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Strategic business model for digital home market

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STRATEGIC BUSINESS MODEL FOR DIGITAL HOME MARKET

A Project

Presented to the

Faculty of

California State University,

San Bernardino

In Partial Fulfillment

of the Requirements for the Degree

Master of Business Administration

by

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ABSTRACT

In the United States, car environment should be an extension of the "digital home" concept because it is one of the main transportation means. Americans spend approximately two hours a day on the road, which increases the importance of the car significantly. When people think about the digital home concept, it is only for the home itself, which does not include the car environment. In this project, I would like to propose that it is necessary to redefine the concept of the digital home in the United States in order to include the car environment. Each country has its unique lifestyle and culture. With the different home concepts in each country, we need to think thorough the digital home concept so that it applies to the appropriate consumers with different needs. People have a lot of prototype models at present, but most of them are not impressive. The successful digital home models will stimulate the consumers to consider and recognize the digital home world.

This project used Sony Corporation (Sony) as an example for the future digital home model in the United States. It is highly valuable to have an image of near future models of the digital home especially for Sony, because they have an obligation to create and bring

innovative products to the market. In addition, for Sony, it is essential to revive their electronics business for their future growth. One of the competitive edges of the digital home is the speed of the implementation. The implementation of the digital home model is regarded as large scale and corporation wide project for Sony. The project management method must be applied to manage the digital home project, which requires the development of individual products and the integration of those products.

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CHAPTER ONE

INTRODUCTION

The consumers are acquiring a huge amount and variety of digital media on PCs, mobiles, and other consumer electronic devices - movies, games, photos, email, music and more. They want to be able to access and enjoy that content easily and conveniently, using any device they choose. This requires a home network that allows disparate devices to interoperate seamlessly, and this is the basic concept of the digital home. The ultimate goal is to enable consumers to access digital contents from any device, any time and anywhere, both inside and outside the home, and offers greater levels of convenience and variety in entertainment and leisure. There are several digital home models that we are using in the world today. For example, there are VoIP and Webcam communications, home security, e-healthcare, digital entertainment, and so on. Currently, many countries are developing and testing the digital home technology and it is estimated that in 2010, the digital home will be fully commercialized to every part of the world (Digital Home Analysis Group of Japan, 2005). More importantly, it is estimated that online entertainment (online digital music, IP consumer video

subscription services, and PC online gaming) will be worth more than $11 billion worldwide in 2008 according to Parks Associates, In-Stat, and TDG (Johansen, 2005). To establish standard specifications for home networking, Digital Living Network Alliance (DLNA) has proposed specific guidelines to introduce digital networking. Many companies are involved in this alliance and they are following the strategies as well. In this digital home market, there are big opportunities. To gain advantages and to survive in this market, each company has to understand the consumers' needs, perceive the future market, and produce an impressive model of the digital home.

Problem Definition

One of the big issues of the digital home is how to spread this concept and to blend with the consumers' lifestyle. First of all, the companies need to define the industry standards for the consumers. It is important that all of the commodity products are collaborated because if the consumers have to think about the connectivity between the products, it would be inconvenient. For example, if there is a standard of connectivity between different electronic brands, the consumers would not face the

difficulty when they have a TOSHIBA PC and want to obtain a SONY TV. Second, it is equally important to consider the security of these devices. If the personal network is allowed access anytime, anywhere, the threat of hacking will be increased and may cause damage to both the network and the original consumers. Finally, it is important to offer impressive models of the digital home to attract the customers into the digital home world. It is a fresh and flourishing inclination, so it is desirable for some companies to take the lead to develop in the new area.

Purpose of the Project

The purpose of this project is to establish an effective model for the digital home market. Sony will be used as an example. Sony is the leading entertainment company at consumer electronics industry and has the most potential to direct the consumers to the digital home world effectively and efficiently. It is very important for Sony to consider the new lifestyle of the digital home.

Benefits of the Project

During this project, the market survey was conducted at California State University, San Bernardino (CSUSB). The students have been raised in the beginning of the

digital world, have been exposed to it, and they are the key users of the digital home in the future. This survey will help to find out the needs of the digital home world and to grasp the current picture of how far this digital home concept is spread in our lifestyle. It can provide fresh feedback from the students who will be the consumers of the digital home in the future. In addition, the interview was conducted with two people. One of the interviewees was the Distinguished Engineer and e-Security Officer of IBM Japan and Member of IBM Academy. Based on the market survey, the interview, and the industry analysis, a model was established in this project which will be effective and useful in the real digital home market.

Limitation of the Project

The project has two limitations. First, the strategic model developed in this project is U.S.-market oriented and may not apply to other markets in the world. Second, the market survey was conducted among a limited target group whose opinion was the focus of this project, because they are the representatives of the generation of future users of the digital home.

Definition of the Terms

Accoring to DLNA, the term "digital home" refers to a wired and wireless interoperable network of PCs, consumer electronics and mobile devices in the home enabling a seamless environment for sharing and growing new digital media and content services (DLNA, 2006).

CHAPTER TWO

CURRENT INDUSTRY ANALYSIS OF THE DIGITAL HOME

The Concept of Digital Home

Intel's Vice President, Don MacDonald, did an interesting demonstration at CEATEC JAPAN 2005. He played radio music and a TV program for the audience. After playing these traditional entertainments, he said these were very traditional entertainments but there was a big difference. The devices, which played these contents, were totally different. The radio sound came from a cell phone and the TV program from a PC. Both devices were streaming the contents from the Internet. He emphasized that this was possible because the contents and the players were digitalized. Finally, he summarized that the digitalization enables people to deal the contents more flexibly and this is the beginning of the digital home concept (Intel, 2005).

I would like to explain one example of the future model, the Bill Gate's digital home. The lights automatically come on when people come home. Speakers are hidden beneath the wallpaper to allow music to follow people from room to room. Portable touch pads control everything from the TV sets to the temperature and the

lights, which would brighten or dim to fit the occasion or to match the outdoor light. Visitors to Bill Gates House are surveyed and given a microchip at the entrance. This small chip sends signals throughout the house, and a given room's temperature and other conditions will change according to preset user preferences (Agarwal, 2005).

When people build the home network, what kinds of services can they have through this network? The following are some examples:

Convenient Home

- e-health care
- e-learning
- Home Office
- Remote Control

Happy Home

- Interactive Digital Television (DTV)
- Video On Demand (VOD)
- Games
- In-home Video Streaming

Safe Home

- Home Security
- Disaster Prevention
- Anti-Theft

- Door Bell system
- Monitoring System for elderly people

Economic Home

- Home Shopping
- Home Banking
- Energy Management

Industry Analysis

The digital home industry is broad and interrelated with many fields, so it is really complicated and hard to understand the whole structure. To get the clear picture of the industry, the industry-based view of the strategy was used for the identification of a clearly demarcated industry. Porter's five force model is the tool for the industry-based view to understand the industry structure (Peng, 2006).

As computing and consumer electronics devices converge in the digital home, the consumers will demand that the devices of all types from any manufacturer work together seamlessly. The PC and consumer electronics industries must work together to specify open standards for the digital home products. Without cross-industry standards, the growth of digital home market will be very limited. Collaboration between the industries enables us

to create a much larger playing field for everyone in both industries. To establish the cross-industry standards, they have an alliance group. This group is called DLNA.

DLNA is a cross-industry organization of consumer electronics, computing industry and mobile device companies. They share a vision of a wired and wireless interoperable network of PC, consumer electronics and mobile devices in the home and on the road, enabling a seamless environment for sharing and growing new digital media and content services. DLNA is focused on delivering interoperability guidelines based on open industry standards to complete the cross industry digital convergence. Many companies, such as Microsoft Corporation (Microsoft), Intel Corporation (Intel), Panasonic Corporation of North America (Panasonic), and Sony participate in this alliance.

The first guideline was published in June 2004. In this guideline, they defined the servers, which provide contents, Digital Media Server (DMS) and the clients, which play the contents, Digital Media Player (DMP). There is no restriction about DMS and DMP functions. The vendors can even put these functions into one device. The DLNA guideline specifies the condition how DMS and DMP can work together. The devices complying with the guideline can

exchange contents without any special settings when they connect to the home network. When DMP is connected to a LAN cable, IP address will be assigned automatically and the devices communicate with each other. The DMP finds out DMS, which is connecting to the LAN cable, and obtains and shows the list of the DMS contents.

The specification of the DLNA guideline is combined with standards and general protocols. There is no new protocol. For example, the transmission standard uses Ethernet or IEEE802.11 wireless LAN, the communication protocol uses TCP/IP, exchange of control message and file transfer use HTTP, and message should be described with XML. The data format of a motion picture uses MPEG2, and that of a picture uses JPEG and LPCM. This guideline specifies that each media has at least one format. The other formats can be decided in advance between DMP and DMS (DLNA, 2006).

The core specification in this guideline is Universal Plug and Play (UPnP). This can assign the address to DMS and DMP and use UPnP Device Architecture's protocol in the automatic recognition part. The DMS, which provides the information list of files and sends the data to DMP, uses the specification of UPnP Media Server.

