be conducted without the author’s aid of completing the answers. Secondly, provided the end users are equipped with internet access the samples can be drawn from simultaneously from anywhere. Thirdly, the samples are not only voluntarily invited but no time limit was given to complete the questionnaires. This means less error will be made given that respondents

are under no time pressure to contemplate during the processes, which increase the accuracy of the answered responses.

3.3.1 Population and Samples for The Study

According to the investigation on current market information from Chapter 2 four of the most popular consoles are identified in the UK during the 2005 timeframe. Three out of four console manufacturers agreed to be interviewed. The three portable gaming manufacturers (Gizmondo, Nintendo and Nintendo) are formed as one group. Retailers' views (Game and HMV) are also gathered as another group. Interview letters (Appendix 4) are sent out electronically to the email addresses provided from the information given by each company's website.

The research method is denoted from non-probability sampling technique. Non-probability sampling can be defined by Bryman (2001, p.85) as "a sample that has not been selected using a random selection method". It is therefore needed to recognise that "some units in the population are more likely to be selected" especially in the way which the samples are chosen for this research (Bryman, 2001, p.85). Due to the constraints of "time and cost, and the need of precision", Bryman (2001, p.95) argues that "a large sample can not guarantee precision" but can only increase the chance of achieving it for a sample. The above argument can be advantageous in terms of its ability to avoid non-response of sample survey (Bryman, 2001). This is because the sample error can be even greater if the units within a sample are not familiar with certain aspects of the subject or even not equipped with the necessary amount of expertise in answering the survey questions. For example, a random sample can often be hampered by the number of non-responses and the above method can also be adopted in terms of this research. This is even more so with respect to the end-users' research as any respondents were required to have played and/or owned a portable gaming device in order to answer the questions which specifically aimed at the feedbacks from their gaming experiences.

Population is primarily focused on the relevant personnel engaging in the portable gaming environment. Due to time and resource constraints the possibility for making arrangements to identify each end user is simply not possible. Therefore non-probability samples are considered most suitable for identifying the end-users in the research. The numbers of valid respondents will be collected towards as statistically significant as possible to ensure the robustness of this research. Snowball sampling is therefore chosen to be the research method for the investigation amongst end users. Initial contacts of know gamers within my living community are invited to complete an online questionnaire (See appendix 1) and then those respondents are used to explore and establish contacts with others (Bryman, 2001, p.98). Bryman (2001, p.99) supports the above approach by pointing out that “such as approach is the only feasible one” if “there is no accessible sampling frame for the population”. He also argues that “by and large, snowball sampling is used not within a quantitative research strategy, but within a qualitative one”. Hence, “external validity” and the ability to generalise is of a less significant problem as this research is done towards the qualitative end of the spectrum (Bryman, 2001, p.99).

3.4 Selection of Materials and Respondents

The first part of the study from manufacturers’ point of view is focused on the products and process innovation such as design, improvements and functionalities. The second part is focused on the iteration of design which is primarily focused on how users are engaged in the innovation process. Interview-based survey is involved in the recording of verbal data from interviewees, which arises in relatively unstructured interviews or meetings.

Prior to the actual process of research the investigation was primarily targeted at four of the most popular and widely available gaming devices on the market. These are Tiger Telematics’ Gizmondo, Nintendo’s Dual-Screen (NDS), and Sony’s PlayStation Portable. Although much effort was made to pursue an arrangement for an interview with Nokia a return of response has not yet received in the time of writing the dissertation. Therefore the possibility of interviewing them was not realised during the research period.

Topwave's Zodiac 2 was neglected from the study due to the fact that the hardware lacked significant games support from software manufacturer. The market share is amongst the lowest of current gaming console market and the company itself has positioned itself as a personal digital assistant (PDA). They are more affiliated to portable computers that were originally designed as personal organisers than a portable gaming machine. Zodiac 2 is retailed at £329.99 and are categorised by their main retailers Dixon under the category of 'pocket personal computer'. Since the existing user samples are very rare and nor was Zodiac 2 designed to play video games (even though it can) therefore it is not included in the study. In addition, interview requests were also forwarded to the retailers amongst the largest in the UK. The firms identified from the sources of secondary resources are HMV, Game, and John Lewis. These firms were specific selected with the ones that sell at least two of the PGCs from the samples if not, three of the consoles in order to facilitate cross-comparisons in analysis sections.

The aim for conducting interviews with hardware producers and retailers was to investigate the relationship between the two actors and how each of them is represented in the innovation process of the videogame industry. The intended interviewees were targeted at the most experienced personnel available at the time of study. Fortunately, many of the personnel identified below whom willing to participate in my study were amongst the most senior ranks. The sample questions conducted during the interview for retailers and manufacturer are given in Appendix 5 and 6 respectively.

The summary below gives some brief descriptions with regards to each interviewee's background information. Each interviewee's details are accurate at the time of writing and may not represent their current status of employment.

3.4.1 Background Information with regards to the Interviewees

Representing Gizmondo is Mr James Beaven who was the director for game publisher Indigo Pearl and also as the head of public relations (PR) and communication at Gizmondo. He has vast experiences in the electronics sector and his last job was with the

Royal Navy. After unsuccessful attempts to pursue a suitable representative for an interview in the UK, Mr Yo-Chen Tseng- managing director of Nintendo Taiwan was approached and agreed to participate in my study. He and his family has been running toy business since 1990s in Taiwan and was the first to successfully gain the exclusive rights to represent Nintendo for their overseas operations in Taiwan after the launch of Nintendo *GameBoy* in early 90s. The third person interviewed was Mr Nick Sharples, who is the head for corporate communications at Sony Computers Entertainment Europe (SCEE). He was also responsible for the launch of PSP in the UK. Due to the limited time given by the interviewee there was only sufficient time allowed to complete interview questions without much introduction. Therefore Gizmondo, Nintendo, and Sony complete the lists of extracting main sources of product and process innovation.

In order to complement the findings from the standpoints of the manufacturers two of the largest game retailers in the UK were contacted and agreed to be interviewed. At the time of writing, Mr Simon Soffe, who was the head of PR and has been working for GAME for three years. The last interviewee was Mr Jason Mitch, who was responsible for the video game section at HMV situated at the Manchester City Centre branch and has considered himself to be a dedicated gamer.

3.5 Organisation of Data Collection and Analysis

The summary of operationalisation of the research including the procedures for the data collection and analysis throughout the study are represented in table 3.1. The interview arrangements and construction of online interview were conducted in the first two weeks of June. Interviews for console manufacturers and retailers are conducted throughout the remaining month of June. In addition, each interview was transcribed and collectively analysed before the end of July. Similarly, the feedback of online questionnaire was aimed to collect as many entries as possible through the use of ‘snowball’ sampling technique from the beginning of August. Once the number of respondents participated discontinues to increase and reached the optimum the author then closed the website and began the process of quantitative analysis. Finally, all the remaining tasks including the

synthesis derived from the collected data are comprised and any conclusive remarks are denoted.

Period	Activity
May 2005 – June 2005	Planning and Orientation
June 2005 – July 2005	Development of interview guide and initial efforts to contact prospective respondent companies in the UK. Configuration of online questionnaire survey by using initial known contacts to complete and distribute invitation for others.
July 2005 – August 2005	Collection and analysis of responses from online surveys. Interviews conducted with agreed respondents from companies in the UK (except Nintendo). Transcription and analysis of interview data.
August 2005 – September 2005	Final analysis and conclusive remarks comprising data collected from interviews and surveys.

Table 3.1 Tabulated Data Collection and Organisaion

The questions used during the interview are aimed to generate specific answers as well as elaborative answers in order to facilitate comparisons within each group and cross-comparisons from different groups. For instance, the two retailers specialised in gaming industry are given to a similar questionnaire which aims to investigate their relationship with developers/manufacturers but also as well as end-users if the interviewing time allows. Moreover, the qualitative nature of the interviews means that it can be very flexible in terms of the way the questions are asked. To let the flow of interviews much more smoothly the author has decided make as little interruption as possible throughout the interviews. Hence a much more discussion-like atmosphere with each interviewee was conducted. Lastly, specific questions with regards to each product feature were used to further differentiate in terms of its innovative features (refer to interview questions from section D in Appendix 6).

From the manufacturers’ point of view the analysis will hope to generalise the technical priorities and innovation capability that each PGC was designed to improve users’ gaming experiences. In addition, the considerations and processes given for end users in developing the new product can also be summarised. Moreover, the empirical data can be used as cross-comparison in accordance to users’ preferences of their priorities in

terms of decision-making in purchases. Similarly, the strength in marketing abilities allows retailers to share their insight in terms their understandings in their customers' purchasing decisions. Again, these can be recorded to prove (or disapprove) whether the results from online surveys reflect the adaptation and diffusion trends generalised from the samples.

Due to time constraints this study was unable to explore the software development of video game productions which has become increasingly prevalent as the reasons in hardware adoptions from the end users' perspectives. Users are important complementary assets/ not just as pure recipient of new technology but can contribute constructively in video game development. Nonetheless, the influence in adoption and adaptation from the availability of games available of are included in the end users' surveys regarding purchasing decisions for a new console.

3.6 Conclusion

This chapter has examined the choices made with respect to the selection of methodology and research tools in the study, and has explained the various stages via which the investigation progressed as it moved towards completion. The qualitative and inductive orientation of the research has been explained, and readers will understand how this approach was implicated in the choice of appropriate research tools (i.e. semi-structured interviews). Moreover, the quantitative aspects of sampling and online opinion-based survey techniques are explained and explored in relation to how the research for end user adoption of PGCs can be conducted under time constraint and resources. Readers will also understand some of the limitations of, and problems associated with these tools, as such themes are addressed in an early section of the chapter.

After the explanation of orientation the organisation and operationalisation of the research was also examined. Following the constructed research plans and organised methods next sections (Chapter 4 and 5) will each report the data collected from the qualitative and quantitative research methods respectively.

Chapter 4- The Portable Gaming Innovation Processes- The Views from Producers and Retailers

4.1 Introduction

This chapter aims to discuss and analyse the qualitative aspects of research methods regarding the feedback received from the interviewees. More specifically, the interview questions constructed in the previous chapter seeks to facilitate the investigation on the organisation, management and orientation of the innovation processes each portable gaming console (PGC) firm possesses. Firstly, the interviewees are introduced with respect to their expertise and experiences responsible for each console. Then the drivers and barriers of product innovation regarding each PGC will also be summarised from interviewees representing PGC manufacturers.

The samples of interview questions asked are included in the appendixes. This chapter is mainly based on some of the issues mentioned in literature review, which were brought up in the interviews in order to compare and contrast from the three manufacturers and two retailers. Firstly, for the hardware producers the questions were primarily focused on the 'drivers' and 'barriers' of product and process innovation. Then the questions were aimed at collecting as much qualitative data as possible on how the users are perceived as part of the innovation processes above. Secondly, the study also aims to investigate the working relationships between each manufacturer and its respective retailers of its products. This is conducted through the scope of, most noticeably, marketing strategies. Again, the end users are taken account in terms of feedback received, technological adoptions of new hardware features and so on.

The next section will focus on analysing key issues answered and raised during the interviews from the representatives of each console manufacturer. Sequentially, each interviewee contributes his/her knowledge towards the PGC representing respective firm.

The themes consist of three parts including “product and process innovation”, “user and adoption” and “current market information”. In addition, the answers collected from the interviews will be analysed and summarised in subsequent sections to derive a broader picture in the portable gaming industry.

4.2 Product and Process Innovation

4.2.1 Product and Process Innovation at Gizmondo

According to the first interview, Mr Beaven from Gizmondo described the rationale and business concept for this product was that the firm aims to construct a “truly multifunctional, radically different gaming machine, which can be seen as a clear alternative of any other current devices available in the market”. As a new entrant for the portable gaming market, Gizmondo realised that to save costs their potential product needs to be delivered efficiently and effectively.

Firstly, the “speed-to-market” was crucial in terms of delivering the new product to reduce costs. As research and development (R&D) was estimated by the firm of at least five years Gizmondo decided that once the product design is complete the most cost effective way for producing the product is to purchase the combination of components from recognised firms in accordance of its needs. For example, the 28 bit graphic processor comes from Samsung, SE 10. CE operation system comes from Windows and the Global Position Functioning (GPF) hardware and SIRF chip come from the manufacturer named X-track. Secondly, by bundling various parts in innovative processes, the overall performance is much higher than the sum of each individual component combined (where synergy is created). As each components are purchased from the manufacturers who are specialised in the production of the above components the reliability of Gizmondo is significantly improved as a result.

Moreover, Gizmondo’s robustness was much stressed as its most significant part of innovation. According to Mr. Beavens, Gizmondo has been granted a ‘CE marking’ in

conforming essential health and safety requirements of the same standards as mobile phones. This means that many physical tests regarding the console were obliged to operate in order to gain the approval. For example, drop tests and water proof level tests were necessary to match the minimum requirements where no other PGCs can compete with in the industry. The multi-functionality approach for the console meant that it was a necessity for acquiring the standard. For example, the Global System for Mobile Communications (GSM) modem was installed not only to facilitate “international roaming” (between mobile phone operators enabling subscribers to use their phones in many parts of the world) but also enable the use of a mobile data service such as General Packet Radio Service (GPRS) to download data and internet communication services such as email and web access.

There are functionalities which the firm has taken into consideration to benefit game usage. For instance, the Global Positioning System (GPS) which benefits from the Global Navigation Satellite System can be very useful to provide gaming experiences with regards to the objects in the real world. From Mr. Beaven’s description, a real-life adventure game can become closer to real life situation from the information of the player’s surround geographical area which the Satellite transfers to the console. Activities such as treasure-hunting, puzzles-solving, and scenery-exploring are amongst the most popular incentives can be benefited from the satellite navigation system.