Sony and Sharp Corporation (Sharp) have already launched network media players, which are based on DLNA guidelines. People had network media players before that could play movies or music. There were inside PCs or Hard Disk Recorders that accessed the LAN cable. However, these devices were using their own existing protocol and were combined. In contrast, the DLNA guideline uses the same specification that agreed upon by many vendors. The value of the DLNA guideline is not the technology itself, but the common use of specification.

It is challenging to get the PC and consumer electronics industries to collaborate because the two industries have very little history of working together. Until the industries began to converge, there was not much need to collaborate. The consumer electronics industry established consumer electronics centric standards and protocols, an approach that would require consumers to buy new technology components for each consumer electronics device they wanted to connect to the home network. The Information Technology (IT) industry, by contrast, focused on leveraging the existing wireless Internet capabilities of home PCs to connect a variety of consumer electronics devices, throughout the home, to the network. While in recent years the new technologies for the connected home

were intended to connect consumer entertainment devices to the home network, the next frontier is the merger of the digital home network with the mobile devices.

History

Household Audio and Video Equipment Industry Summary

In the United States, the household audio and video industry was an exceptionally mature market. The penetration of the products was around 95 percent. The large numbers of Americans who already possess such equipment have fewer reasons to upgrade because the rate of obsolescence among these products is very slow, especially in comparison to computer products. This industry was dominated in the early 2000s by American subsidiaries of Japanese companies who used technologies developed by American companies. The leading companies were usually subsidiaries of the foreign-owned companies, such as Matsushita Electric Corporation of America, a subsidiary of Japan's Matsushita Electric Industrial Co. Ltd (Matsushita). Matsushita had more than 20 manufacturing sites in the United States. The other examples are Zenith Electronics Corporation. which is operating as a subsidiary of South Korea-based LG Electronics and Philips Electronics North America Corp.

which is a subsidiary of Netherlands-based Royal Philips Electronics. In 1963, the Japanese manufacturers began to export televisions to the United States. The sales of Japanese televisions increased while U.S. companies suffered. Matsushita, Sony, and Sanyo Electric Company established manufacturing facilities in the United States first, and Hitachi Ltd. and Tokyo Shibaura Electric Co., Ltd. (Toshiba) followed with them. The Japanese companies also established manufacturing facilities in other countries where the cost of labor was low, such as Mexico and Argentina to avoid the U.S. limits on the imports from Japan. Furthermore, Taiwan and South Korea began exporting televisions to the United States. Taiwan increased their share of the U.S. market from seven to fourteen percent. General Electric Corporation and the RCA Corporation, which accounted for about 45 percent of all color television sets sold in the United States in 1980, was the last major U.S. owned companies to manufacture televisions. In the early 1980s, many of the Japanese companies that established U.S. manufacturing facilities in the 1970s to avoid restrictions on imports moved their operations to Mexico because of the recession. Almost all televisions made in Mexico by foreign companies went into the U.S. market. The North America Free Trade Agreement

(NAFTA) made this movement hasten. In the late 1990s, the compatibility between various technologies was becoming a primary and frustrating concern to the home audio and video equipment industry. The companies were challenging to integrate their products with personal computers in a move toward convergence (Pearce, 2004).

Electronic Computer Industry Summary

The microprocessor was developed in 1971, which allowed the entire central processor of a computer to be placed on a single silicon chip. This development led to rapid expansion and transformation of the industry. In the 1980s, International Business Machines Corporation (IBM), Sperry Corporation, Wang Laboratories Inc., Unisys Corporation, and Digital Equipment Corporation (DEC) were the companies that generated tremendous revenues during the decade. These companies succeeded by developing proprietary hardware and operating systems that effectively prohibited the consumers from switching to the other company's product. However, the strong growth and the solid profits enjoyed by most computer companies during the 1980s faded in the early 1990s because of the global recession and the fact that the U.S. computer market was becoming saturated. In the early 1990s, many consumers started purchasing more advanced systems through

the mail or at discount warehouse for approximately $1,000 to $2,000. In the late 1990s, the price competition was fierce in the market for laptops, where good values also could be found for less than $1,000. In the early 2000s, the consumers tended to delay purchases of new computers because the terrorist attacks occurred on September 11, 2001 and this left the consumers anxiety, which made the consumers less active to buy the products. In addition, rising unemployment and a war with Iraq worsened this situation. According to International Data Corporation (IDC), in late 2001 the four largest U.S. such as Dell Inc (Dell), Compaq Computer Corporation (Compaq), Hewlett-Packard Development Company (HP), and IBM controlled almost 40 percent of world PC shipment. Dell increased their market share and took over the Compaq's market leader position. By late 2002, HP had acquired Compaq, challenging to get back the leadership position (Pearce, 2004).

Porter's Five Force Model

The Structural Analysis of Industry

Competitive strategy must grow out from sophisticated understanding of the rules of competition that determine an industry's attractiveness. The ultimate aim of

competitive strategy is to cope with and, ideally, to change those rules in the firm's favor. In any industry, whether it is domestic or international, or produces a product or a service, the rules of competition are embodied in five competitive forces: the entry of new competitors, the threat of substitutes, the bargaining power of buyers, the bargaining power of suppliers, and the rivalry among the existing competitors. Since it is a new industry, the leader must constantly balance its own competitive position against the health of the industry as a whole. To make it clearly understood, it is considered that the digital home industry is segmented by four fields: PC, consumer electronics, mobile devices, and services.

The Entry of New Competitors

The company, which has rigid position in the industry, called incumbent, has to keep an eye on new entrants not only existing competitors. The incumbent usually prevents the new entrants by establishing entry barriers. At least, five structural attributes are associated with high entry barriers. The first one is scale-based low cost advantages. The incumbent, which enjoys economies of scale, can get advantage with this barrier. To overcome the barrier of economies of scale,

the new entrants have to grow their experience curve faster than the incumbent. In the digital home market, especially PC and consumer electronics market, the economies of scale exists and it is hard for the new entrants to get into the market. However, the content service and the new technology device field has no economies of scale. The second barrier is non-scale-based cost advantages from the resources such as proprietary technology, know-how, access to raw materials and distribution channels, and favorable location. In this market, the incumbents have a lot of non-scale-based advantages: the proprietary technology such as Microsoft Operation System (OS), and Intel Viiv technology. The third barrier is product differentiation. This comes from brand identification and customer loyalty. The brand identification and customer loyalty is high for Microsoft, Dell, and Sony. The fourth barrier is possible retaliation by incumbents. The incumbents have a power to punish the new entrants. For example, The Coca-Cola Company is known to retaliate by cutting down prices if any competitor crosses the threshold of 10 percent share in any local market. The fifth barrier is government policy, which might ban or discourage companies to enter the market.

It seems that entry barriers are really high and there is no space in the market for new entrants, however, in this market the potential of new technologies and services is very high. Even if the barrier of PC, consumer electronics, and mobile device companies is high, the new company can enter the digital home industry with the new technology and services. After the new entrants enter this industry, they might be able to enter the PC, consumer electronics and mobile device field. For example, Sling Media Inc. (Sling Media) founded in 2004 produces the Slingbox, which allows individuals to access their living room. It enables the consumers to use their cable, satellite, or digital video recorder (DVR) programming from wherever they are. The Slingbox turns any Internet-connected laptop, desktop, PDA, or smartphone into a personal TV. Sling Media has been innovating rapidly and was chosen by FORTUNE Magazine as one of the 25 Breakout Companies in 2005 (Sling Media, 2006). The company could expand their business more and be a strong competitor. MovieBeam, Inc. (MovieBeam) is another good example of a new small company entering the market. It is a privately held company backed by The Walt Disney Company, Cisco Systems Inc., Intel, Mayfield Fund and Norwest Venture Partners. The company was formed in January 2006, after

being incubated by The Walt Disney Company for nearly four years. MovieBeam provides consumers a new way to rent and watch movies at home without the need for cable, satellite or computer. The movies are "beamed" via wireless connection into the MovieBeam Player using patented digital signal (MovieBeam, 2006). Founded in 1997, TiVo, a pioneer in home entertainment, created a brand new category of products with the development of the first digital video recorder (DVR). Tivo is not a hardware company. Tivo brand HDD recorder is provided by OEM. In addition, Pioneer Electronics Inc., Sony, Toshiba, and so on, produce Tivo Machine under their own brand. Sling Media, MovieBeam, TiVo are good examples how small innovative companies with new technologies can enter the markets and change the structure of the market.

The Threat of Substitutes

Substitutes are products of different fields that satisfy customer needs currently met by the focal field. The threat of substitutes will occur when the substitutes have superior quality and switching costs are low. The big issue in the digital home market is that anything will be the center of the home network. So far, it seems that PC can be the center of the network. However, with the developing technology, the other devices could be the

center. For example, Sony's high quality computer, PlayStation 3 (PS3), will be substitute for PC for the person who thinks games are important in their life. PC, vice versa, will be a game console with the availability of on-line games. Even the server could be a substitute for home network. VoIP telephone, such as Skype could be the substitute of normal telephone. The companies have to pay attention to the new technologies, which are possible to replace the existing products. The new technology is critical factor in this market. However, it is important that the new entrants have to examine what they can do by matching these technologies and the consumer demand.

The Bargaining Power of Buyers and Suppliers

The bargaining power of suppliers refers to their ability to raise prices or reduce quality of goods and services. In the digital home market, main suppliers are Microsoft and Intel, which dominate the crucial areas: operating systems and microprocessors. However, they do not have forward integration except the game console of Microsoft. In the PC field, the most profitable players are not Dell, IBM, or Sony, but these two suppliers. Intel is strong supplier of microprocessors and promoting the concept of the digital home intensively. They sell their microprocessors to the companies but very often they also

promote the concept directly to the customers. In my opinion they want to lead the consumers to the digital home world and promote them to buy digital devices, so the device producers need to buy Intel's microprocessors. In addition, portraying themselves as an innovative leader is good for their brand image. In early 2006, Intel introduced a new brand for consumer PCs called Intel Viiv technology. Intel's Viiv entertainment PC platform is for the digital home. To realize the digital home model, Intel has been investing in the multi core architecture of the processors. The dual-multi-core CPU not only satisfies the requirements of the performance but also solves the problem of the battery running out of the power fast. However, recently, Sony, IBM and Toshiba invented a new microprocessor named "Cell." This might weaken the bargaining power of the supplier, Intel.

The bargaining power of buyers is contrast with suppliers. The buyers in the digital home are both the companies and the consumers but here I want to deal the consumers. The reason is the consumer is a very important factor in this industry. The bargaining power of the consumers is strong right now because they don't need to buy the digital home devices if the digital home is not attractive for them. However, the governments recommend

the digital home concept and there will be the situation that the consumers need to move to the digital home market. For example, in the near future, the consumers have to change the current TV to the digital TV because the analog TV service will be terminated. This might weaken the buyer's power.

The Rivalry Among the Existing Competitors

The intensities of rivalry among competitors include frequent price wars, proliferation of new products, intense advertising campaigns, and high-cost competitive actions and reaction. There are six conditions to lead the intensity. First, a large number of competing firms will lead the intensity. Second, if the rivals are similar size, influence, and have similar product offerings, this will cause the intensity. Third, high-price, low-frequency purchases make rival intensity high. Forth, new capacity has to be added in large increments. Fifth, slow industry growth or decline leaves competitors in a harder situation. Finally, high exit costs will also lead to the intensity in the industry. In PC, consumer electronics, and mobile field, there is a large number of competing firms. Microsoft, Intel, Sony, Matsushita, and Toshiba are just few examples. However, the service sector is quite new and not so intense. In this digital home industry,

low-frequency of purchases is one characteristic. In conclusion, it can be said that the intensity in the industry is really high.

Microsoft is another company that heavily promotes the concept of digital home. Mira, which is a wide range of smart displays that extend the Windows XP experience to any room in the home, is one of their products for the digital home. Recognizing the growing trend of consumers who want to enjoy the benefits of the rich features of Windows XP in more relaxed settings, Microsoft and industry partners are developing a variety of 10-inch and 15-inch wireless monitors to meet this demand. The smart displays give consumers their personalized Windows XP experience, including browsing the Web, sending or receiving e-mail messages, listening to music, and editing and displaying digital images, in any room in the home. Vista is also designed to deal easily with the home network. The consumer devises can be recognized easily and embedded to Vista network.

To conclude this analysis it can be said that in order to compete successfully in the industry and gain competitive advantage, it is beneficial if the company is vertically integrated, as it can provide to the market full solution service of the digital home. The companies

also have to keep their eyes on the new technologies to create new services, which are customer oriented.

CHAPTER THREE

AUTOMOBILE ENVIRONMENT

Current Situation of the Automobile Environment

Car Navigation System

I have been living in the United States for two years and I have noticed that car navigation systems are less popular in the United States than in Japan. Japan has the highest car navigation system sales in the world. One reason could be that the Japanese roads are really complicated and the streets do not run like the grid of a go board. In addition, Japanese tend to buy expensive car navigation systems embedded into their car. They can do this because of two reasons. The first reason is their national character. They are seeking high quality and reliable goods. The second reason is that the rate of brake-in to the cars is much lower than in the United States. This means that Japanese can buy expensive car navigation system and leave it in the car. However, the situation in the United States is totally different. Americans are very price sensitive and the rate of brake-in to the cars is really high. They can not put the expensive car navigation system in their car and leave it there. Therefore, in the United States, if we think about

car navigation system, affordability and portability are important. From my analysis, Americans do not tend to buy expensive embedded car navigation systems. In the United States, Personal Navigation Device (PND) is gaining popularity recently. This product is portable and the price is not as high as that of car navigation system. Actually car navigation sales numbers went up by 30% in 2005, but PND seems to become a major navigation system for the car in the United States (Tech-on, 2006). Personal Digital Assistants (PDA) has also entered the car navigation market. The disadvantage of PDA is the screen: it is too small for the driver to see when they are driving. They can use voice to lead the driver but it is better if they can easily see and understand the image of their destination. Cell phones have the same problem as PDA.

Audio System

In audio system, there is a big trend - connectivity of audio systems to the car environment. For example Apple's iPod can already be connected into the car environment. This means the car audio system is going to be digitalized. Apple Computer Inc. (Apple) announced that 70% of 2007 new car models will have connecting function with iPod (Apple, 2006). Apple already succeeded to enter

the automobile industry. Before, people had two ways to connect iPod to the car audio systems. One way was by using FM transmitter. The other way was by using cassette tape. Both do not provide good quality sound and more important, it is hard for the driver to control and see the display during driving. Therefore, Apple tries to connect to the audio system and makes driver directly able to control the iPod through car audio system. It looks like the cars were digitalized and already matured market, however, there is still some room to increase convenience. I always think that it is inconvenient to choose the music contents, transfer it to MP3 player and bring the contents in my car. Much more convenient would be to have a product, which could skip the first two steps of choosing the content and transferring it to the car. I believe this will be the trend in the near future.

Trends of the Automobile Environment

The trend towards full digitalization of the car environment is speeding up. Honda Motor Co., Ltd. (Honda) put the communication device inside their newest models. In Japan, almost all Honda's new cars are sold with the integrated communication device and navigation system. The Honda's navigation device provides the driver with on time

traffic data that GPS-devices can not do. They combine Global Positioning System (GPS) and the traffic data on their navigation. Therefore, Honda owner can see real time traffic data in their car. Honda is the only one who currently provides this kind of service. They use this as one tool in their customer retention. In my opinion it seems that automobile companies are highly interested in this business model in order to add value to their own main product - the car. The auto manufacturers will invest in developing the connection between home and car environment, because it is very beneficial to them. It will increase the attractiveness of their products.

CHAPTER FOUR

SONY ANALYSIS

History

In 1946, Tokyo Communication Industrial Company was founded in Tokyo to research and develop communication devices and measures. They changed their name to "Sony" in 1958. Sony has been producing a lot of innovative products such as the Walkman and the PlayStation (PS). Sony's engineers have innovative ideas, which got the start with Mr. Ibuka co-founder of Sony. Mr. Ibuka not only taught how to come up with innovative ideas, but also how Sony can manage the innovative engineers. The best example is Trinitron TV. This was the first big challenge facing Sony in the 1960's. Before the Tokyo Olympics in 1964, many Japanese companies produced the shadow mask TVs but Sony hesitated to produce that kind of TVs. Sony had three reasons. The first reasons was that many companies already produce the shadow mask TVs. The second reason was there were many failures with the shadow mask TVs. Finally, the reason was that the screen was darker than black-and-white TVs. Mr. Ibuka believed in chromatron technology (which the U.S. Army invented) because chromatron technology made TVs sharp and bright; however they failed badly because of

the cost. Mr. Ibuka decided to invent a new cost effective way to mass produce color TVs. He served as the project manager and took care of project members as his friends. Mr. Ibuka trusted and strongly supported his members, which allowed them the flexibility to see how technology could be used in new and inventive ways. In 1967, they invented Trinitron TVs. The other companies were astonished when they saw this TV. The Trinitron TVs sold in Japan and also in all over the world. After this, Sony produced the Walkman in 1979, the PS in 1994, and AIBO in 1999, which made people surprised and fascinated.

Business Model

Sony specializes in sound and image. They are engaged in the manufacturing and sale of consumer electronic equipment. Sony operates in six business segments: electronics, game, music, motion pictures, financial services, and other business (Sony, 2006).

Electronics

- Audio: home audio, portable audio, car audio, and car navigation systems.
- Video: video cameras, digital still cameras, video decks, DVD-video players/recorders, and digital-broadcasting receiving systems.

- Televisions: Cathode Ray Tube (CRT) -based televisions, projection televisions, Plasma Display Panel (PDP) televisions, Liquid Crystal Display (LCD) televisions, and projector for computers and display for computers.
- Information & communication: PC, printer system, portable information PC, broadcast and professional use audio/video/monitors and other professional-use equipment.
- Semiconductors: LCDs, Charge Coupled Devices (CCDs), and other semiconductors.
- Electronic components & others: optical pickups, batteries, audio/video/data recording media, and data recording systems.
- Others: Aiwa products, entertainment robots, cellular phones (mainly sold to Sony Ericsson), and other products and services.