4.2.2 Product and Process Innovation at Nintendo

The second interviewee Mr. Tseng believes that the past success which Nintendo has achieved in the portable gaming industry is mainly due to the firm’s risk adverse business strategy to maintain “backward compatibility” for the new consoles. This means that the games produced for the first generation PGCs (GameBoy and GameBoy Colour) are also compatible for the second generations such as GameBoy Advance and GameBoy Advance SP. Similarly, NDS has been designed to follow similar technological trajectory and is able to play the games that are made in the second generation. However, the innovative features such as the dual-screen which was believed by Nintendo as the

competitive advantage in the third generation portable gaming. The evolution of GameBoy series leading to the latest NDS console, has been adopting a cautious approach in terms of the innovation for their products. Since the concept of portable gaming originated from Nintendo for more than 20 years they have maintain competitiveness in the industry according to Mr. Tseng. “They were right by focusing on making their products universally affordable” said Mr. Tseng. Their success was confirmed once costs are kept down, and reliable models are in production with high volume of retail store as their business bases. In addition, their software partners were comforted by the early return on the investments which boosts confidences for both parties.

The interview with Nintendo was primarily focused on its latest technologies that NDS embodied with the actual users-application. What makes the current model more significant than its predecessors it the following: it has two screens, which one of them is a touch-screen. To take full advantages of the touch-screen touch-pen can be used for better controls of the bottom touch-screen which are the main innovative features for specifically delivering unique gaming experiences for the users. The touch-pen can also be used for more accurate and efficient in physically “pointing” at the virtual object or information. Moreover, the touch-screen can be used for drawings and handwriting which may be useful in either 10 to 30 meters wireless communication between consoles or the internet connections benefited from the installed Wi-Fi communication architectures to explore the gaming community networks and to acquaint peers. This is enabled through the development of the new chat room- “Pictochat”, which is supplemented with Japanese, European and English characters to facilitate and bridge friendships amongst users that are distributed around the world.

Mr Tseng states that from the “accumulated innovation incrementally, the accuracy in terms of directional control is dramatically improved”. Specifically, better designed right (R) and left (L) triggers are now available, which gives gamers better control in games such as to better navigate an flying object. Other improvements, despite relatively less significant have been implemented around the peripherals of the hardware. For example,

the new NDS games use smaller cartridges, which reduces the burden for gamers to carry games.

The competitive advantage which Nintendo possess over other potential entrants is their relationships with game developers, publishers and other outsourcing companies which support Nintendo with the technologies that can benefit NDS as an integral part of gaming experience to benefit their users. For example, in term of the Wi-Fi internet technology Nintendo have formed strong corporate venture with IGN Entertainment who has enabled Nintendo to develop a new gaming interface supported by the connectivity services. This has a major impact towards usability of this aspect of gaming where users who may not be familiar with the operation, which may cause frustration in adopting the console.

4.2.3 Product and Process Innovation at Sony

The background information which triggered Sony's invasion in the portable gaming market was the fact that there already exists a very lucrative TV consoles market, where Sony's PlayStation (PS2) is already the dominant market leader. With regards to the hand-held consoles they have also been seeking to find a niche market. However, as Mr Sharples from Sony Computers Entertainment Europe stressed on the firm's strategy as "we did not want to make a move unless there was a significant breakthrough in terms of technology", which means that Sony's concept for product innovation is very much technology-push orientated. Just as Mr Sharples stressed in their belief of business strategy: "From our point of view, technology comes first, then the latent consumer demand". The accumulated experiences of innovation in consumer electronics allow PSP to be enhanced by Sony's strong technological capabilities. Hence Sony's competitive advantages for PSP is created through the iterative incremental innovation in-house. More specifically, the Universal Media Disk (UMD) which stores games to be played on PSP consoles.

“Its use of UMD approach is a better alternative of DVD which makes PSP much more like an ergonomically designed console”, said Mr Sharples. Overall, the UMD disk is perceived as the most important piece of technical innovation. Others such as the convergence of technical abilities of wide and flat-screen productions with WiFi enabled abilities can boost the overall experiences of a new gaming dimension, and he has no doubt that it is the most important piece of innovation with respect to Sony’s PSP.

From Sony’s point of view, the superiority in terms of design PSP has a cutting edge on which Mr. Sharples believes to generate and create lock-in effects to its customers. These are essential processes of innovation which Sony’s R&D teams need to undergo in order to integrate functions such as GSM, GPRS were eventually added. Their responsibilities were to “shape a device into a convertible, multi-functional, and mostly around a 16:9 inch high resolution screen”. These are backed from his point of view, which revealed that “Sony do not simply make a game machine”. The multi-functional feature means that the new innovative 1.6 GB UMD storage, which enable the consumers more options to store films, MP3 or other data.

In summary, table 4.1 below summarised the main drivers and barriers which for product and process innovation noted amongst the three interviewees with respect to each represented product.

	Drivers for innovation	Barriers for innovation
Gizmondo	<ul style="list-style-type: none"> • No costs involved in R&D development. • Ability to focus on position itself in market niche. 	<ul style="list-style-type: none"> • Games duplication. • Support of game developers. • Supply of games.
Nintendo DS	<ul style="list-style-type: none"> • Past successes in being a monopoly position. • Ability to innovate from steady revenue. 	<ul style="list-style-type: none"> • Popularity in spread of gaming communities. • Costs of internet connection.
Sony PSP	<ul style="list-style-type: none"> • Lucrative market • Previous experiences in home console. 	<ul style="list-style-type: none"> • Development time for videogames.

Table 4.1 Drivers and barriers for innovation

4.3 Marketing, Retailing and Diffusion of Portable Gaming Consoles

4.3.1 Marketing Strategies

In terms of marketing Gizmondo the company have obtained the patented system called “smart ads” Mr. Beaven described it as the ‘Holy Grail’ for Gizmondo. Significantly this feature aims to reduce the costs of waste in advertising, which happens when the recipients are not being targeted at or miss-targeted. This is because the inherent difficulties in marketing as whether the targeted consumers are receiving the information you want them to see. Moreover, even if the above situation can be overcome, there still exists so much irrelevant information which is being passed onto consumers. Smart ads are loops which usefully links consumers and retailers. It can measure the effectiveness which the digital media is able to provide. “It can tell us that a specific advert has been

watched and can provide feedbacks for us”, said Mr Beaven. Consumers can let the firm know what kinds of advertisement they like to receive and what to be neglected. As a result, less intrusive spam and the amount of money received is predominantly used to subsidise the hardware. Thus a win-win situation has been created as the costs of unnecessary advertising can be reduced while consumers can choose more suitable advertisements that are correlated to their interests. According to Mr, Beaven, in their research shows that latest statistics 82% of those voluntarily went to their website welcomes the ‘smart ads’ project. There are 65% of them even went onto refine their search for personal interests in term of advertising available. Gizmondo’s hardware is carefully acquiring the attention with regards to the promotions that their customers for their own interests. The emphasis is again, the relevance of advertisements they receive. “There are roughly 65 commercials being played a day in one channel and 95% of them are completely irrelevant to the audience. We believe the provision of our adverts have much more ‘appeal’ to them”, said Mr Beaven. Currently, the most obvious benefit is the funds we receive from advertisers are directly subsidised the costs of the hardware. In terms of technical know-how and codified function Gizmondo believe that more education for end-users on how their consoles actually work. Additional functions and software applications should be readily explored. “It is Even more so in terms of game design”, said Mr Beaven of Gizmondo. With respect to consoles, Gizmondo have extensive links with focused groups of hard-core gamers as well as constant updates and changes as well as regulations are posted online. For example, the current use of menu and navigation are constantly taken in the future developments.

According to Mr Tseng of Nintendo, “Marketing supporting power is kept strong and Nintendo has kept managing allocations of resources effectively by attracting new partners to explore areas which they are not familiar”. For example, its latest corporate venture with IGN entertainment has enabled Nintendo to develop a new gaming interface boosted by wireless internet connectivity service. According to Mr Tseng “a simpler, all-access, non-leakage NDS internet gaming service will be achieved in a foreseeable future”. By using IGN’s ‘GameSpy’ connection techniques to make WiFi connection much less “steps” hence potential customers can anticipate more user-friendly

connections. The most important of all is that the service is completely free of charge and it should bring the Nintendo world gaming community much closer to each other. As quoted from Mr Tseng “we want to make it as convenient as its short distance wireless connections which NDS already supports”.

In terms of games repositioning, Sony indicated that this is not currently a concern for them. “I do not think that the game-repositioning will cause a major setback for our consumers”, said Mr. Sharples. He then went on mention that even to play an exact same game such as FIFA 2005 on a PS2 is completely different experiences whilst playing on a PSP. There are so many possibilities that you can invent on a handheld games can simply differentiate games offered between the two devices. Moreover, Mr. Sharples believes that the potential end users recognise Sony’s image in quality of home consoles and PSP can transform gamers’ experiences onto a portable platform. An example was given to illustrate that despite similar games exist across platforms such as home console, personal computer, and PGCs the demand for those games will not be hampered as Mr. Sharples was quoted saying “a football game is a football game and a hard-core football-frenzy gamer will continue to play football games regardless of where and when and PSP can give you just that without compromising our standards”.

4.3.2 Product features and Diffusion Process

According to Gizmondo, “mobility” is the most important factor behind the diffusion of portable gaming. The types of consumers are those who want to be “out and about and carrying it all the time”, said Mr. Beavens. These means that duration of game-play is needed to be short burst, and is estimated by the firm to be playable in 10, 15 or 30 minutes. It is the focused, short entertainment that Gizmondo wishes to focus on in terms of their software production. The above notion can be extended not so much in the types of game but graphic details. For example, “in the FIFA 2005 we do not care so much about the details of each players’ graphics and the gaming experiences are different in comparison with playing playstation on a 35inch plasma TV”, said Mr Beaven. The GPS function provided by Gizmondo can provide gaming experiences with another dimension.

For example, games which consist of treasure-hunting can provide gamers with experiences of real physical geographical location. However, first-person shooting games can not be achieved by a portable gaming device as the ability of graphics performance can not be matched by Gizmondo. In addition, the controls can not provide users' experiences well enough in comparison with home consoles.

In terms of network gaming Gizmondo seems very pessimistic about progress so far. According to their research "90%, if not, 99% of all the gamers are engaged in single player mode", said Mr Beavens. Current, their evidences show that portable gamers very rarely engage themselves in multiplayer mode. "There used to be so much publicity and interests in network gaming within mobile gaming industry has now died down", said Mr Beaven.

Network gaming is important in a sense, e.g., a group perceived as gamers are not restricted to one TV screen. However, Wi-Fi is not its best approach to network gaming. Unlike NDS, Bluetooth technology has the simplest connectivity which is adopted most widely by mobile phone users. GPRS technology can provide full network coverage running by telephone companies. Gizmondo's philosophy, according to Mr Beavens is that "you don't have to use it but it is ought to be there when you need it (network gaming)". There are 3 phases in terms of the consumers' age which Gizmondo focuses on: First six months we target at 25-30 years old male. The second six months 18-35 years old which is the core phase. The third six months is targeted at younger gamers who have access to financial resources from their parents. Lastly, Gizmondo's GPS function can be supported from satellite stations to provide users wherever they are in the world. Information on players of specific interest, puzzle hints can be delivered via the GPS network, which are invaluable for newly developed games. For example, the GPS clock which shows the lifespan of different creatures is essential for gamers to explore information for Luna cycle in monster fighting games. In addition, games can be facilitated from the provision of users' geographical surroundings and features such as Stonehenge (special powers) and libraries (monsters' information) instantly derived from real-time GPS transmission.

In terms of improvements NDS have made with respect to the user-interfaces, Mr Tseng mentioned the provision of 10-30 meters wireless communication can make a good use of Pictochat. Wi-Fi internet connectivity at several 'hot stops' already reached 1000 in Japan and it is planning to develop with overseas game and software developers to focus operations in large department stores. The example of a game which has been enhanced by Wi-Fi capabilities is 'Animal Crossing: Wild World', which allows players to visit other players' villages, assuming that access to a compatible wireless access point is available and that they are using a version of the game with a compatible language.

From Sony's point of view, there is not a certain type of games in relation to their product development with respect to end-users. "We want our consumers feel that there are additional features enhanced by PSP in terms of the games they own", said Mr, Sharples. However, some of Sony's publishers are willing to offer games by taking advantages of our facilities. For example, game share can act as a playable demo for potential gamers without having to purchase the game first. "It can also give us advantages of marketing a product from the users group", adds Mr Sharples. He then gave an example of first person shooting games which can be perfectly crafted by PSP consoles and projected on the innovative LCD wide screen. "Our philosophy in handheld gaming device is that due to the timing constraints, the concept of 'game snack' is very much focused in terms of game-development", said Mr Sharples. Thus it is a different perspective to home console games where often gamers tend to play continuously. He also stressed that "only 3-5 minutes of short games such as racing games" are focused in the majority style of game-play from the prospective users. For example, the game 'Ape Academy' which offers mini, bite-size chunks to be played on a PSP, its style is significantly different to the version released for home consoles.

The new features which the PSP wants to bring customers' attention, in terms of improving their gaming experiences, according to Sony, is the newly added internet browser. Sony argue that it is very useful to upgrade its internal software without having to purchase a complete new hardware. The importance for the ability to maintain their relationships with their customers is seen as extremely important by Sony: "We

understand that the ability to download new stuffs is important for contemporary gamers in order to build a long lasting relationship with Sony". GPRS is another important feature. In terms of the combination of our software it is a very useful proposition. A camera is also included and we can even expect games to be developed based on that function, such as "i-toy". Other functions are related to PDA enabled features, recording facilities with detective phones, and most importantly, our USB port which broadens the view of many additional functions externally.

4.4 The relationship between Producers and Retailers of the Portable Gaming Consoles

Game is Europe's largest game retailer and have excellent relationships with publishers and gaming hardware manufacturers. According to Mr Soffe from Game, "We built our relationships based from the supports we give to both hardware and software manufacturers" and "We have been in the retail business for a long time and have lots of experiences in working with each other towards promotions to encourage consumers to buy games". Portable gaming consoles such as GBA, GBSP, NDS are currently available and Game will start selling PSPs as well from September 2005. Moreover, Nintendo Micro, which going to be the next portable device for Nintendo will also become available towards the end of year. The best selling console according to HMV is the Nintendo GameBoy series. There are plans for selling Gizmondo and PSPs which may be introduced in September 2005. Their advertising plans are set by Nintendo and any other additional offers and promotions are set by the central HMV office in London.

Both Game and HMV are very interested in terms of feedbacks given by consumers. From the interviews given, it appeared to be even more so from Game's point of view: "We operate our business in a face-to-face daily basis and ongoing feedbacks flow between us, consumers and the suppliers", according to Mr Soffe from Game. It is very important in the aspect that lot of the marketing materials are focused on window displays. Deals and promotions are easier to promote to consumers at prime sales positions. There are even Billboard-like styles for top-selling games and various

comparisons and contrasting information provided by advertising to industries. According to Mr. Beaven from Gizmondo, their relationships with retailers are perceived as “symbiotic”. Moreover, the usefulness with respect to their retailers is described as “forward-facing, product ambassadors, and recognised points to purchase”. Gizmondo’s retailers represent the important of sales (which according to Gizmondo, is accounted for 80% of total number of sales) while 20% marketing budgets is spent on advertising in their stores.

From Mr. Sharples’ (Sony) point of view, the gaming market is driven by new technology. Communications to consumers in order to inform any price changes are very important from advertisers’ point of view. Retailers are seen as “hugely important” by Sony who perceive them as an integral part of distribution processes to channel and deliver pre-launch information for their products. According to Mr Sharples, retailers are “safer persuaders for potential consumers with its expertise to attract consumers” which Sony not rely on their expertise in promoting their hardware but also many important ‘killerapps’. In terms of the relationship with software companies, according to Mr Sharples, there are 13% of game titles are published by Sony itself. The remaining 87% comes from other publishers such as Sports Interactive who pay license fees to Sony and to produce their own games independently without any interference. There are also wholesalers who can distribute wide range of games to retailers directly such as EA Sports, whose experiences in games publishing can provide up-to-date information especially for the pre-launched products. Finally, table 4.2 below summarises the difference between the efforts which each hardware producers contribute to end users innovation in relation to the significance of marketing efforts.

	Level of End Users Innovation	Significance of Marketing
Retailers:	n/a	High
Hardware Producers:		
Gizmondo	Low	Very High
Nintendo DS	High	Very High
Sony PSP	Medium	Very High

Table 4.2 Comparison between level of marketing and innovation for end users

According to the evidence derived from secondary data and interviews, the significance level of marketing are very high for the three PGCs examined. Sony, Nintendo and Gizmondo have multi-million USD budgets for their advertising campaigns. However, while PSP and NDS are available to purchase at Game and HMV, Gizmondo may currently be retailed at their flagship store in London at the time of writing. Nevertheless working relationships of promoting the three PGCs were emphasised strongly by each of the representative. For instance, according to Mr Beaven from Gizmondo, the relationship with their retailers was described as “interdependent and symbiotic”.

According to the findings from the interviews the levels vary widely with respect to innovations associated with end users. Despite being the most functional PGC the risk-averse concept in the notion of product developments has led the discouraged process in terms of R&D. Moreover, the limited support from third party game developers means that the functions such as GPRS and GPS may not be optimised to their use. The development of network gaming has not being fulfilled and cost structure of extra connection charges were not clear. Rather, implementation of ‘smart ad’ to increase sales the focus was the focal point which do not act as an advantage for improving users’ gaming experiences.

Sony’s traditions of technology-push orientated innovations means that PSP aims to differentiate significantly in terms of its product (hardware) and new technologies such as the storage units (UMD) and other multi-media functions. The large display, interfaces

and controls have been shaped to match users' needs in accordance to their past experiences with PlayStations. Despite Mr. Sharple's from Sony believes that the majority of their gamers engages in single player mode, the inability to implement connections for PSP's network gaming and pricing policies may overshadow the benefits of their wireless technology. The importance of networking gaming will be examined in the next chapter.

Nintendo has focused on their product innovation with respect to processes which are closely linked with users. The innovative touch screen allows their users to improve physical aesthetics and more accurate games control. The variety of game supports and affordability has been considered for their perspective end users. From the view point of network gaming the new addition of WI-FI connectivity has been enabled. Reflecting to the sensitivity of costs from the end users the provision of free WI-FI Internet connections at the designated areas ('hot spot') increases the feasibility and trail-ability for the end users to engage with other gamers in the virtual space.

4.5 Conclusion

This chapter provides a detailed analysis deriving from the respective qualitative data of interviews conducted with three portable console manufacturers and two retailers. The detail of interview questions can be found from appendixes five and six.

As a new entrant to the market, Sony's PSP is heavily relied on the innovation of the new technology. The firm aims to differentiate significantly in terms of its product (hardware) and new technologies such as the storage units (UMD) and other multi-media functions have enabled their product to inherit the traditions of technology-push orientated. However, difficulties have been raised from the length of videogames production which does not balance to cost of productions. The use of new technology means that game developers may have difficulties adjusting for the modification of games and therefore the timing for game releases may be less accurate. Similarly, Gizmondo have found that the support for the production of games to be quite difficult. Even though the hardware

has a superior features of functionality than either Sony's PSP or Nintendo DS the duplication of similar game titles and less 'killer applications' will less likely to improve the hardware sales. However, Gizmondo have the lowest costs in terms of R&D which means that their current financial burdens to achieve success is less and hence their aggressive strategies in marketing such as 'smart ads'.

In terms of the users innovation Nintendo has been the most convincing. Many of the product innovation processes have been linked with users. Incremental innovations ranging from the thumb wrap to the touch screen shows the improvements of not just the user interface but also the physical aesthetics of more accurate games control. Extensive testing has been conducted throughout each iteration of their design in order to achieve the consistency and affordability which is central to the concepts of aims. From the view point of network gaming, Nintendo remains the most optimistic. The new addition of WI-FI feature means that more gamers can be gathered to participate within a reasonable range without barriers of connectivity in the past. Moreover, 'hot spot' of internet connectivity may be feasible for the end users to engage with other gamers in the virtual space. The main concern was the costs, which is seen fairly sensitive for their targeted consumers. In terms of the current market, Sony are very clever with enormous amount of experiences in the gaming business. It has been able to deliver great technologies to emerge in the market. They have a strong desire to prove that they can break into the portable gaming market. Amalgamation of manufacturing, financing and marketing muscle Sony is Multi-platform in terms of their strategic positioning.

Finally, the linkages between retailers and hardware producers have been described as 'very strong'. The interdependence between the two parties is seen as very important in achieving the successes of portable console sales and their respective videogames promotion. All the interviewees from the hardware firms believe that the retailers possess crucial roles in terms of getting end-users' feedbacks as well as their specialised marketing ability. They are acted as a medium between the communications of end-users and producers.

Chapter 5- Quantitative Research- Online Survey Analysis:

5.1 Introduction

The previous chapter much effort was focused on exploring the innovative processes connected with the development of each of the product examined. Attention was also given to the innovative features and important specifications of each PGC from interviews with company's representatives. Moreover, the role of users in the innovation process was examined from the perspective producer's representative. In terms of product delivery, views on channelling and retailing strategy were shared by the interviewees from rental stores. This chapter will aim to discuss an online survey involving end users of PGCs. The reason for conducting both the interviews and online survey was that broader views were reviewed useful in so far as they might give the overall research another dimension. The disadvantages of having interviews just for either game manufacturers and retailers is that it does not convey the whole picture of innovation processes and feedback loops. As stated earlier, this research is primarily focused on developing analysis into the role of users in innovation as the factors that affect adoption and diffusion. This chapter aims to move towards a better comprehensive analysis of current and future issues of end users in understanding of adoption behaviour with the use of figures and statistical charts. This is derived from the sample of 70 respondents who participated on the online survey.

5.2 The Orientation and Structure of the Study

The collective information from the interviews in the previous chapter has been entrenched to the actors ranging from producers to the intermediaries such as distributors and retailers. The business relationships and strategies between the actors above were also examined. Therefore, in order to complete the network of video games, this chapter aims to address factors which affect users' adoption and adaptation of PGCs.

First, this study addresses the personal information (such as age and gender) of the sample collected with regards to their game play experiences associating with PGCs. Assuming all the respondents have had some experience in playing PGCs the usage of current or previous models are recorded to determine the distribution of varieties from their backgrounds. The sample has been asked to complete twenty questions. After the initial collection respondents' past and current experiences, the survey is then focused on gathering the opinions of usefulness across various innovative features in the PGCs examined. Factors such as 'functionality', 'design', and 'availability of games' will later be cross-examined in order to determine their order of importance.

The next section is directly linked with how end users perceive the benefits of network gaming. This notion is explained in the literature review chapter of how PGCs can stimulate diffusion processes as a result of user adoptions. In terms of network gaming, the most important innovative feature is 'connectivity' between the PGCs which connects to the development of wireless technology: many PGCs of producers have expressed the importance of exploiting connectivity for portable gaming. Therefore questions 9 and 10 are set to investigate whether end users coincide with the producers in this respect.

In addition to the diffusion and adoption elements, the respondents are then asked what the main reasons are behind purchasing decisions for PGCs (question 11). Then the respondents are asked to put the four chosen factors of importance in descending order. Following questions 11 and 12 respondents are encouraged to choose one of the studied PGCs which they most likely to purchase and also asked to state reasons if possible (question 13 and 14). The respondents are invited to recommend improvements for PGCs (question 16) and also how they perceive of the industry evolve in the future (question 15).

Finally, the brand images of PGCs in accordance of the respondents are recorded for companies which have released their products (question 17). The subsequent question was addressed to respondents who may have possession of home consoles. In addition, those who answer question 18 and have experience in home console ownership are asked

to provide information on similarities in terms of their game-play experiences on the PGCs in question 19.

5.3 The user demography and Ownership of Portable Gaming Consoles

The results of 20 survey questions are displayed in appendix 2 graphically and also in percentage forms. Out of 70 respondents the majority of the samples (60) lie within the range of 20-29 age group (85%). There are 9 recorded (13%) for age 30 and above and only 2 respondents are below 20. In addition, the gender difference is found insignificant from the sample collected. This is somehow surprising because female gamers are usually neglected and underrepresented in the videogame industry (Bryce and Rutter, 2005, p.301). However, the sample (40 males and 30 females) shows that the gender difference in the number of respondents is only 10. Therefore it appears the 'gender biases' will not be a major issue in the subsequent findings represented from the study.

There are 36 (52%) respondent who have been using a gaming console for less than a year but there are also accounted for 14 (20%) who have been playing mobile games for more than 5 years. This can be explained by the significance of recent introduction of various portable gaming devices available in the market. From figure 5.1 below there are less than 5 respondents who possess a console for more than 5 years. Moreover, only 10 respondents manage to keep their consoles for more than five years. Hence the rate for eliminating old products appears to be high for the previous models (mostly produced by Nintendo).

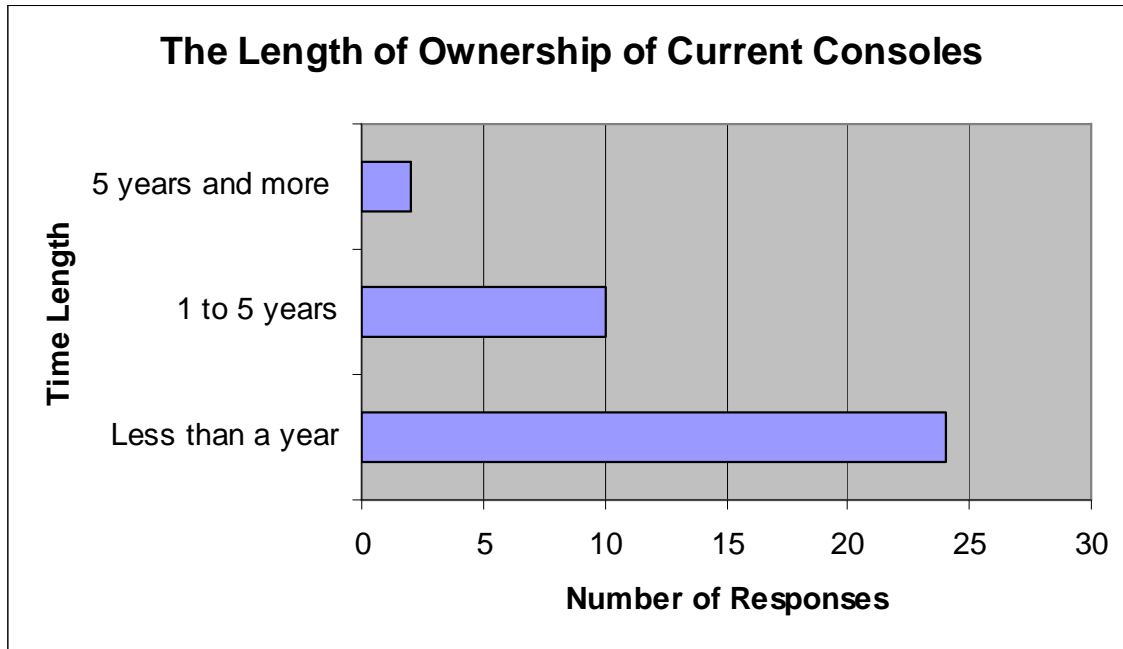
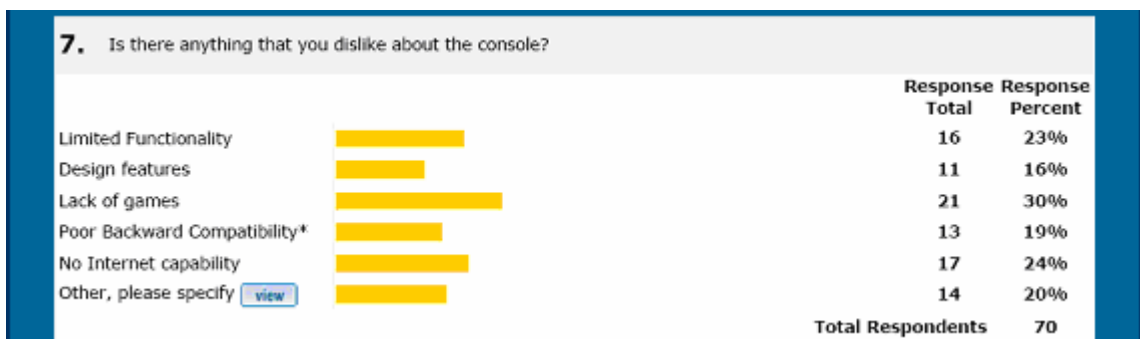
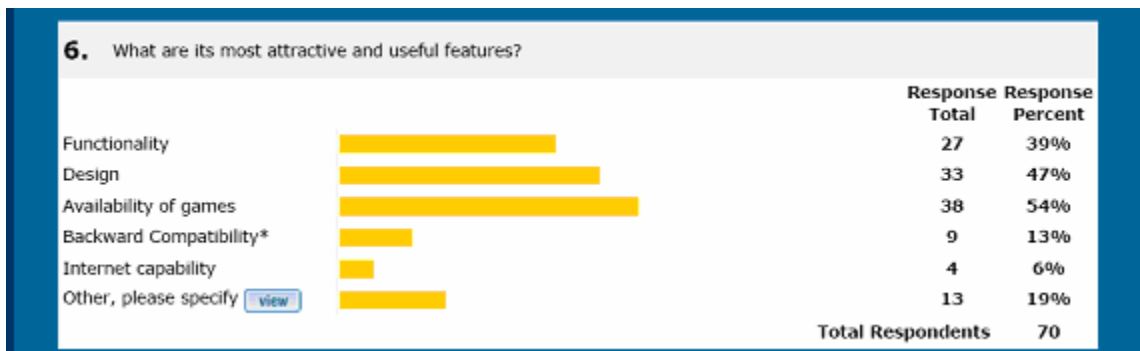