Games

Sony develops, manufactures, and markets home-use game hardware and software under the name of PS and PlayStation 2 (PS2). Sony has taken an effective strategy with these game console machines. These hardware machines utilize the Moore's Law: the empirical observation that

the transistor density of integrated circuits, with respect to minimum component cost, doubles every 24 months. It is attributed to Gordon E. Moore, a co-founder of Intel. There is no scientific evidence but many people are using the law to predict the improvement rate of semiconductors. If we apply the law to one chip, the chip size will scale down to the half. The smaller the chips become, the more chips we can produce from one silicon wafer. Because of this size reduction, the production costs of chips dramatically drop. The PlayStation has been realizing both the size and the cost reduction with this innovation of the chip. Why can Sony realize this strategy? This is because they have own facilities. This enables Sony to redesign the chip and produce that. The PS will follow this strategy. The PS always changes the vision of game generation by generation. For example, PS introduced the 3D graphic function and PS2 reached the entrance of the virtual reality and got attention as a DVD machine. Where can the next generation console, PlayStation 3 (PS3), take us? PS3 invites you to the whole new generation in high-definition graphics and digital entertainment.

Music

Sony's music business is conducted through Sony Music Entertainment Inc. and Sony Music Entertainment (Japan) Inc. Sony sells recorded music and videos, and also provides digital music services such as monthly subscriptions for downloading music and sale of individual tracks.

Motion Pictures

Motion picture and television business is conducted mainly through Sony Pictures Entertainment Inc. (SPE). Sony Pictures Entertainment's global operations encompass motion picture production and distribution, television programming and syndication, home video acquisition and distribution, operation of studio facilities, development of new entertainment technologies and distribution of filmed entertainment in 67 countries worldwide.

Financial Services

Sony through Sony Life and Sony Assurance Inc. Co., provides life insurance and automobile insurance. Sony is also engaged in the provision of internet-based banking, credit card, leasing services.

Other

Sony is engaged in the provision of internet-related, advertising agency services, and Integrated Circuit (IC) card business in Japan.

Midterm Management Policy

Sony emphasis electronics, game, entertainment as core business and strengthen the competitive advantage and management culture. To realize this, Sony puts the first priority on electronics operation and promotes the structural reform and the growth strategy. Sony evolves the electronics business centralizing the important decision making authority to electronics CEO. Sony abolishes the Company System to integrate each business sections and creates the environment, which each business sections is able to focus on their fields. In addition, Sony enables important fields such as products strategy, technology, material procurement, production, sales, and marketing to strengthen the integration cooperation structure, fasten the decision making processes, and to optimize the whole efficiencies. In terms of growth strategy, Sony focuses on the electronics business. Sony established the new organization, Cell Development Center, under CEO to develop new applications and products that

take advantage of Cell's outstanding processing capabilities.

Strengths, Weaknesses, Opportunities, and Threats (SWOT) Analysis

We have to understand the company's environments: internal and external environments. To understand a company's internal environment, we examine company's strengths and weaknesses. The examinations of opportunities and threats are for company's external analysis.

Strengths

- The employees have an innovative mind. This innovative mind is embedded in their culture and has been producing a lot of unique products, which enable people to enjoy new lifestyles.
- Sony's innovative products such as the Trinitron TV, the walkman and the video recorder ensured the strength of Sony's brand. Sony has been keeping this strong brand image in all over the world producing the innovative and high quality products.
- Specialization in sound and image, which has lead to special skills in these fields and increased quality compared to the competitors.

- Sony covers different facets of the industry: hardware, software, and contents. This enables Sony to realize the vertical integration. They have the competitive advantage that they can produce the electronic devices and play their entertainment contents.
- Sony is good at high quality small products.
- Cell processor technology: IBM, Sony group, and Toshiba invented this processor as a next generation Central Processing Unit. PS3 will have this processor inside. Sony also plans to put this processor to home servers.
- Blu-ray Disc is a next generation DVD and was created to match the accelerating growth in digital consumer electronics and computer technology. This format provides five times larger capacity than today's DVDs delivering entertainment content in full high-definition (HD) quality.

Weaknesses

- Sony's core business is electronics but they did not do well for a while because of the luck of their innovative products.

- Sony has communication problems between their business units.
- Sony has several business units with low profitability.
- Sony's competitiveness is decreasing. There is the fierce price competition in the consumer electronics market.

Threats

- The iPod is a brand of portable media players designed and marketed by Apple. The bundled software used for transferring music, photos and videos is called iTunes. The iPod has been succeeding in the MP3 area. According to NPD Group, the market share of the digital music players in 2006 from April to June is: 1st Apple 75.6%, 2nd SanDisk Corporation 9.7%, 3rd Creative Technology, Ltd. 4.3%, 4th Samsung Coporation 2.5%, 5th Sony 1.9%, others 6.0%. Apple's iPod is the dominant power in this market in the United States (Wikipedia, 2006). Sony failed to keep their share of the MP3 portable player despite the fact that this is Sony's specialty area. By the end of 2006, Microsoft plans to release a portable music

player, the Zune. Sony has to keep eyes on these and other possible new entrants, too.

- In 2005, Sharp was the number one in the U.S. LCD TV market. Sony was tracing right after Sharp. Sony was well-known in TV market and SONY TVs represented the "best" quality in the market. However, SONY TVs are no longer the "best" in the market. Sony has to get back the number one position in order to accelerate the revival of their electronics department.
- Known as the Nintendo Dual-Screen (DS), the DS is a handheld game device with two screens, a stylus pen, and the ability to play both Nintendo DS and Gameboy Advance games. Equipped with wireless technology, a touch sensitive screen, and a microphone, the DS has many characteristics similar to a specialized PDA, but with wonderful gaming ability. Sony's PlayStation Portable (PSP) has to keep their share in the handheld game console area.

Opportunities

- Cell architecture has a Cell computing concept at the core. The Cell computing is the one of a Peer-to-Peer style grid computing and means a

distributed computing with the devices having a Cell processor. This distributed computing is different from existing one and pursues to be used for software, which needs real time feature including game field. First, the Cell computing will be realized in home networks. Next step is Internet environment. For example, Cell game console, PS3, can enter the home environment. Next, Cell home servers and Digital Cell TVs can enter. When we realize this, it is possible to do small Cell computing. The Cell has high performance and a landmark possibility of distributed computing function. However, the Cell has a problem: software problem. There is really high wall to jump over to develop the software for the Cell, which use totally different programming model than current systems. The companies have to think about the advantage and the disadvantage. Because of this, it is estimated that the Cell will take a long time to enter the enterprise system. The question is if IBM, Sony, Sony Computer Entertainment Inc. (SCE) and Toshiba will continue investing into the development of the

Cell. To overcome the problem, it is important to put the Cell inside game consoles and consumer electronics and increase demand to realize the volume efficiency. It seems that the successful Cell enterprise systems depend on next generation Cell game console, PS3.

- In the United States, the discussion is heading that analog broadcast will be stopped by December 2008.
- The consumer demand for big screen TVs has increased. The diffusion rate of the digital devices is growing and number of high vision TV programs is increasing. In this situation, the consumers want to enjoy the contents on the big screen. Another reason is that the DVD image was better than the TV image before but now the digital TV is better than the DVD image in the big screen.
- Lifestyle with movies. Americans love video library. Their lifestyle is tied to image.

CHAPTER FIVE

INTERVIEW

Nobuyuki Ishigaki

Distinguished Engineer e-Security Officer of IBM Japan and Member of IBM Academy

Mr. Nobuyuki Ishigaki is a top level engineer at IBM Japan. He studied at Yale University as an overseas student through an IBM sponsorship. He has been working with many companies such as Honda and Sony and giving technical guidance to them. He has the experience to examine what IBM can do in the digital home market. Therefore, he is the right person to ask about the current situation and movement of the market.

First of all, I asked him current situation of the digital home market. He said in Japan the entertainment such as music, movies, and games, is gaining popularity as an application of the digital home. He continued, now people can use broadband, and it is really convenient and cheap to get music or movies: people don't buy CD because of iPod and enjoy the games using networks. However, he mentioned, the entertainment is heading towards the "personal." I asked him what he means by the personal. He explained that by the personal he means individual

products, that don't need to be shared in the home environment. Mr. Ishigaki predicts that the entertainment doesn't need to be the home concept. I asked him, if the entertainment goes personal, what Sony can do as an entertainment company. He answered, in terms of the digital home concept, Sony needs to focus on the things that people desperately want to use at home, for example big screen TV and a feeling of a high realistic sensation. He also pointed out the remarkable characteristic of this market that there is some deep relationship between the price and the consumer electronics: a big screen TV would be sold really well if the price goes lower than $1,000. He said another example is that, if the price is lower than $500, people tend to use the devices as a personal. Therefore, He said, Sony needs to consider the affordability of the application too. Mr. Ishigaki returned to the subject of the current digital home situation. He said other fields, which can be big potential in the digital home, are medical and education fields. He explained people tend to use tremendous money in these areas because it is related to the human's life. He pointed out that these fields are not going personal because there is a limit of numbers: we want to share the specialists. Mr. Ishigaki concluded that in this market we

need a killer application, which is very impressive. He said companies have various kinds of applications so far and, if you have these applications, it is convenient, however, they are not strongly desired by the users.