Figure 5.1 Time Length of Ownership of Current Consoles

The most popular console owned by the respondents at the time of the research was the predecessors of GameBoy series manufactured by Nintendo. There are 44% (21 people) of our respondents still using the previous models manufactured by Nintendo (such as GameBoy™). This is understandable given that Nintendo’s dominance in the portable gaming industry has accrued since they enter the market in 1989. However, only 10% of the respondents (5 people) own the current model NDS whereas 42% of them indicated that they own a PSP. With 20 entries Sony’s PSP was shown as the highest number of new PGCs owned by the respondents in 2005. It is very interesting as it provide us an indication of the possibility of market penetration by Sony, who only have entered the mobile gaming market for the very first time. There are 24 out of the total of 49 respondents (67%) who mentioned that they own the current console for just less than a year. There were also 28% of the respondents claimed that their current consoles have been used in the region of 1 to 3 years. Similarly, the different groups with portable gaming experiences vary from more than 1 year to 5 years are almost equally distributed. This means that the respondents are equally dynamic in terms of their variation in portable gaming. Therefore the suggestions and opinions gathered later can reflect diverse groups of gamers which are not often represented by snowball sampling method.

5.4 The Appeal of Innovative features to Consumers

The results generated from questions 6 and 7 are somewhat contradictory (see below). The ‘availability of games’ is the most satisfying feature of their current consoles while lack of games is still mentioned by 1/3 of our respondents. According to the findings, on one hand, ‘the availability of games’ is the most important feature according to the votes by respondents (54%). Factors such as ‘design’ is next with 47% and ‘functionality’ is third with 39%. Some of the respondents provided many very useful comments such as “the games implemented on that platform attracted me, not the platform”, games with “Killer Application” and the “trendy” factors which affects some buyers in their purchases. On the other hand, there are still 30% of total respondents thought that there were still lack of games available on the market. Next in order are factors such as ‘non-existence of internet capability’ (24%) and ‘limited functionality’ (23%).



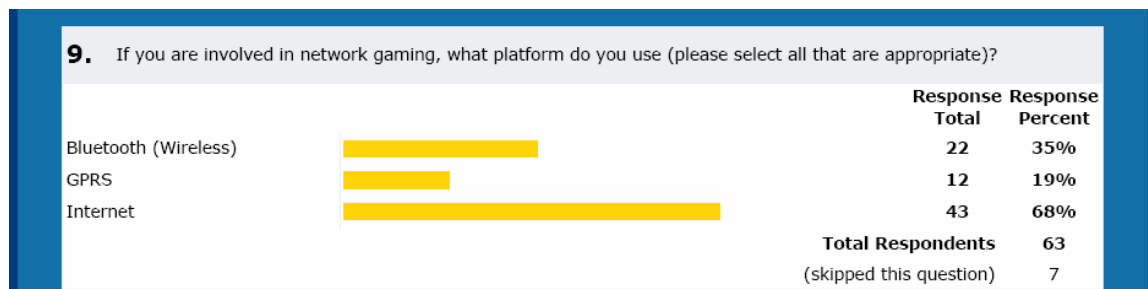
Others suggested that their current consoles are too old, ugly design, poor battery life, and too heavy. Even though the evidences shown that over half of our respondents think that there are sufficient number of games available there is clearly a tendency of high

expectations on the focus to release more and better games. Hence, the contradiction now seems less confusing.

In terms of internet connection only 6% (4 respondents) find their consoles attractive. Moreover, 24% (17 respondents) believe that the inexistence of internet connect for PGCs are amongst the second highest for the reasons that this hamper the users' game-play experiences. It leads naturally for the survey to explore towards the specific technologies in relation to network gaming, which varies in accordance with different manufacturers. More details are discussed in the next section.

5.5 Console Connectivity and Network Gaming

In terms of network gaming, 68% of our respondents (43) use internet as their main platform. The second place Bluetooth technology is consist of 35% (22) and GPRS is the least popular with 19% (12). The internet technology is not new but very few people have experienced it on PGCs. The PGCs studied offered two types of network gaming. Sony and Nintendo have adopted the use of WI-FI technology which is advantageous for users of high speed intra-networked experiences amongst themselves. However, Gizmondo's GPRS function allows gamers to through a server which are most commonly used for tern-based games such as RPGs.



The importance of a wireless feature according to the research finding shows that it is moderate to the respondents (where 1 is very important while 5 equals to not important at all). The majority lies on the middle of the spectrum with 16 respondents (29%). The calculated response average of 2.9 shows that the data is very close to 3, hence the

importance of network gaming is still undecided by the opinion poll from respondents.

10. How important is a wireless feature (network gaming) for your gaming experience?							
	1	2	3	4	5	Response Total	Response Average
The importance of a wireless feature	18% (10)	22% (12)	29% (16)	11% (6)	20% (11)	55	2.9
						Total Respondents	53
						(skipped this question)	17

It may be because the internet connection is still too complicated and acts as an extra expenditure for end-users, which adds to the uncertainty of their willingness in using the technology. At the time of writing the pricing plans were unclear and the three PGCs were all at the planning stage of service provision. However, Nintendo have considered providing service of their WI-FI connections at ‘hot-spots’ without causing expenditure for their gamers.

The next section will concentrate on the search for the four of the most important factors that are taken into account when purchasing a PGC. The results can reflect as an indication for selecting the most suitable PGCs that matches the needs of end users. The ranking of factors are useful for the author to determine the important issues which actually affects that the end users make with respect to purchasing decisions.

5.6 An Analysis for the Factors of Adoption:

The calculations of rankings can be denoted from question below (please refer to question 12 from appendix 2 and 3). The calculations are such that the ranking points are added up from and plotted against the 18 factors. In descending order, the highest rank of a chosen factor is awarded 4 points while the last (the fourth) chosen factor is awarded 1 point and so on. In doing so, the relative importance of various factors can thus be differentiated. Amongst all the factors which might influence the decision to purchase a portable gaming device, cost (106 points, denoted by K) is most significant. The next group consists of ‘graphics’ (G) (57 points), ‘variety of games’ (I) (55 points) and ‘battery life’ (D) (54 points).

Of the three consoles sold in the UK PSP is the most expensive and Gizmondo is second. Nintendo's current retail price in the UK is almost half of PSP's when PSP first launched, which means that if consumers are very price sensitive the impacts which it placed upon Sony will be significant in terms of sales. However, as the user demography between the two firms are much different, other factors may be considered in my sample and not considered in a younger age group. The points calculated show that factors G, I, and D are very similar in terms of the level of their influences. The level of importance factor for 'graphics', again proved significant as just under half (49%) of the respondents which the outcome was the second highest in the ranking. This also correlates with the previous selection where 51% of the respondents made this selection in question 11. Hence Sony's strategy in their ability to match PSPs' resolution with a PlayStation console has an edge over other portable gaming devices.

From the interview, James Beaven from Gizmondo stressed the importance of battery life in terms of Gizmondo's technical innovation processes, which revolutionised the production of mobile gaming consoles. Gizmondo's 4 hours active gameplay and over 150 hours standby time is quite promising which shows their improvements on the innovations to try to meet end users' needs. Similarly, Nintendo's Lithium ion battery is able to deliver six to ten hours of play on a four-hour charge, depending on use. This appears to challenge Sony, who estimate the battery life of the PSP to be, depending on the application, four to six hours for gaming and four to five hours for video playback. However, according to the ranking points (please refer to questions 2 from appendix 2 and 3), apart from the 'cost' (K) factor (106 points), which still remained the most important in terms of making purchasing decisions. However, figure 5.2 also shows that factors such as 'graphics' (G) (57 points), 'variety of games' (I) (55) and 'battery life' (D) (54 points) may become prevalent when competition becomes fierce and the pricing strategies may turn aggressive amongst firms.

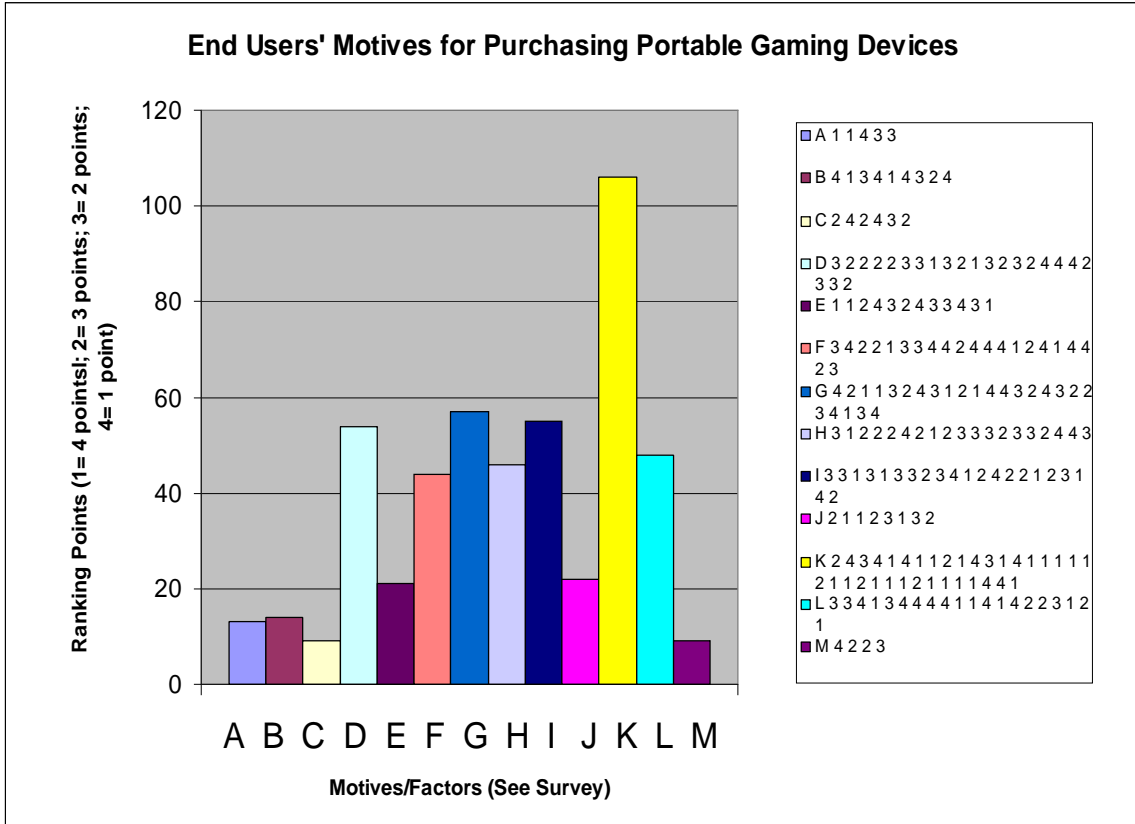


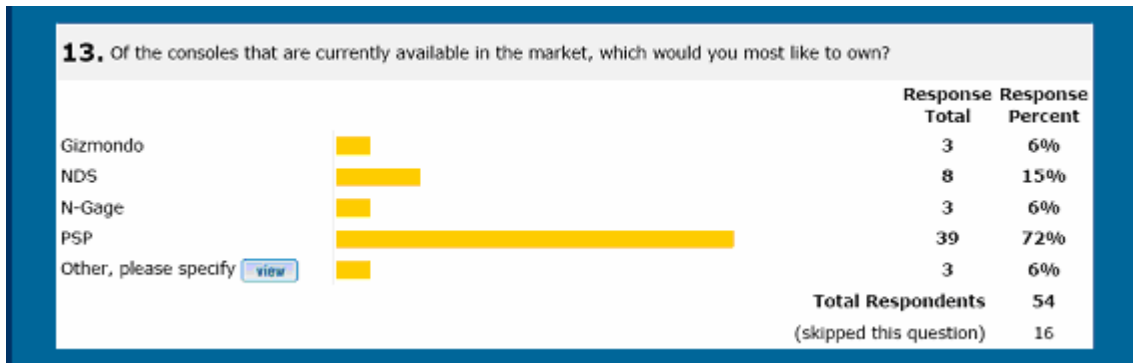
Figure 5.2 End Users’ Motives for Purchasing Portable Gaming Devices

In terms of size, Gizmondo prevail between the three PGCs. Not only are they the smallest (138 x 82 x 32 mm) their weight of 181g is significantly lower compared with that of NDS (275 g) and PSP (260g). Despite NDS being relatively heavy and quite large (148.7 x 84.7 x 28.9 mm), availability of games from many third party developers has producers have already been encouraged: to produce games in the NDS format and base with complement the already strong in-house support of games for the NDS.

With respect to PSP’s weight and size (170 x 74 x 23 mm) they may not be the ideal choice for consumers. However, similar to Nintendo, additional support is derived from Sony’s other areas of expertise such as electronics. In this case one of the main strengths of UMD is that it provides a lighter and more robust way of storage not only for game productions but also film makers. Therefore UMD provides an attractive perspective to encourage third parties producing games and other media products for Sony.

5.7 Selection for Purchase and Recommendations for Future Innovation

There is overwhelming evidence (72% of the total 54 respondents) that most respondents would like to own the PSP. The next favourite, is the NDS but this was only 15% of the respondents (see findings below).



The image of NDS can be seen as less appealing to the sample of the study which are predominantly between age 20 to 29 years old. This age group is often perceived to have higher disposable income for luxury goods and therefore they are less likely to be put off by price. In addition, Sony's PSP is about to enter the European and the UK market in September 2005 and many potential consumers have placed high expectations on the forthcoming device. The reasons which many of the respondents gave for selecting PSPs include: "smart/cool design", "excellent graphics and sound quality", "mobility", "Sony equals quality", and "rich, multi-functionality" whereas Nintendo received feedbacks for its advantages in "affordable price", "exclusiveness of games (especially Mario series)", "wide variety of games", and "long battery life". Other reasons such as "fast processors", and "exciting new product with potential" can be seen as to Gizmondo's advantages.

In terms of the improvements and future developments of portable gaming, there are over 56% of the respondents would like to see future game console more powerful in terms of 'processing power'. Over 40% of the respondents want more functions to be added onto the devices. More than 5 respondents also specify battery life and performances in the 'others' section. There are also 49% of the respondents would like to see improvements on the 'graphics'. A recorded 53% of the respondents stressed again that 'functionality'

of portable gaming consoles is still in need of improvement. Overall, the above findings make Gizmondo's powerful processing power the most favourable for the future selection of consoles. In terms of functionality NDS is very much lagging behind, and its inadequacies may be reflected upon their relatively inexpensive price.



5.8 Other Factors to Consider With Respect to Adoption:

In terms of the depth of branding, Nintendo may have to worry about its image as the sole provider of portable gaming consoles. There are 49% of the respondents chose Nintendo whereas 47% select Sony as their choice. Therefore it is not difficult to see that Sony's market penetration power can certainly have an impact on Nintendo's leadership in the current mobile gaming market.



As a content setting question, respondents are asked whether they own a home console. The results are shown that out of 55 respondents 68% own a home console and 28 of them own a Sony gaming device. This means that question 18 can support the notion that gamers who own PGCs are not limited to portable gaming alone. In addition, with respect to the findings there is no evidence that PGCs are substitutes for a home console. There are 6 respondents who own a Microsoft's X Box, whereas only 3 own a device made by Nintendo. Again the results clearly reflect the dominance of Sony in sales of home consoles. There are also 2 respondents that have both Sony and Nintendo home consoles (this evidence is provided in the 'other' section).



There are also some statistically important issues aided in the final question. On one hand, many respondents foresee the possibility of phone-incorporated gaming devices will grow in the future. One of the respondents mentioned the additional costs of downloading games is GPRS hampers the growth of the usage of network gaming. He/she also mentioned that it is expected that the internet service will become cheaper or even free of charge in the near future. This will attract more players and game sales, as

well as fulfil the use of consoles' functions to a further extent. However, on the other hand, many respondents still think that a mobile phone device should not be over-complicated by turning itself into a great gaming gadget. There would be content with simple, short and downloadable games and not worried too much about other additional features.

5.9 Conclusion

This chapter aims to provide feedback from the quantitative online survey which used "snowball sample" techniques explained in Chapter 3. The sample was asked to complete twenty questions which focuses on exploring the main factors for adopting a PGC. A few initial questions were constructed to draw end users into considerations of innovative features that are useful in fostering game-play experiences. In addition, this chapter investigates the suitability of the three PGCs examined with respect to purchase decision-making processes for the end users. Lastly, users are tested for the brand images against each PGC as well as research on the effects from the use of home consoles with respect to adoptions for portable gaming.

The findings show that out of 70 respondents the majority of the samples are in the age group of 20-29 years. The difference in number of both sexes from the sample collected is found insignificant. The most popular console owned by the respondents at the time of the research was the GameBoy series (predecessors of NDS) which is accounted for 44% (21 respondents). In terms of gaming experiences there are 36 (52%) respondent who have been using a gaming console for less than a year. However, but there are also 14 respondents (20%) who have been playing mobile games for more than 5 years which shows the diversity across the game-play experiences. The actual adoption of PGCs at the time of research shows that only 10% of the respondents own an NDS whereas 42% of them indicated that they own a PSP. There are 67% of respondents who stated that they own the current console for just less than a year.

Regarding factors of adoption, results show that the respondents are most satisfied with respect to the 'availability of games' (54%). Factors such as 'design' rank second with 47% while 'functionality' is third with 39%. In contrast, still 30% of total respondents believe availability of games for PGCs are limited. Next in order are factors such as 'non-existence of internet capability' (24%) and 'limited functionality' (23%). Amongst all the factors which might influence the decision to purchase a portable gaming device, cost' (K) factor (106 points) scored the highest while, other factors such as 'graphics' (G) (57 points), 'variety of games' (I) (55) and 'battery life' (D) (54 points) are also important in terms of making purchasing decisions

In terms of Internet connection, even though only 6% (4 respondents) find their consoles attractive 24% (17 respondents) believe that the lack of Internet connect are reasons that hamper the users' game-play experiences for PGCs. Therefore networking is seen by many respondents with significant potential for portable gaming diffusions networks. According to the findings, 68% of respondents use internet as their main platform. The second place Bluetooth technology has 35% of users, and GPRS is the least popular with 19%.

72% of the total 54 respondents said that they would like to own PSPs most whereas 15% of the respondents would like to own NDS. According to the respondents, PSPs are seen as superior in terms of being a fashion item. The quality of graphical resolutions and functionalities are most commonly noticed. Nintendo received feedbacks for its advantages in their pricing, variety of games, and longer battery life. In terms of branding and image there are 49% of the respondents chose Nintendo whereas 47% select Sony when they think of portable gaming consoles. Hence the balance in the persistence of Nintendo's dominance in portable gaming has been challenged by the new entrance of PSPs.

Lastly, in terms of the improvements and future developments of portable gaming, over 56% of the respondents would like to see future game consoles with greater 'processing power', whereas 53% stressed again that 'functionality' of portable gaming consoles is

still needs improvement. In the next chapter the collective views from end-users and manufacturers will be cross examined. This synthesis will be useful not only to capture the level of understandings between them, but also may help to reveal the likelihood of successfulness from the firms' innovation diffusions with respect to their PGCs.

Chapter 6- Synthesis: Networks and Relationships in the Product Development Process

6.1 Introduction

This Chapter aims to provide a synthesis with regards to the important findings derived from Chapters 4 and 5. Essentially, the assessment for the data collected can be useful to examine the correlations with the innovation theories examined in Chapter 1. The first part will summarise how the PGC manufacturers engage with users to conduct the process product innovation. Moreover, the significance of the relationships between the actors in the video game production network (including the manufacturers, retailers and end users) will be examined. Moreover, specific innovative features of development from the PGCs are cross-examined with respect to the data collected reflecting users' needs in Chapter 5. Consequently, this chapter aims to provide a critique for the innovation strategies with respect to end users explored from PGC manufacturers. Finally, the implications for each firm's competitiveness in the future will also be examined.

6.2 Innovative Strategies and Accountability of End Users

According to the finding from the interviews the following are the main priorities for the manufacturers to assess the technological trajectories and feasibilities of product innovation. As its console was the first ever product brought to the market by the firm, Gizmondo's focus was to release the device to the market as soon as possible. Hence the concern was mainly for the speed of product delivery. The firm has opted to purchase the key technological components without the enormous amount of investment which naturally accrued during R&D activities. The advantage from this approach is that the Gizmondo recognises the costs and uncertainties of in-house R&D and the decision for out-sourcing means that the firm wish to avoid "technological uncertainties" (Freeman 1990). As a start-up company it is both time-consuming and costly to conduct R&D from

scratch. This contrasts with Sony's strategy with PSP as the firm is heavily R&D oriented. The main reason for the birth of PSP was due to the technological breakthrough which was the storage facilities came with UMD disk and its extended storage capability. Therefore a product such as PSP can be perceived as a 'technological push' innovation.

Moreover, a significant amount of investments and efforts has been devoted by all three firms to overcome "marketing uncertainties" (Freeman, 1990). This uncertainty is connected with the difficulties in predicting the firm's product appeal of the firm's products and the intensity of competitors within the market. Borrowing from the experiences of a firm who possesses superior technology than other competitor does not necessarily achieve market success, the need to testing the market to determine success or failure for any products becomes a necessity (Cawson et al., 1995).

The importance of good internal and external communications (noted by Rothwell, 1977) is reflected in the efforts mentioned by the three firms to engage with user needs in the innovation process. For example, Sony's added internet browser in its PSPs can be very useful to upgrade its internal software without purchasing a new hardware. The ability to allow users to be connected with iterative upgrades and improve user interfacing is important for some users as a form of learning process. This is because experienced gamers with accumulated knowledge (Cohen and Levinthal, 1990) have a tendency to make adjustments to, or even reconfigure, the products they have purchased. Consequently, according to Jeppesen "similar bodies of knowledge" (2001, p.17) are shared amongst end users and the manufacturer.

6.3 Interdependent Relationships Between Manufacturer and Publishers

According to the data and finding reported in chapter 4, there exists a relationship of interdependence between manufacturer and publishers. Retailers are not only important for console manufacturers in the sense of 'product delivery' to end users, but also to extract specific end-users' needs that might be useful for producers as they operate/innovate in the future. The 'needs' which reflects the realities of user's desires,

can be difficult to generalise and according to chapter 5, the most desired features and innovation from the perspective of end-users may not necessarily be captured by manufacturers. Moreover, opinions towards specific innovative features of PGCs vary widely and gamers who possess various game-play experiences may demand differently across a wide spectrum of innovative features and ergonomics.

The interviewee from Gizmondo stressed the relationship between his firm and retailers is a symbiotic one. Gizmondo's retailers are described as "product ambassadors" and operators such as HMV, have installed a promotional shelf exclusively for the use of promoting Gizmondo related products. Similarly, Nintendo and Sony have frequently engaged with retail stores in delivering advertising campaigns and promoting their products through specific designated areas. For example, GAME was responsible for in-store advertisements to promote pre-ordering and console booths to stimulate purchase following the launch of new products. Pre-order campaigns for PSP and NDS are specifically targeted at the group whom are early adopters whereas those who want to practically acquire game-play experiences by playing demos after the release are often known as laggards. Hence, the significance of pre-launch and post-launch advertising campaigns is crucial in the processes of diffusion and adoption for the end-users and PGC producers can not deliver without the aid of retailers' aid (Gardiners and Rothwell, 1985). The above findings offer evidence that portable gaming firms are strong believers in the notion that which it is necessary to construct a close liaison with customers. Moreover, the total offering by launching and following-up on a campaign in order to stimulate acceptable rates of diffusion (as indicated by Littler, 1994, p.298) are all mentioned by the three manufacturers.

6.4 New Product Development and End User-Led Innovation

Much of the findings reported in Chapter 5 have explored the degree of importance of user adoptions in terms of mobile gaming applications. Several factors which have been found to carry significant influences of can also be identified in Rogers' (1995), which includes "relative advantage"; "compatibility"; "complexity"; "communicability" and;

“trial-ability”. However, according to the result from our study the factors of adoption may vary in different degree of importance.

The most significant according to the survey was the ‘cost’ factor which determine the majority purchasing decisions for a PGC. Apart from consoles and games which directly link to the costs, the emerging need for ‘network gaming’ have become increasingly prominent for portable gaming applications. Unsurprisingly, the PGC manufacturers have taken into account to include innovative features such as Wi-Fi, GPRS and other internet connection facilities in innovation of their products. However, according to our research findings only Nintendo have incorporated the use of internet connection by integrating their PGCs with Wi-Fi services provided by an outsourced firm. Even though each PSP and Gizmondo is equipped with internet connecting features, the solutions for pricing policies and charges remain unclear. This can be related to one of Rogers’ (1995) factors of adoption i.e. “payment option”. Despite acknowledging the support of internet enabled properties are becoming more apparent to support users to play network games, consumers are becoming more aware of the services which can be potentially costly for them if they were to choose adopting the service. As a result, end users who are more cost-sensitive may hesitate to commit themselves financially. This is evident from the results derived the survey, where the importance of adopting network gaming is less than expected. Hence the “functional” or “innovative” feedbacks from users (von Hippel, 2005, p.65) can not be ignored and many end users’ ideas could facilitate valuable productive knowledge as important sources for innovation (Jeppesen, 2001, p.7)

In terms of attractiveness and useful features, the factor of ‘design’ was found to be quite important. In terms of design and functionality, the PSP is much preferred out of the three PGCs studied. For many prospective end users the futuristic design and high-resolution graphics are persuasive enough to stimulate purchase. This type of consumer behaviour referenced here can be found in Rogers’ (1995) notion of “relative advantage”. The design of PSP and its multi-functional performance provides a “relative advantage” for fashion-conscious end-users. According to Cawson et al (1995, p. 42) factors such as fashion, novelty, modernity and sense of taste coincides with the reasons which many of

the respondents provided their purchasing decisions. The reasons for the PSP's popularity include: "smart/cool design", "excellent graphics and sound quality", "mobility", "Sony equals quality", and "rich, multi-functionality". In contrast, Nintendo received feedbacks for its advantages in terms of "affordable price", "exclusiveness of games (especially Mario series)", "wide variety of games", and "long battery life" which are clearly evident for both cases.

However, in terms of "compatibility" (Rogers, 1995) PSPs do not appear to have the edge over NDS and Gizmondo. In order for mobile gaming to become an integral part of gamers' daily activities the importance of battery life can not be overemphasised. According to the findings the battery life for an NDS (at 6 hours) is about double that of Gizmondo and about three times that of a PSP (assuming that sound and screen illumination are at the highest settings). Nintendo seem to have taken account of from past experiences – and expectations from potential users – in the process of innovating current products.

The factor of battery life has been highlighted as one of the most required improvements by respondents. In addition, the notion of product compatibility and lock-in can provide a persuasive guidance in terms of purchasing decisions in industries and consumer markets. Therefore it is important for producers to focus on incremental innovations in order to "ensure 'backward compatibility' with existing equipment and promise 'forward compatibility' with subsequent innovation significant impact on purchasing decisions (Cawson et al., 1995, p.52). For example, the games produced for predecessors (such as GBA) can also be played by on a NDS while new games are also compatible. Even though not applicable at present this feature is important to be taken into considerations for the next generations of PGCs produced by the other two manufacturers.