Next, I asked him about the relationship between the car environment and networks because I want to connect the home and car environment with networks. The model, which is based on car environment and networks, must help my idea to connect the home and car environment. He said the model, which is using the networks in the car environment is a very hot subject. In Netherlands, he continued, they have been trying to test the variable pay road from this year and swept tollgates away: they use GPS and the map of Netherlands to track and decide the fee for each car. In Japan, he said, the diffusion rate of Electronic Toll Collection (ETC), which is an automatic highway toll system, is 80% because they have done a discount, and in two or three years almost all cars will have the ETC system and we might be able to track all cars by using this system in Japan. Mr. Ishigaki said Toyota tries to control this kind of the information but it is hard because some cars might not have the ETC and there is also the privacy problem. He pointed out there are many models; however, in this environment they lack the impressive

applications. However, he gave me one impressive model as an example that in England they tried to use GPS and offer discount to the people who are not driving so much. He continued that this idea was good but they failed because of the privacy problem and the critical system down. To solve the privacy problem, he suggested that the cars can keep their information inside the cars. He said Sony can do the same model and attract the users because Sony has an insurance division. To understand the difference between the home and car environment, he commented that the characteristic of the difference between the home and car environment is standardization. He said we can't buy a half Toyota and a half Nissan car.

I also asked about "Cell" a next generation processor, which Sony, IBM, and Toshiba have co-developed, because I wanted to know if this Cell has some potential or not in this digital home market. Mr. Ishigaki said the Cell can do many jobs because Cell can divide their tasks. Before, he continued, the color, the reality, the graphic was separated into different processors; however, Cell can do everything with the same processor. He said this means the cost of chips goes down; the processor can cover up itself, when some part fails, because of the dividing functions. He said there are several microcomputers in the

control system of the car. The Cell might be used for this system because of their coverage function.

Next, I told him about my idea, which is about the connection between the home and car environment. I also told that I want to use PSP to connect these two environments. Mr. Ishigaki pointed out that Japanese tend to invest a lot of money in their cars. He asked me a question: how about Americans? He moved to the navigation subject, and said that their roads are really easy to understand. He had the feeling that that kind of device in their car was not attractive for Americans. He also said that Nintendo tried to deal with stock subjects through their game console but they failed because the key application is game. He commented PDAs and cell phones will be the strong competitors; however, manipulability of cell phone is not convenient for the Americans. He continued that PDAs have touch screen and this screen is popular with the consumers in the United States. He suggested me to use touch screen on PSP. He also explained about the market in the United States, that Americans are more price sensitive. In contrast, he said, Japanese are seeking the quality or reliability. For example Japanese don't buy beef from the United States now because of a cow disease problem. He said that even though there was only

few cows that got the disease, the Japanese can't trust the U.S. beef and they stopped importing it even though Americans are still eating the beef. He concluded that the affordability is also important in the United States.

Finally, I asked him if Sony's products are expensive or not. Mr. Ishigaki said Sony has a strong brand power and this power is from reliability. Sony can sell products with higher price if the product is innovative and reliable. He commented that Sony should not lose reliability. He continued that Sony also has to be innovative and fashionable. This is different form Matsushita. He said Matsushita always keeps second position and provides good products.

He concluded my interview by saying that killer application and affordability are very important in this market.

Yohei Otsuka

Nissho Electronics Corporation Consumer Electronics Team Storage Technologies Group Innovative Devices Division

Mr. Yohei Otsuka has been selling hardware in the digital home market for three years. He has the current picture of the digital home market. He said the digital home is a sort of a proposal of a new life style. He mentioned that now we can easily connect to the

environment from any devices, anytime, and anywhere. By using this environment, he continued, people can gain the excitement and happiness, and that is the ultimate goal of the digital home concept. He said that in order to support and spread this digital home concept, each consumer electronics company is developing their own technologies. Of course, he said these companies can only provide hardware, which is using cutting edge technologies. However, what the users truly want to do might be sensitive analog part by using their devices. He emphasized that the key point is what customers want to do by using these technologies. Mr. Otsuka said, if a company knows what kind of sound users want to listen by using a cutting edge sound technology, the company will win in this market; if a company knows what user want to see with the vision technology, company can succeed in this market. He pointed out many companies lost their true needs by focusing on the technologies and management; however, the most important thing is to understand the customer needs.

I asked him the Sony's current situation in the digital home market. He answered there are many similar products and competition is fierce in this market. In this situation, he continued, Sony is very active to propose a

new lifestyle or vision, and Sony actually has being realizing the new lifestyle for the consumers. Mr. Otsuka said there are few companies, which have power to produce new lifestyle. Personally, he mentioned, he prefers that kind of company, which is challenging to create the new world. Again, Mr. Otsuka said the most important thing they have to do is to propose the lifestyle in the market.

CHAPTER SIX

SURVEY

To achieve the competitive advantage of the digital home market, first of all, the companies need to know the current attitude of the consumers toward the digital home: what the consumers are thinking. The reason, why I consider it important that the companies have to know the current attitudes of the customers, is that from my analysis it is the companies that have to lead the consumers to the digital home world. For the consumers, it is hard to understand this concept and they tend to hesitate to enter the digital home world. How can companies lead without knowing what the consumers are thinking? Next, as my interviewees said, the companies have to understand what consumers really want from the technology. I also wanted to know how the consumers respond to connecting home and car environments in the digital world. In addition, I wanted to find out the consumers' opinion about the affordability and security of the digital home. Mr. Ishigaki mentioned about the importance of the affordability of the digital home usage model. These questions will help a lot to establish my proposal for the digital home. Because we combine these

questions with the demographic information, we will get substantial data. To compare these data, we expect to see some trends in the market.

Need for the Study

The purpose of this survey is to investigate consumer behavior and attitudes toward the digital home environment and to understand the consumer's real needs.

Research Key Questions

- Do the consumers know about the digital home?
- Have the consumers already experienced the digital home?
- What does the consumer really want to do with the digital world?
- What does the customer think about the connection between the home and car environment?
- What is the response to the price of the digital home?
- Does the security problem prevent the consumers from entering the digital world?

Questionnaire Design

The questionnaire was simple, one page, in order not to lose the respondents' motivation (APPENDIX A). The

questionnaire was designed by using three types of question-response formats; Open-Ended question, Closed-Ended questions, and Scale-Response questions. The first part of the questions is about the recognition of the digital home and explains about the concept of the digital home by using the examples. In order to know what the consumers are seeking in the digital world, the people need to know exactly what the digital home is. This was the reason why the explanation of the digital home was included. After the explanation, the questions were about the consumer's expectation of the digital home. To examine my proposal for the digital home model, the question talking about the connection between car and home was included. The final part was the demographic question. The question asked about the number of the people in their house was included in order to find out if there is a trend between the number of people in the household and expectations towards the digital home.

Sample Scope and Limitation

The survey is conducted only at CSUSB because we want to limit the sample to the students and to know the direct opinions from them who are raised in the digital world environment. The student might suggest us some new ideas

of the digital home. CSUSB has 16,431 (Male 34%, Female 66%) students and 100 students answered this questionnaire (CSUMentor, 2006).

Method of Analysis

Following the completion of the data gathering, I coded the data by using the Statistical Package for the Social Science (SPSS). The analysis of this data used measures as the means, frequencies, percentages, range, rank orders, cross-tabulation, and other statistical tools considered useful for this analysis.

Demographic Results

Gender of Respondents

In this survey, 49% of respondents were the male students and 51% of respondents were the female students (Figure 1). This survey picked the samples very successfully because this survey included almost the same number of the male and the female. This means that this survey equally reflected the opinion of both the male and the female sides.

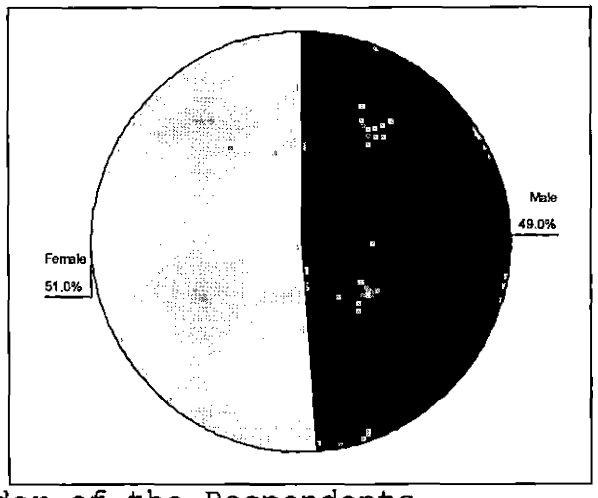

Figure 1. Gender of the Respondents

Age of Respondents

In this survey, 66% of the respondents reported an age 18-23 years old, 24% of the respondents were 24-29 years old, 5% of the respondents were 30-35 years old, 2% of the respondents were 36-41, and 3% of the respondents were above 42 years old (Figure 2). As the target of this survey was the generation of future users of the digital home, the people 18-29 years old were dominant (90%).

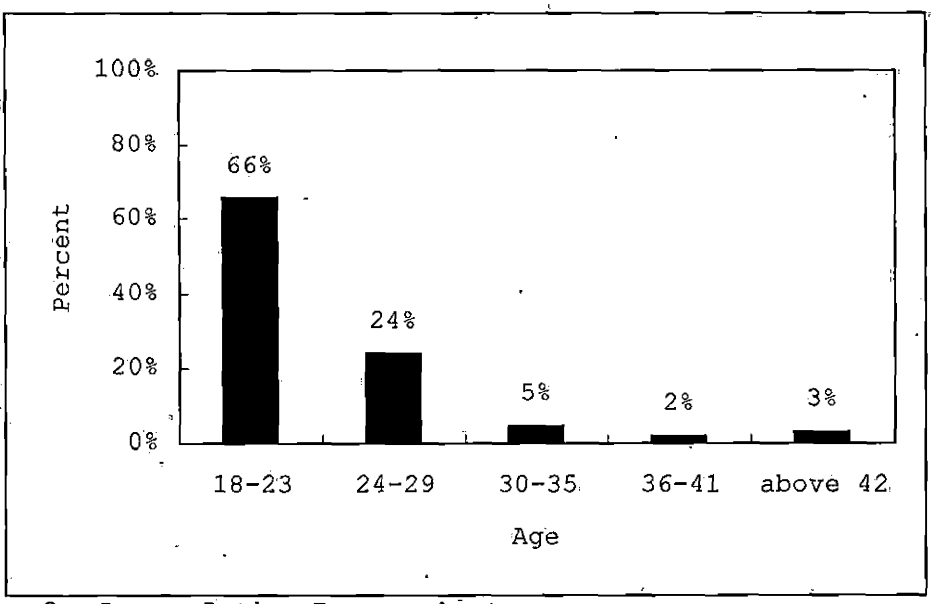

Figure 2. Age of the Respondents

Number of People in the Household

In this survey, 6% of the respondents were living alone, 21% of the respondents were two people, 21% of the respondents were three people, 27% of the respondents were four people, 16% of the respondents were five people, 7% of the respondents were six people, and 2% of the respondents were more than seven people (Figure 3). The number of the people was spread out very well. This fact helped considering the trends about the number.

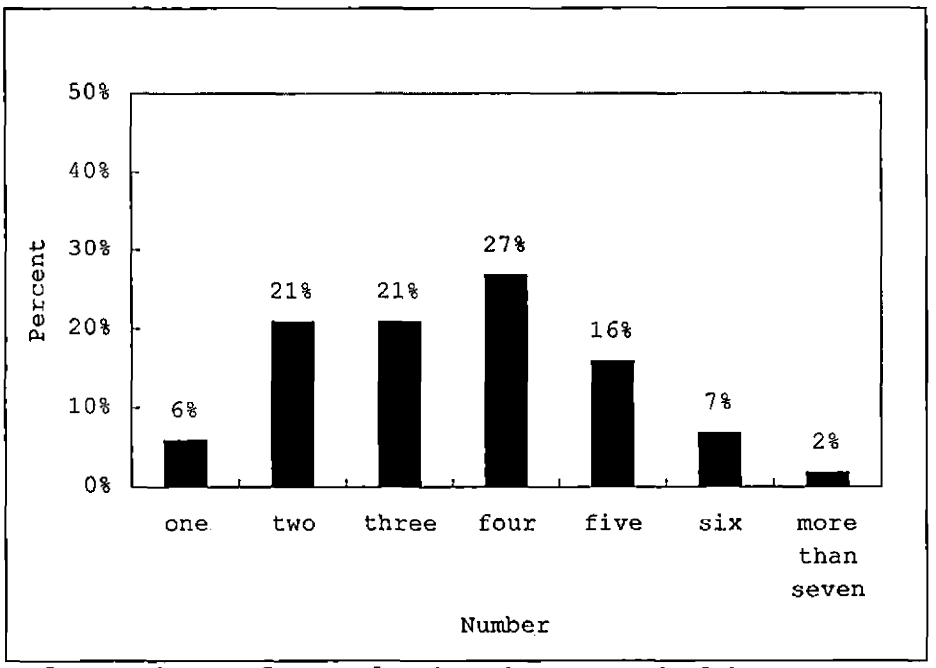

Figure 3. Number of People in the Household

Research Question Results

Q1: Have You Ever Heard of "the Digital Home?"

The respondents were asked if they have heard of "digital home" and the results show that the awareness of the concept is rather low. Figure 4 shows that only 24% of the respondents answered "Yes", and 76% of the respondents answered "No." This means that the majority of the students had not even heard of the digital home. It is very clear that the recognition of the digital home was not high.

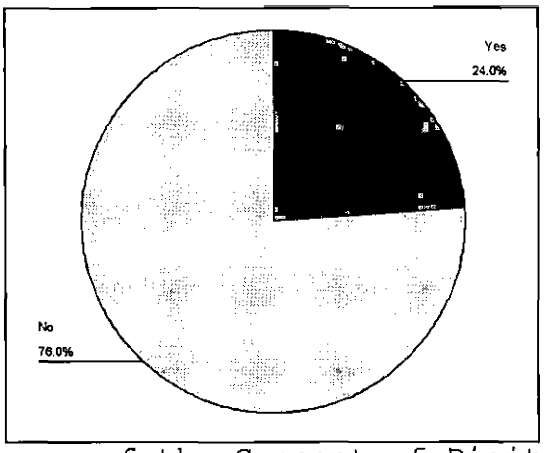

Figure 4. Awareness of the Concept of Digital Home

Q2: Do You Know What "the Digital Home" is?

Figure 5 shows that 19% of the respondents said "Yes" and 81% of the respondents said "No." The people who understand the concept of the digital home is only 19%. This result is even lower than the 24% of people who only knew the name "the digital home." In addition, the cross-tabulation analysis led to the interesting fact that more male students know what digital home is (Figure 6). When the companies put together the marketing plan for the digital home market, they will be required some thought for female.

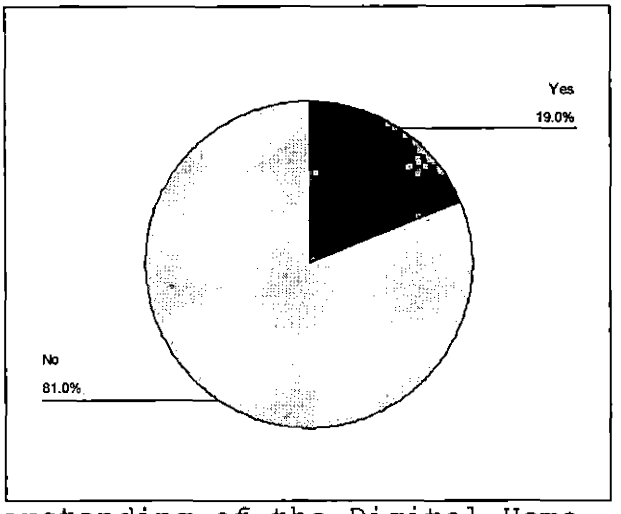

Figure 5. Understanding of the Digital Home

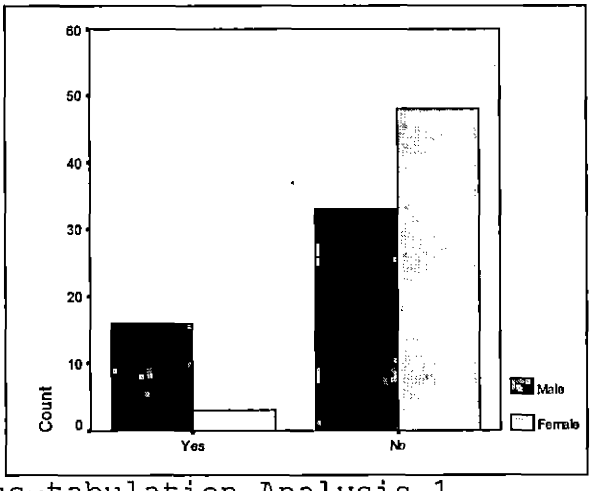

Figure 6. Cross-tabulation Analysis 1

Q3: What Do You Expect in the Digital World?

The respondent were asked what they expect from the digital world, and given the list of choices. Figure 7 shows the percentage of the person who answered "Yes, I expect this field." in the each field. 83% of respondents expect from entertainment, 81% expect communication, 61% education, 36% medical services, and 46% home security. According to the responses the main things expected from the digital world are entertainment and communication services. Medical field did not get so high response. The students might not have the image of how to use the digital home in the medical field or do not worry so much about their health. They do not have to measure their blood pressure twice a day and have it reported to the doctors. When this questionnaire was designed, it was predicted that there might be some correlation between the number of people in the household and the consumer expectation. The cross tabulation analysis was conducted in order to find out if this assumption was true, but the analysis shows no correlation (APPENDIX C). The reason could be that the respondents are students and household they live in (the dorm or co-rented apartment) does not really represent the standard family household with parents and children.