In terms of "complexity" the survey undertaken in connection with this study indicates that 66% of respondents perceive that their consoles are at least 'easy' to use (level 2). However, judging from the number of buttons which directly link to navigation or manoeuvring, the PSPs are equipped with most controls: this can be perceived to user

friendliness. With more buttons than other consoles studied, PSPs can seem more complicated in operation and thus, it is notionally more difficult for prospective purchasers to learn how to play games on the machines.

Despite the findings showing that the level of significance of network gaming is ‘fairly important’ for end users, the “communication” factor facilitate social diffusion through adopting PGC amongst users. The users of NDS are provided with virtual chat rooms which allow their gamers to communicate and thus encourage networking. Moreover, Nintendo also freely provide ‘hot spots’ for gamers to engage socially, whether chatting or playing games. As a part of marketing strategy, the “trial-ability” denoted by Rogers (1995) have been addressed by all the three PGC manufacturers. NDS and PSP consoles are provided for gamers to experiment in designated stalls in many retail outlets. However, Gizmondo’s flagship store in London is crucial for a new product not only to increase its “product visibility” (Cawson et al., 1995, p. 52) but also to facilitate learning from end-users’ experiences that can be used in the innovation and product iteration process in the future.

6.5 Conclusion

This chapter has examined the significance of the relationships between the key parties (i.e., manufacturers, retailers and users) in gaming with respect to product and process innovation. Interpretation of the data collected and analysed in Chapters 4 and 5 indicates that the extent to which the views and preferences of end users are taken into account in the innovation process is a major factor in determining the success or failure of a PGC firm and its products. This connects positively with literature reviewed in Chapter 1, wherein commentators have noted that the views of prospective end users should be considered prior to, during and after of the production processes. In general the findings indicate that the innovative features provided by Nintendo’s NDS have shown promising signs both in strategic and innovative terms. Moreover, the most important factors that determine the effects user adoption shown from the survey indicate that Nintendo is the most competitive of the three PGCs studied. The competitive

advantages which derived from the innovative features equipped by NDS have given Nintendo an edge to stay ahead in the portable gaming market at least in the short run.

In terms of shaping the future paradigm Sony's new design characteristics of portable gaming are well-reflected in our findings. Sony's reputation derived from its success in consumer electronics implies that Sony's potential for market penetration is enormous. This has helped to cement the company as a key player in the portable gaming industry. However, the findings show that neither Gizmondo nor Sony pose a significant threats towards Nintendo's leadership in portable gaming industry.

Chapter 7- Conclusion: Embracing Users in Mobile Gaming Innovation

7.1 Introduction

At its heart, this study has aimed to examine the relationship between producers/designers and end users in the innovation process in the portable gaming console industry. The rationale for undertaking the study resides in the fact that little is known about the levels and forms of interaction that exist between PGC developers and their community of users: moreover, little is known about the role of important intermediaries such as retailers, and this group was thus included in the research. This final chapter will revisit and re-state key findings reported in earlier sections and provide suggestions for further research on the basis of lessons from the current study.

7.2 Research Context, theories and practicalities

Chapter 1 begins by introducing innovation theories and incorporates concepts relating to product and process innovation, organisation of innovation activities, the role of users innovation, and users as innovators. The factors of adoptions and diffusion are also examined and connected with the PGC development process. Their implications in terms of determining the success or otherwise of specific gaming consoles is addressed in Chapter 2. Chapter 2 also includes an overview of all the main competing firms and products in PGC space – their histories and relative positions are analysed and the various product features and marketing strategies of the consoles and PGC manufacturers are compared and contrasted. Research Questions are explained at the close of Chapter 2 and awareness is drawn to the way in which the questions have been developed on the basis of the ideas and themes that are discussed in the first two chapters. Chapter 3 is constructed around a discussion of the methodology and tools that were selected for the launch of the research. The holistic nature of the study implied that both qualitative and quantitative approaches would be used to address the three actor groups (producers, users and retailers): each of these has considerable differences in terms of populations and

requirements for investigation and sampling. The key research tools used in the study were semi-standardised interviewing and online questionnaire surveying.

7.3 Relationships of Actors in Portable Gaming Network

In chapter 4 the findings show that portable gaming firms, just like any other firms, tend to prioritise new innovative features when implementing new product development plans and processes. Three PGC producers shared their views on how their development and innovation effort was deployed in order to improve the mobile gaming experience of end users. Prior to the release of new products, retailers are an important mediums for channelling end users' opinions to manufacturers (in order that these can be used to improve products and marketing techniques). Producers may consolidate or test their ideas via retailers in order that they can develop their pitch towards the end users and ensure that this pitch is framed in the most effective and efficient terms. The interdependent relationships between manufacturers and retailers are apparent as tasks between product innovation and marketing become increasingly specialised. However, the effort to understand users' needs and wants in general has proven to be very difficult. The results obtained in chapter 5 from an online survey indicate diverse opinions and behaviours in relation to PGC adoption: the factors of adoption do not necessarily match the producers' assertions with respect to how consumers' desires and performances are reflected in the new technologies. The broader diffusion of portable games may be facilitated by network gaming but the results of the survey show that many factors, for example, cost, may hamper the actual rate of adoption with respect to this type of gaming (especially for gamers who are sensitive to additional costs). Albeit from innovative features with respect to PGCs the availability of software support is closely connected with the considerations for end users' adoption of any PGCs.

Chapter six argues that it is essential for firms to identify the main innovative features that are seen as important for the benefit of users at an early stage in product development. For example, the development relating to user interfaces, controls and buttons are directly linked to the game play experiences of end users. End users, especially early adopters

tend to be more sensitive with regards to not only personal taste and fashion trends but also innovative design features and functionalities that PGC devices can offer. The information which producers and retailers may find useful in making innovative decisions for future improvements can be found in feedbacks from early adopters. Therefore, the role of retailers have become important – they do not just mediating the messages that producers would like to deliver (e.g. how each of the product functions) but also act from the end users’ perspective to collect and transmit preferences and behaviours with respect to the adoption of PGCs.

7.4 Suggestions for Further Study

The study has provided supporting evidences for considering the producer-user feedback loop as a tool for improving product innovation in PGCs. However, the competitiveness of console manufacturers can also be affected by one of the actors which has not been examined in detail in this study – the video game developers. The importance of ‘availability of games’ found in the current study implies that this is a crucial ingredient for success when releasing PGCs to the market. More specifically, strong software/game supports can increase the length of a product’s life cycle of the hardware as well as the marketing strategy for expectation. Strong software support which integrates with marketing expertise of retailers can actively increase consumer royalty. For example, a ‘killer app’ such as “Super Mario Bros” not only has become exclusive to Nintendo consoles but also the anticipation of games from end users extends NDS’ shelf life and images. The marketing strategy by ‘bundling’ video games and consoles together shows that the important effect which some games can bring to boost sales.

As the intertwining of production of games and user innovation has become noticeably more important since the ‘modification’ (MOD) era, the playing habits of gamers have become more proactive (The Modern Age, August 2003). The author suggests that more attention should be given to advantages for firms where these incorporate gamers into video game projects. Also, further investigation is required with respect to the

implications of including users in the designs and development process for hardware and associated peripherals.

APPENDIXES:

APPENDIX 1 SAMPLE OF THE ONLINE QUESTIONNAIR FOR END-USERS

Mobile Gaming Consoles - User needs and preference Survey

Mobile Gaming Consoles - User needs and preference

Page 1 of 2

1. Age: *
 - 15 and under
 - 16-19
 - 20-24
 - 25-29
 - 30 and above
2. Gender:
 - Female
 - Male
3. For how long have you been using a mobile gaming console?
 - Less than 1 year
 - 1-3 years
 - 3-5 years
 - More than 5 years
4. What kind of mobile gaming console do you own at present?
5. How long have you owned your current console?
6. What are its most attractive and useful features?
*ability to play previous released games on new machine Select at least 1 response.
 - Functionality
 - Design
 - Availability of games
 - Backward Compatibility*
 - Internet capability
 - Other, please specify

Appendix 1

7. Is there anything that you dislike about the console?
*ability to play previous released games on new machine Select at least 1 response.

- Limited Functionality
- Design features
- Lack of games
- Poor Backward Compatibility*
- No Internet capability
- Other, please specify

8. To what extent do you agree with the following statements?
(where 1 = agree very strongly and 5 = disagree very strongly)

	1	2	3	4	5
(a) My current console is very easy to use	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(b) My current console represents relatively good value for money	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

9. If you are involved in network gaming, what platform do you use (please select all that are appropriate)?

- Bluetooth (Wireless)
- GPRS
- Internet

Appendix 1

Mobile Gaming Consoles - User needs and preference

10. How important is a wireless feature (network gaming) for your gaming experience?
(where 1 = very important and 5 = not important at all)

	1	2	3	4	5
The importance of a wireless feature	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

11. Which of the following factors were important in helping you to decide whether to purchase your current gaming device?
(please tick all that are appropriate)

- A. Additional feature - phone device
- B. Additional feature - video function enabled
- C. Additional feature - wireless
- D. Battery life
- E. Speed
- F. Functionality
- G. Graphics
- H. Size
- I. Wide variety of games available
- J. Supports a specific game
- K. Cost
- L. Ergonomics or attractive design
- M. Same model used by friends

12. From the list above, please select the 4 factors that are most important to you when purchasing a new console and enter them in the grid below in descending order below: *
(i.e., most important first)

	1.	2.	3.	4.
The FOUR from the list (A to N) are:	I	B	C	F

13. Of the consoles that are currently available in the market, which would you most like to own?

- Gizmondo
- NDS
- N-Gage
- PSP
- Other, please specify

14. Please explain (very briefly) what it is about the console selected above that makes it attractive to you.

15. How would you like to see game consoles evolve?

(please tick all that are appropriate)

- More network players
- Faster processors
- More additional functions
- Better resolution
- Other, please specify

16. What improvements (if any) would you like to see with respect to gaming consoles?

(please tick all that are appropriate)

- Better graphics
- Better networking
- Multi-functionality
- Other, please specify

17. When you think about 'portable' or 'handheld gaming' what brand name comes into mind first?

- Gizmondo Nintendo Nokia Sony

18. Do you own a home console? If so, what brand is it?

- Microsoft
- Nintendo
- Sony
- I do not have one
- Other, please specify

19. Does your current portable gaming experience match your game-play experience at home? If so, in what ways:

(please select all that are appropriate)

- Interface (Bottoms, Directional Control, Triggers, etc)
- Graphics
- Games
- Other, please specify

20. Please use the box below to add any important issues or views (re: mobile gaming and selection of consoles) that have not been covered in this questionnaire, or to make any comments about the questionnaire in general.

Back

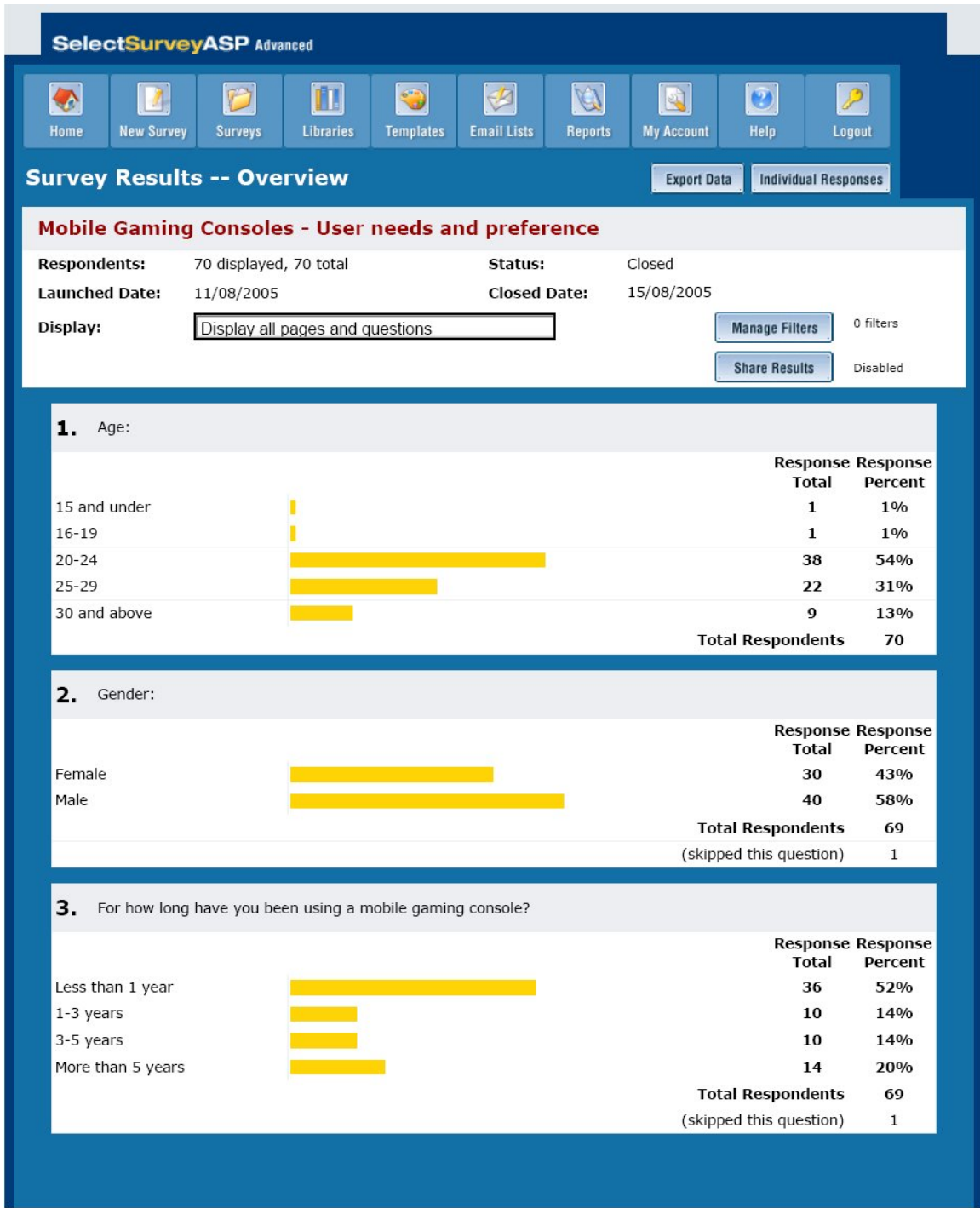
Done

Cancel

Appendix 1

APPENDIX 2

ANALYSIS OF THE ONLINE QUESTIONNAIR FOR END-USERS



Appendix 2

4. What kind of mobile gaming console do you own at present?

		Response Total	Response Percent
Game Boy series		21	44%
Gizmondo		1	2%
NDS		5	10%
N-gage		2	4%
PSP		20	42%
Total Respondents		48	
(skipped this question)			22