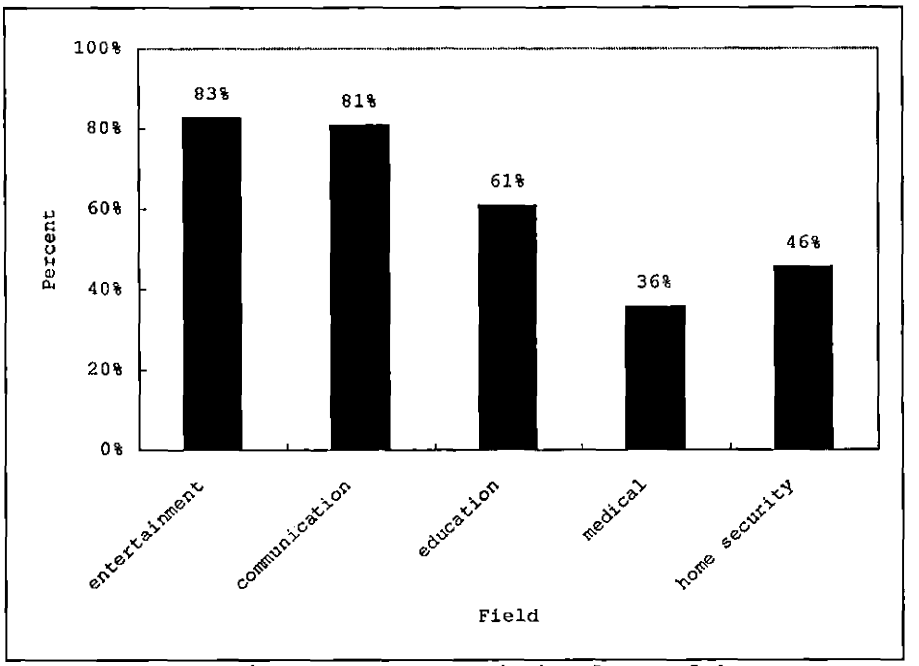

Figure 7. Expectations to the Digital World

Q4: What Else Do You Expect?

The respondents were asked to write themselves comments on what they expect from the digital world. The comments included for example food, globalization, shopping, cleaning, transportation, and virtual reality. From these answers, the companies developing digital home service can get see that the digital home has a big potential in the future. However, some of the respondents also mentioned privacy and security as things they expect. This shows that the developers of digital home should pay special attention to these topics, or could become the

obstruction for the consumers. The full list of comments from the respondents is brought in APPENDIX B.

Q5: How Much Money can you Spend on Your Digital Home Devices?

Figure 8 shows that 43% of the respondents answered that they would pay $0-$499, 29% of the respondents answered $500-$999, and 28% of the respondents answered more than $1,000. Mr. Ishigaki pointed out that, when the price of the consumer electronics products goes below $500, people tend to treat the product as a personal product, which does not need to be shared in the home. More than half of the students (57%) answered that they would pay more than $500. This might indicate that they are ready to go out from the "personal" and spend money for the digital home but still the companies have to pay attention to the movement of the "personal." In addition, the cross tabulation (Figure 9) shows an interesting correlation. The students who understood the concept of the digital home tend to use more money than the student who did not understand. If the consumers understand the concept, they might spend more money and accelerate the digital home expansion.

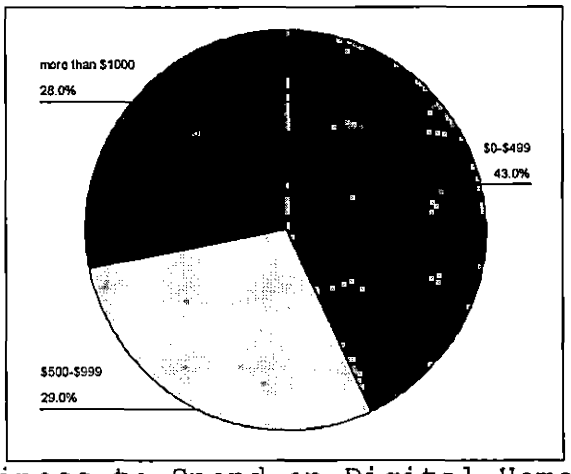

Figure 8. Readiness to Spend on Digital Home Devices

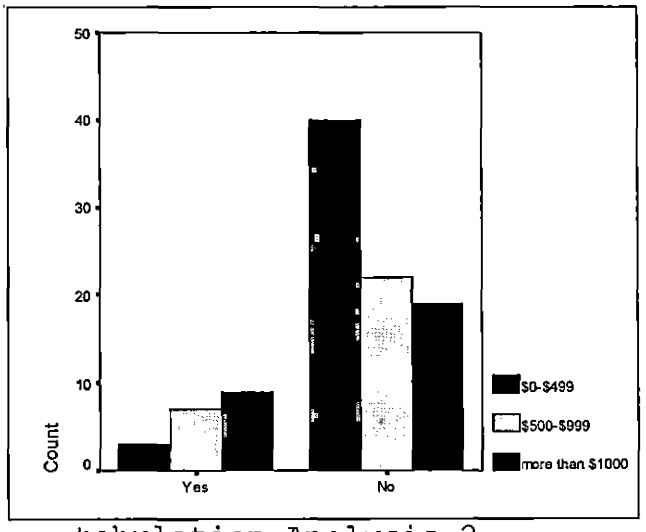

Figure 9. Cross-tabulation Analysis 2

Q6: It is Very Convenient to Connect My Car and the Digital Home Environment?

In order to get feedback on the digital home model presented in this project, the respondents were asked if they regard it convenient to connect their car and digital home environment. Figure 10 shows 30% of the respondents strongly agreed, and 44% of respondents agreed with this concept. In total it means that 74% of respondents would value the connection between the car and digital home environment. Another 17% of the respondents had a neutral attitude towards this concept. Only 20% of the respondents disagreed, and 7% strongly disagreed with it. In addition, the cross tabulation analysis proved that both the male and female students were interested in this idea.

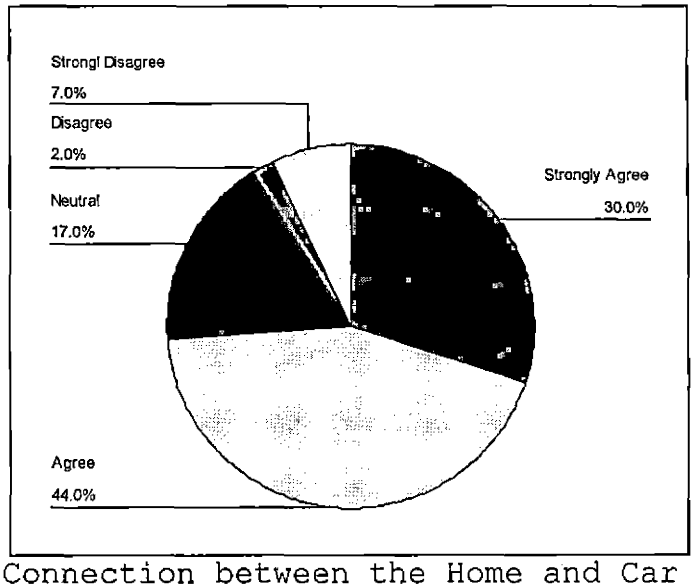

Figure 10. Connection between the Home and Car Environment

Q7: I do Hesitate to Expose Myself in the Digital Home Environment because of the Security Problem?

Figure 11 shows that 8% of the respondents strongly agreed, 31% of the respondents agreed, 31% of the respondents were neutral, 21% of the respondents disagreed, and 9% of the respondents strongly disagreed. The total of 39% of the respondents said that they hesitate to expose themselves in the digital environment. For the producers, loosing 40% of the market because people are scared of using the products is a big thing. My analysis is that the security will be the key in the digital home.

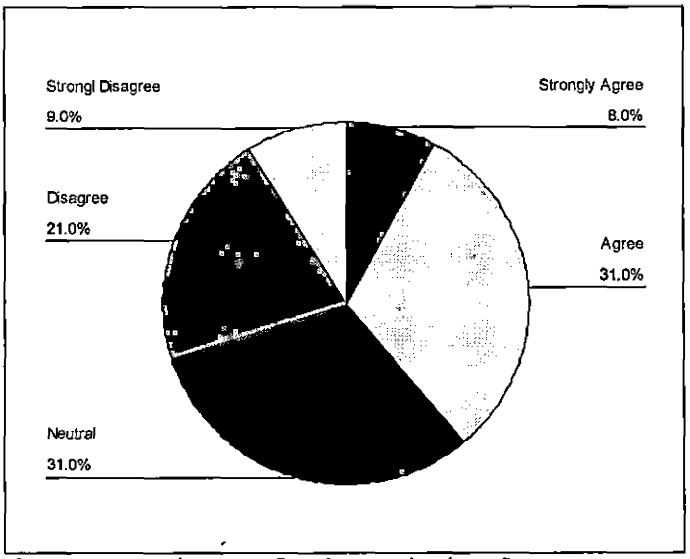

Figure 11. The Security of the Digital Home Environment

In conclusion for the analysis of the survey results, it can be said that the digital home concept is relatively unfamiliar to the respondents. The main things that they expect from it are entertainment and communication. Also developers of the products should pay attention to the security and privacy issues.