5. How long have you owned your current console?

View responses to this question [view](#)

Total Respondents	49
(skipped this question)	21

6. What are its most attractive and useful features?

		Response Total	Response Percent
Functionality		27	39%
Design		33	47%
Availability of games		38	54%
Backward Compatibility*		9	13%
Internet capability		4	6%
Other, please specify view		13	19%
Total Respondents		70	

7. Is there anything that you dislike about the console?

		Response Total	Response Percent
Limited Functionality		16	23%
Design features		11	16%
Lack of games		21	30%
Poor Backward Compatibility*		13	19%
No Internet capability		17	24%
Other, please specify view		14	20%
Total Respondents		70	

Appendix 2

8. To what extent do you agree with the following statements?

	1	2	3	4	5	Response Total	Response Average
(a) My current console is very easy to use	23% (14)	43% (26)	18% (11)	8% (5)	8% (5)	61	2.4
(b) My current console represents relatively good value for money	16% (10)	30% (18)	38% (23)	10% (6)	7% (4)	61	2.6
						Total Respondents	60
						(skipped this question)	10

9. If you are involved in network gaming, what platform do you use (please select all that are appropriate)?

	Response Total	Response Percent
Bluetooth (Wireless)	22	35%
GPRS	12	19%
Internet	43	68%
	Total Respondents	63
	(skipped this question)	7

10. How important is a wireless feature (network gaming) for your gaming experience?

	1	2	3	4	5	Response Total	Response Average
The importance of a wireless feature	18% (10)	22% (12)	29% (16)	11% (6)	20% (11)	55	2.9
						Total Respondents	53
						(skipped this question)	17

11. Which of the following factors were important in helping you to decide whether to purchase your current gaming device?

	Response Total	Response Percent
A. Additional feature - phone device	13	24%
B. Additional feature - video function enabled	23	42%
C. Additional feature - wireless	19	35%
D. Battery life	38	69%
E. Speed	29	53%
F. Functionality	22	40%
G. Graphics	28	51%
H. Size	31	56%
I. Wide variety of games available	30	55%
J. Supports a specific game	14	25%
K. Cost	39	71%
L. Ergonomics or attractive design	25	45%
M. Same model used by friends	10	18%






Appendix 2

Total Respondents 55
(skipped this question) 15

12. From the list above, please select the 4 factors that are most important to you when purchasing a new console and enter them in the grid below in descending order below:

view	The FOUR from the list (A to N) are:	Response Total
		225
		Total Respondents 225

13. Of the consoles that are currently available in the market, which would you most like to own?

		Response Total	Response Percent
Gizmondo		3	6%
NDS		8	15%
N-Gage		3	6%
PSP		39	72%
Other, please specify view		3	6%
		Total Respondents 54	
		(skipped this question) 16	

14. Please explain (very briefly) what it is about the console selected above that makes it attractive to you.

View responses to this question [view](#)

Total Respondents 43
(skipped this question) 27

15. How would you like to see game consoles evolve?

		Response Total	Response Percent
More network players		21	39%
Faster processors		30	56%
More additional functions		22	41%
Better resolution		17	31%
Other, please specify view		8	15%
		Total Respondents 54	
		(skipped this question) 16	

16. What improvements (if any) would you like to see with respect to gaming consoles?

		Response Total	Response Percent
Better graphics		26	49%
Better networking		18	34%
Multi-functionality		28	53%
Other, please specify view		2	4%
		Total Respondents 53	

Appendix 2

17. When you think about 'portable' or 'handheld gaming' what brand name comes into mind first?

		Response Total	Response Percent
Gizmondo		1	2%
Nintendo		27	51%
Nokia		1	2%
Sony		26	49%
Total Respondents		53	
(skipped this question)			17

18. Do you own a home console? If so, what brand is it?

		Response Total	Response Percent
Microsoft		6	11%
Nintendo		3	5%
Sony		28	51%
I do not have one		18	33%
Other, please specify view		2	4%
Total Respondents		55	
(skipped this question)			15

19. Does your current portable gaming experience match your game-play experience at home? If so, in what ways:

		Response Total	Response Percent
Interface (Bottoms, Directional Control, Triggers, etc)		19	42%
Graphics		21	47%
Games		18	40%
Other, please specify view		4	9%
Total Respondents		45	
(skipped this question)			25

20. Please use the box below to add any important issues or views (re: mobile gaming and selection of consoles) that have not been covered in this questionnaire, or to make any comments about the questionnaire in general.

View responses to this question [view](#)

Total Respondents	12
(skipped this question)	58

Appendix 2

APPENDIX 3

OTHER INFORMATION DENOTED FROM THE ONLINE QUESTIONNAIRE

The screenshot displays the SelectSurveyASP Advanced interface. At the top, there is a navigation menu with icons for Home, New Survey, Surveys, Libraries, Templates, Email Lists, Reports, My Account, Help, and Logout. Below this, the page title is "Survey Results -- Details" with a "Results Overview" button. The main content area shows the survey title "Mobile Gaming Consoles - User needs and preference" and its status: Respondents: 70, Status: Closed, Launched Date: 11/08/2005, and Closed Date: 15/08/2005. A table lists 13 responses to the question "6. What are its most attractive and useful features?". Each response has a "view" button next to it under the "Full Response" column.

	Full Response
6. What are its most attractive and useful features?	
1. Mobile telephony	view
2. Killer App	view
3. price	view
4. looks pimp	view
5. price	view
6. the games implemented on that platform attracted me, not the platform	view
7. None	view
8. none	view
9. none	view
10. none	view
11. non	view
12. none	view
13. trendy...ha	view

Appendix 3

7. Is there anything that you dislike about the console?	Full Response
1. Poor battery life	view
2. Nothing, just dont have enough time	view
3. it is too old now	view
4. weight and size, also audio experience	view
5. ugly product design	view
6. None	view
7. none	view
8. none	view
9. Too old	view
10. none	view
11. none	view
12. Sise of the device	view
13. none	view
14. the size of screen is too small	view

Appendix 3

12. From the list above, please select the 4 factors that are most important to you when purchasing a new console and enter them in the grid below in descending order below:
Prompt: The FOUR from the list (A to N) are:

**Full
Response**

1.	E; K; L; G	view
2.	s; h; i; t; E; G; F; B	view
3.	G; J; D; K	view
4.	b; c; l; f	view
5.	a; d; k; m	view
6.	g; f; i; l	view
7.	L; F; H; K	view
8.	k; e; g; c	view
9.	f; g; l; k	view
10.	K; M; F; G	view
11.	K; D; I; W	view
12.	I; D; G; L	view
13.	Games; price; functions; design	view
14.	A; G; H; L	view
15.	K; C; I; E	view
16.	G; D; E; K	view
17.	h; e; d; a	view
18.	J; G; D; L	view
19.	G	view
20.	d; h; k; l	view
21.	A; B; C; D	view
22.	i; j; d; g	view
23.	k; d; b; c	view

Appendix 3

24.	d; h; i; k	view
25.	A; B; C; D	view
26.	L; H; D; G	view
27.	k; d; a; e	view
28.	l; m; g; b	view
29.	k; g; d; h	view
30.	k; d; i; f	view
31.	k; h; j; g	view
32.	k; i; g; d	view
33.	H; K; E; D	view
34.	J; G; I; D	view
35.	k; g; e; f	view
36.	k; f; m; i	view
37.	i; k; j; e; i; k; j; e	view
38.	B; D; G; L	view
39.	K; H; D; G	view
40.	K; I; H; F	view
41.	K; J; H; I	view
42.	G; I; H; F	view
43.	L; K; E; F	view
44.	F; H; A; B	view
45.	K; I; G; L	view
46.	I; F; B; G	view
47.	k; L; H; F	view
48.	K; H; L; W	view
49.	L; I; D; H	view
50.	F; L; I; K	view
51.	I; B; C; F	view
52.	L; C; D; H	view
53.	i; j; c; h	view
54.	e; f; h; k	view
55.	k; i; f; b	view
13. Of the consoles that are currently available in the market, which would you most like to own?		Full Response
1.	<i>[No Answer Entered]</i>	view
2.	SurveyAnswerTextNull; SurveyAnswerTextNull	view

Appendix 3

14. Please explain (very briefly) what it is about the console selected above that makes it attractive to you.	Full Response
1. It is very smart in its design and it is multi-functioned	view
2. test; the available games	view
3. it looks cool and therefore makes me look cool	view
4. cool design and rich functionality	view
5. lots of game	view
6. as you all know, it is the best available. You have to rush to a shop on the release date like getting a Tamagochi	view
7. design	view
8. notexpensive, strong function and good software	view
9. Graphics & sound quality are excellent	view
10. Mario Brothers is my favorite	view
11. Design	view
12. it's design, the functionality, graphics, speed and the wide variety of games	view
13. portable, convenient	view
14. cool and more games	view
15. I like Mario games	view
16. graphic of psp is almost the same level with ps1...	view
17. Massive catalogue of games available	view
18. design, games, size, function	view
19. GOOD	view
20. a wide variety of games is available. it got lost of nice reviews. the good bland image I have.	view
21. abundant of game supported in this device.	view
22. new	view
23. pocket size, long battery life	view

Appendix 3

24.	good game	view
25.	it looks great and the games are amazing	view
26.	Due to the respectability and reputation developed by sony in gaming and consumer electronics market	view
27.	the design	view
28.	nice outlooking + sony brand = quality	view
29.	my beloved game is going to issued on NDS, though PSP seemed to be very attractive in every aspects, there're still too few games developed on PSP	view
30.	new design and great brand name	view
31.	Very pretty. It has many functions	view
32.	For the games	view
33.	design	view
34.	Better hardware	view
35.	Wide varieties of games	view
36.	Small and pretty	view
37.	Colour	view
38.	Interface Design & Simplicity. Wide range of Games. Reasonable Standard of Video and Audio Supports.	view
39.	PSPi's design does not look too much like a console	view
40.	coze i dont have it...	view
41.	There are a lot of games that are available for psp.	view
42.	cool	view

15.	How would you like to see game consoles evolve?	Full Response
1.	Better battery life	view
2.	small for now	view
3.	battery for longer	view
4.	Longer battery life	view
5.	good performance	view
6.	Better battery life	view
7.	More innovative concepts that combine the game together with the device/console.	view
8.	cheaper	view

16.	What improvements (if any) would you like to see with respect to gaming consoles?	Full Response
1.	Better battery life	view
2.	battery life	view

18.	Do you own a home console? If so, what brand is it?	Full Response
1.	Nintendo and Sony both	view
2.	Sony and Nintendo	view

Appendix 3

19. Does your current portable gaming experience match your game-play experience at home? If so, in what ways:	Full Response
1. Enjoyment - very different because a handheld is played differently	view
2. SurveyAnswerTextNull; SurveyAnswerTextNull	view
3. Type of games	view
20. Please use the box below to add any important issues or views (re: mobile gaming and selection of consoles) that have not been covered in this questionnaire, or to make any comments about the questionnaire in general.	Full Response
1. test; SurveyAnswerTextNull	view
2. good work	view
3. fashion	view
4. Good survey!!	view
5. 600 mobile phones are sold every year. As they get more powerful, the gaming element will grow. The handheld market will suddenly grow to incorporate phones, which will mean the battle will move from being hardware-related and the issue will become compatibility, i.e. the operating system. Sony Ericson starts to look like a very interesting acquisition now, yes...?	view
6. n/a	view
7. Investigate more into Java Gaming available to GPRS downloads on may mobile phones - is mobile phone Java Gaming influencing the number of people willing to pay for a PSP Gizmondo Gameboy? Are these consoles aimed at the 'hardcore' gamers? Look into how much time someone spends on gaming - check this out http://news.bbc.co.uk/1/hi/technology/4137782.stm Abrar	view
8. no	view
9. Expandable	view
10. I would rather use a PDA as a mobile gaming console because of its powerful functionality	view
11. Girls don't like games...	view
12. The game function of mobile phone is just about enough for me , and I doni;t really use mobile games nor my friends. Mobiles can download wide range of game to spend in the short period of time	view

Appendix 3

APPENDIX 4

THE LETTER FOR INTERVIEWS ARRANGEMENTS

Dear Sir/Madam:

I am currently working on a dissertation project at PREST at Manchester Business School (University of Manchester) in part fulfilment of the requirements for the degree of M.Sc. in Science and Technology Policy & Management. The study concerns innovation in the mobile and handheld games consoles industry, and more specifically, the business and technology strategies that are deployed in the development of new generations of handheld gaming devices. A particular concern will be the ways in which the preferences of potential users are taken into account in the innovation process, and the study will attempt to examine the mechanisms that are deployed by manufacturers in their efforts to engage with potential customers (i.e., mobile gamers).

The study has been constructed around four key questions as follows:

1. What technological capacities and capabilities (and strategic and business assets) are required in order to ensure successful innovation in the mobile gaming industry?
2. How are the requirements and preferences of (potential) end-users taken into account in the innovation and new product development process?
3. What characteristics, levels and classes of functionality and design elements are attractive to users of mobile gaming devices (across a range of market segments)?
4. What criteria are applied by mobile gamers in the selection of new devices and platforms?

It is envisaged that the first two questions will be addressed via desk research and interviews with well-placed representatives from the main gaming device manufacturers and trade journals. The second pair of questions will be addressed via an online survey that will be targeted at respondents from across the spectrum of the mobile gaming community. It is expected that the results and outputs from the research will contribute to academic studies concerning user-focused innovation practice in leading-edge manufacturing companies. The study should also contribute to innovator and design-practitioner understandings of the ways in which customers arrive at their decisions with respect to selection of handheld gaming consoles.

Given your company's position as a leading manufacturer of gaming devices, and your own experience and expertise with respect to the issues sketched above, I would be extremely grateful if it would be possible for me to arrange a short telephone or face-to-face discussion with you in order to discuss innovation, product development and marketisation processes within your organisation. If you are able to assist with my

request, I can be entirely flexible with respect to timing and arrangements, and can assure complete anonymity and confidentiality (and an undertaking that the study will not seek to gather or expose commercially sensitive materials). If you are unable to speak with me at this time, or feel that one of your colleagues would be better-placed to comment on the themes outlined above, I would be very grateful if you could pass this message on.

I do hope that you will be able to participate in the research, the results of which will of course be made available to you, and look forward to hearing from you.

If you require any further information or a detailed list of questions for discussion, please do not hesitate to contact me either by email or telephone.

Yours faithfully,

Denny Yeh

07876-738-115 (UK)
dennyeh@gmail.com

APPENDIX 5

INTERVIEW QUESTIONNAIRES (RETAILERS)

Interview Questionnaires (with respect to the retailers):

Section A: Personal Details

1. How long have you been in your current position?
2. What does your role involve?

Section B: Current Sales and Trends

1. What portable gaming devices does your store currently sell?
2. Is it likely that this range will expand (and if so, why)?
3. What is your view of trends in the market for gaming devices (expansion, contraction, stability, new entrants, ascendance of a particular device etc.)?
4. What is driving these trends?

Section C: Relationship with Developers/Manufacturers

1. What is the nature of your relationship with Developers and Manufacturers (is this close and interactive)?
2. How do you feedback information on sales and/or user preferences to console manufacturers – are they interested?
3. What kinds of in-store marketing, placement, advertising, promotion, incentives etc. are applied? How important are these in leveraging sales of specific brands/devices?

Section D: Consumers and Users

1. Consumer preferences – how do consumers select devices (what criteria are applied in the purchasing decision)?
2. What features (design, availability of games and peripherals, branding, ergonomics etc.) are likely to make a device more attractive to potential purchasers?

3. Is there segmentation in the market – are particular groups of users likely to be attracted by specific models or brands?
4. Does advertising and marketing appear to have an important impact on consumer demand?
5. How important is availability of a broad palette of strong games in determining the relative success of a particular device?

Section E: Current and future leadership

1. What is the best selling hand-held console of all time in the store?
2. Do you think that there are any potential threats to its dominance from new products entering the market? If so, what impacts do you think this will have with respect to your customers?

APPENDIX 6

INTERVIEW QUESTIONNAIRES (MANUFACTURERS)

Interview Questionnaires (with respect to the console manufacturers):

Section A: Personal Details

3. How long have you been in your current position?
4. What are your responsibilities?
5. What is your personal background (educational and professional)?

Section B: Product and Process innovation

1. What makes the current model more significant than its predecessors?
2. What are the technical priorities generated in the development of the product?
3. What innovation processes are required to meet the technical specifications of the product?
4. What do you perceive as the most important piece of innovation (in terms of functionality and design) with respect to the product? Why?
5. What are the new technologies adopted in relation to the product?
6. What are the new features which the company wants to introduce in order to improve gaming experience?
7. Do you think that there is a trend of game repositioning from home consoles to portable gaming devices?
8. What do you think the potential effects of the above trend might have?

Section C: Users and Adoptions

1. How important do you think that the support of software company can have to the growth of your product sales?
2. Is the ability to the production of some exclusive games important for the company?
3. What impacts do you think receiving feedbacks from the following can cause?
Please elaborate in more details.

How strong is the business relationship between Game developers and the company?

What roles do you expect from the Game Retailers to play with respect to the company?

Does the feedbacks from customers being taken into account of in terms of making of the console or game design?

4. Does the company engage in the game development process? If so, what considerations are taken into account with respect to end-users when designing games?
5. Does the company have certain type of games in mind when initially designing the product?
6. In your experiences, do you think that there is still a differentiation between home console and a handheld device? (Is there something that can be achieved on home console but not on handheld and vice versa?)
7. Do you think that the device requires much learning to facilitate users in its adoption? If so, please give your views.
8. How can the concept of network-gaming affect the current and potential end-users?
9. What age group of consumers does the company targeted at?

Section D: Current Market information:

1. Who does the company regard as the main competitors of the industry?
2. What kind of platforms does the company use in term of the marketing for the product?
3. In your point of view, how does the future of portable gaming evolve and what are the emerging technologies?
4. What do you think about the current market leader of the portable gaming industry?
5. What do you think about the previous models which they have created successfully?

Other questions specific for Gizmondo:

1. Please elaborate on the revolutionary marketing function of “*smart adds*”. Is it a successful campaign so far?
2. In what ways can the newly introduced feature of “*smart adds*” benefit the end users?

Other questions specific to Nintendo DS:

1. What effects can the much stressed technological strategy of ‘backward compatibility’ have on current and future gamers?
2. What are the advantages of the Dual-Screen?
3. What improvements have NDS made with respect to the user-interfaces?

Other questions specific to Sony PSP:

1. What are the latest innovations of PSP?
2. How do the UMD (universal media disc) increase the competitiveness of PSP?
3. In what way can the above innovation benefit end-users?

Other questions specific to Nokia N-gage:

1. Do you think that N-gage is benefited for its all-in-one facility (i.e. a phone as well as a gaming device)?

Glossary

CE A mandatory conformity mark on many products placed on the single market in the European Economic Area (EEA).

EA Sports A brand name used by Electronic Arts since 1993 to distribute games bas on sports.

GBA (GameBoy Advanced) A portable gaming console manufactured by Nintendo first released in 2001

GPRS (General Packet Radio Service) A mobile service function which transfers data and can also be used for Internet communication.

GPS (Global Positioning System) is a satellite system that receives precise radio signals Earth orbit satellites receiver to determine its location, speed and direction.

MMOG (Mass Multiplayer Online Game) A computer game which is capable of supporting hundreds or thousands of players simultaneously. By necessity, they are played on the Internet with one or more persistent world.

MMS multimedia messaging services

Mod (modification) A game that is made by the general public (including new items, weapons, character, textures, levels, story lines and so on) which forms either partially or even completely new games.

MP3 MPEG-1 Audio Layer 3

N-Gage QD (“Quaeque Dies”, meaning “Every Day”) A mobile gaming console manufactured by Nokia.

NDS (Nintendo Dual Screen) A portable gaming console manufactured by Nintendo

NiMH (nickel metal hydride) A type of rechargeable battery

PDA (Personal Digital Assistant) A type of portable personal computer which has a touch-screen interface and is often controlled by a stylus pen.

PGC (Portable Gaming Console) A pocket-sized device for video games, typically utilising a small visual display screen for user output and a directional and few buttons for user input. Also known as handheld consoles.

PSP (Play Station Portable) The first portable gaming console manufactured by Sony.

R&D (Research and Development) A terminology which couples of scientific research and technological development. These activities are conducted by specialised units or centres belonging to companies, universities and public sectors which often have special commercial significances.

RAM (Random Access Memory) A type of data storage used in computers.

RPG (Role Playing Game) A computer game where gamers assume the roles of fictional characters and collaboratively create or follow stories.

SD (secure digital) A form of media contents storage.

SIM A simulated identity module card

SMS short message services

TGTL (Tiger Telematics Inc) A company who owns Gizmondo Europe Ltd. As its subsidiary company.

USB (Universal Serial Bus) is a serial bus standard to interface devices

Wi-Fi (Wireless Fidelity) A technology which enables wireless interface of mobile computing devices. One of the functions includes the ability to facilitate Internet connection.

REFERENCES

- Agarwal, R., and Prasad, J. (1999). "Are Individual Differences Germane to the Acceptance of New Information Technologies?" *Decision Sciences* 30(2): 361-391
- Barnett, V. (2002). *Sample Survey: Principles & Methods*. London: Arnold.
- Berg, B., L. (2007). *Qualitative Research Methods for the Social Sciences*. Boston: Pearson Allyn and Bacon.
- Biz.gamedaily.com. (2004). "Touching Is Good: Ds Campaign Represents New Approach for Nintendo." Retrieved June 25th 2005 (Available at http://biz.gamedaily.com/features.asp?article_id=8191§ion=feature).
- Bryce, J. and J. Rutter (2005). Gendered Gaming in Gendered Space. *Handbook of Computer Game Studies*. J. Raessens and J. Goldstien. Cambridge: Massachusetts: MIT Press.
- Bryman, A. (2001). *Social Research Methods*. Oxford: Oxford University Press.
- Cawson, A., L. Haddon and I. Miles (1995). *The Shape of Things to Consume*. Aldershot: Avebury.
- Cohen, W., M. and D. Levinthal, A. (1990). "Absorptive Capacity: A New Perspective on Learning and Innovation." *Administrative Science Quarterly* 35
- Cole, D. (2004). "Dfc Intelligence Releases New Market Forecasts for Video Game Industry." Retrieved 22 June 2005 (Available at: <http://www.dfcint.com/news/prsep222004.html>).
- Cooper, R. G. (1988). "The New Product Process: A Decision Guide for Management." *Journal of Marketing Management* Vol. 3 (No.3): pp.238-55
- Durlacher. (2001, May 20 2001). "Umts Report." Retrieved 11 June 2005 (available at: <http://www.durlacher.com>).
- Fang, K. (1998). "An Analysis of Electric-Mail Usage." *Computer in Human Behaviour* 14(2): 349-374
- Financial-Times (2004) Article A116568528 Hand-Held Consoles Move Beyond Games. *Asia Africa Intelligence Wire*, May 13, 2004, p.n.a. DOI:
- Fortunemail, P. (2004). "The Videogame World Has Been Sweaty-Palmed Awaiting the Launch of New, Mobile Gaming Units from Sony and Nintendo. Let the Battle Begin."
- Freeman, C. (1990). *The Economics of Innovation*. Aldershot: Edward Elgar.
- Gardiner, P. and R. Rothwell (1985). "Tough Customers: Good Designs." *Design Studies* 6 (1): 7-17
- Hermida, A. (2004). "New Handheld Consoles Fight It Out." Retrieved 13 June 2005 (Available at: <http://news.bbc.co.uk/1/hi/technology/3663594.stm>).
- James, A. (2005). Managing the Product Innovation Process. *Management of Technology & the Innovation Process*. Msc. in Science & Technology Policy and Management.
- Jeppesen, L., B. (2001). The End-Consumer as a Source of Innovation. *The External Organization of the Firm*. Korsør, Denmark, the Danish Research Unit for Industrial Dynamics.

- Johns, J. (2006). "Video Games Production Networks: Value Capture, Power Relations and Embeddedness." *Journal of Economic Geography* 6(2): 151-180. <http://joeg.oxfordjournals.org/cgi/content/abstract/6/2/151> April 1, 2006.
- Karahanna, E. a. S., D. W. (1999). "The Psychological Origins of Percieved Usefulness and Ease-of-Use." *Information & Management*(35): 237-250
- Kleijen, M., K. D. Ruyter and M. G. M. Wetzels (2002). Factors Influencing the Adoption of Mobile Gaming Services. *Mobile Commerce: Technology, Theory, and Applications*. B. E. Mennecke, and Strader, T. J. Hershey, : PA: Idea Group Publishing: 202-217.
- Ladenburg, O. (2003). Chris Deering Talks Playstation, playstation.com 25 Dec, 2003.
- Little, D. (1994). Marketing and Innovation. *The Handbook of Industrial Innovation*. M. Dodgson, and Rothwell, R. Cheltenham: Edward Elgar: 293-300.
- Mindbranch. (2003). "Uk Electronic Media and Entertainment " Retrieved 14 July 2005 (Available at <http://www.mindbranch.com/listing/product/R443-0016.html>).
- The Modern Age (August 2003). *Edge* 126: p.48-67.
- Murray, T. R. (2003). *Blending Qualitative and Quantitative Research Methods in Thesis and Dissertation*. California: Thousand Oaks : Corwin Press.
- Nintendo. (2005). "Nintendo Annual Report 2005." Retrieved Nov 2005, from <http://www.nintendo.com/corp/report/NintendoAnnualReport2005.pdf>.
- Pesola, M. (2005) Nintendo Fires Opening Salvo in Graphic Battle: Sony's Entry into the Market for Hand-Held Games Machines Poses a Serious Threat to the Brand Leader. *National News Business & Economy*, p5 DOI:
- Plouffe, C. R., Vandenbosch, M., and Hulland, J. (2001). "Intermediating Technologies and Multi-Group Adoption: A Comparison of Consumer and Merchant Adoption Intentions Towards a New Electronic Payment System." *Journal of Product Innovation Management* 18(2): 65-81
- Pocket-lint.co.uk. (2005). "The Gizmondo Review." Retrieved 15 June 2005.
- Riggs, W. and E. von Hippel (1994). "Incentives to Innovate and the Sources of Innovation: The Case of Scientific Instruments." *Research Policy* 23(4): 459-469
- Rogers, E. M. (1995). *Diffusion of Innovations (4th Edition)*. New York: NY: The Free Press.
- Rosenbloom, R. S. and W. J. Abernathy (1982). "The Climate for Innovation in Industry." *Research Policy* 11 209-25
- Rothwell, R. (1977). "The Characteristics of Successful Innovators and Technically Progressive Firms " *R&D Management* 7(3): 191-206
- Shaw, B. (1994). User/Supplier Links and Innovation. *The Handbook of Industrial Innovation*. M. Dodgson, and Rothwell, R. Cheltenham: Edward Elgar: 275-284.
- Takeuchi, H. and I. Nonaka (1986). "The New Product Development Game." *Harvard Business Review*: pp.137-46
- Tidd, J., J. Bessant and K. Pavitt (2001). *Managin Innovation: Integrating Technological, Market and Organizational Change*. West Sussex: John Wiley & Sons Ltd.
- Urban, G. L. and E. von Hippel (1988). "Lead User Analysis for the Development of New Industrial Products." *Management Science* 34(5): 569-82
- Utterback, J., M. (1996). *Matering the Dynamics of Innovation*. Boston, Mass. : Harvard Business School.
- von Hippel, E. (2005). *Democratizing Innovation*. Cambridge: The MIT Press.

Wikipedia. (2005). "Handheld Game Console." Retrieved 12 July 2005 Available at http://en.wikipedia.org/wiki/Handheld_game_console.