CHAPTER SEVEN

PROPOSAL

Analysis Overview of the Digital Home

The digital home world enables people to enjoy their life in a new way but the problem is how the companies can lead people to this digital home world. The companies are ready to create the digital home environment but people are not ready to live in it. People do not understand clearly what the digital home is and what benefits it brings. The companies can explain what the digital home is, however, I believe, it is important to show and have people experience the digital home world. According to Will Poole, Senior Vice President of Market Expansion Group, in the United States 44% of family PC users store and manage the digital media, such as music, video, and picture; 32% of people are interested in recording TV program but only 9% can carry it out because of the complexity (Yamashita, 2006). The number of users who can build the home network for the digital home will be much lower because of the difficulty to get people involved. This difficulty will drive users away and eventually drive the digital home concept out of consumers' mind. This difficulty creates hesitancy, which will cause really bad

impact on the digital home market. Even if technology enables people to use home network easily, this hesitancy will prevent them from using it. To get rid of the people's hesitation to enter the digital home world, the companies have to make the digital home easy and simple to use. The companies also have to think about the affordability of the products and the services. In current situation, the most important thing is that the companies need to provide the impressive models for the digital home. There are many products and services for the digital home but not so impressive and attractive. It is not attractive even if we put a lot of not-impressive models together. When the companies provide the impressive and attractive models for people and make them feel comfortable to enter the digital home world, that would be the beginning of the digital home. After they enter the digital home world, people will start thinking what they want to do in the digital home world. It may result in building the network and integrating the devices.

Sony Digital Home Strategy

Based on my IT knowledge and my analysis of the digital home, I would like to propose a model of the digital home market for Sony. Sony is good at producing

new lifestyle. This market will be very beneficial for them. Sony has been producing the products for the digital home but the problem is they don't show what the digital home is. Sony explains what their products are. However, they don't explain how the products work in the digital home world. Sony needs to suggest the way how the products are going to be used in the digital home world.

My definition of the digital home evolution is the following. The evolution has three stages. The different stages are illustrated on the Figure 12 below. The first stage has lasted up to present day and called the Individual Stage, where each individual consumer electronics device has own functions and own contents like music, movies, photos, etc. They are personalized and have very limited linkage with the digital home. The second stage is the Partial Integration Stage, where the products are converged to the digital home concept. The contents can be shared and utilized via wireless connection. The level of this integration depends on the products, and all products are not integrated. The third stage is the Full Integration Stage, where the integration of the products is done completely through the digital home concept.

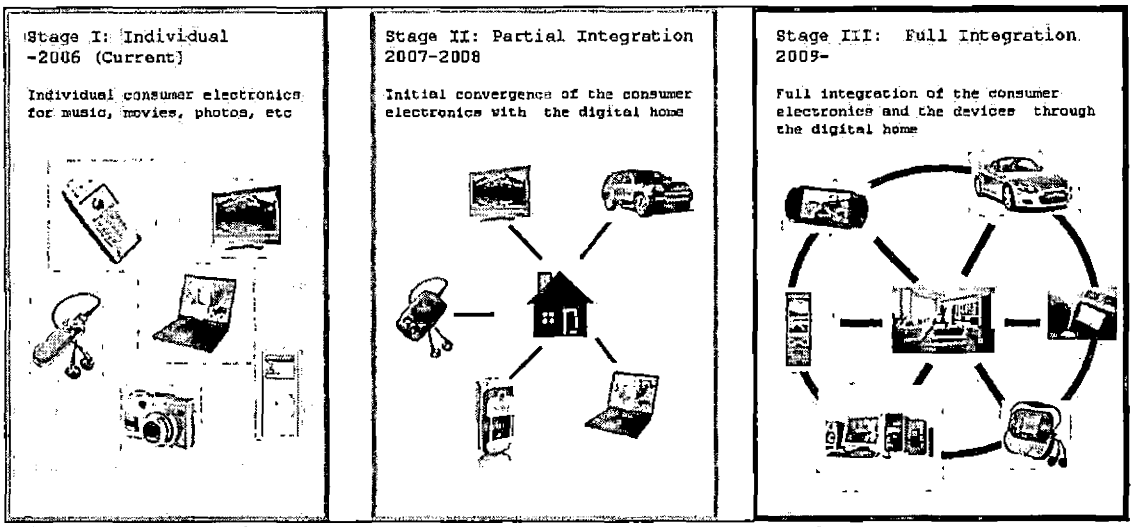

Figure 12. Digital Home Model - Stage of the Transformation

What Sony has to do in the digital home market for coming stages, the Partial Integration Stage and the Full Integration Stage? (Figure 13)

1) Open the door to digital home

Consumer electronics products are converged to align to the digital home concept. Sony needs to establish customer's awareness and acceptance of the digital home concept. The concept must be simple and attractive in order to raise the customer interest in the digital home. Products are not necessarily integrated with each other at this stage. In the United States, "Digital

Home in the car" is one of the key success factors.

2) Capture the consumers under Sony Digital Home Model

Sony needs to follow the standard of the digital home and integrate their products. Their products are enhanced to connect with each other through wireless network at the standard interface. Once the consumers feel comfortable using Sony's products, they will keep staying in Sony's digital home world.

3) Lead the full integration of the digital home products

Sony has to lead the full integration of the digital home products through the integrated product sets.

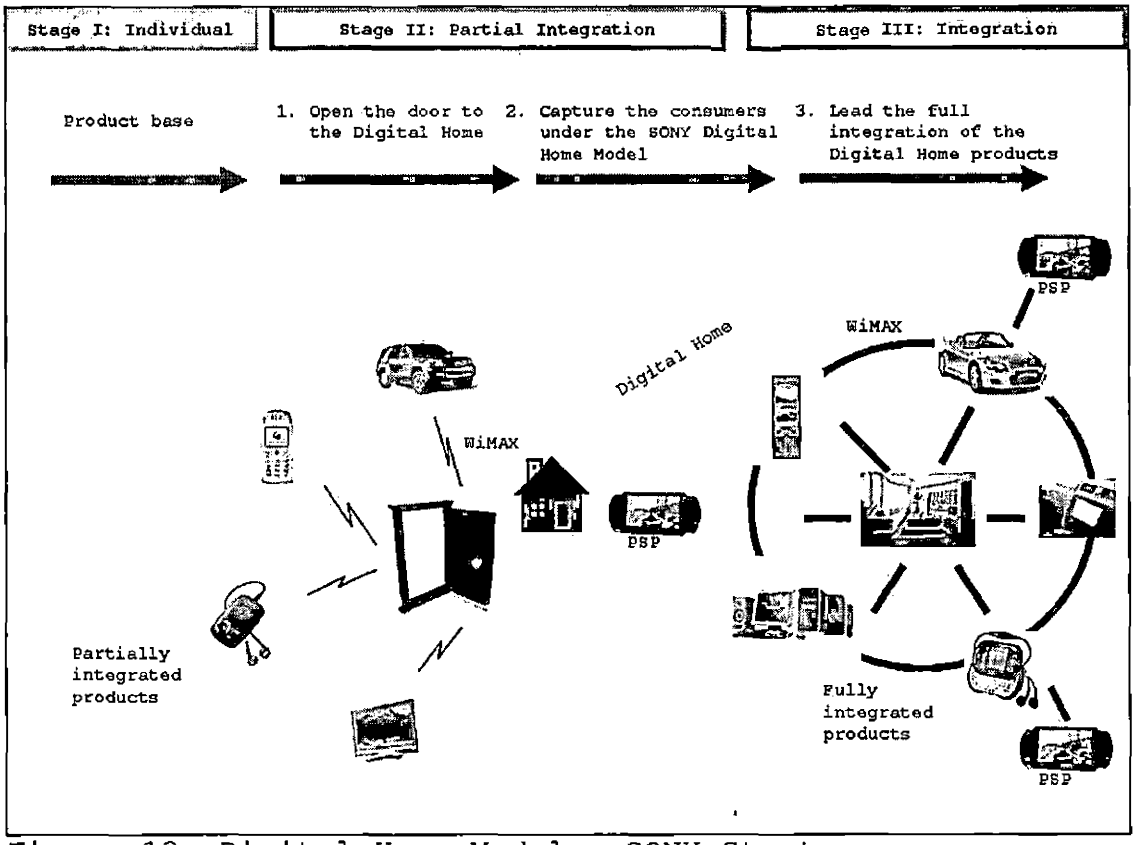

Figure 13. Digital Home Model - SONY Strategy

Sony's Solution for the Partial Integration Stage

What can Sony do in the United States? The important thing is that the digital home is based on each country's culture. In the United States market, I believe that we need to redefine the concept of the digital home market because their culture has an interesting characteristic. Their life style is heavily depending on automobiles. They spend a lot of time in the car, and we can say that for the Americans automobiles are also part of their home. According to the National Highway Traffic Safety

Administration, people drive their car in average 300 hours per year (White Paper on Mobile Society, 2006). In the United States, the digital home concept needs to be captured so it includes automobiles. Apple's products already step into automobile industry. The automobile market is the market that offers Apple the biggest potential. Many of us listen to music in our cars more than we do in our homes, particularly those with a daily commute. Apple has announced that more than 70% of the 2007 new car models can use iPod (Apple, 2006). The automobile industry is not quick to change proprietary technology once they commit to it. The first MP3 maker, which penetrates this market successfully, will enjoy the long-term prosperity. Sony does not need to do the same thing as Apple did. However, if Sony does not go in this market, they will lose the big market share to Apple, and not only the automobile market but also the digital home market. I strongly recommend that Sony consider the digital home market together with the automobile market. The reason why I suggest that Sony needs to think the connection between home and automobile is not only American lifestyle but also the developing technology surrounding automobiles.

What can Sony do with this concern? Sony has really powerful product called PSP, portable game console. Sony can make the PSP developed as the remote control of the digital home. Sony is good at high quality small products. The consumers will be able to control or check their home environment from the new PSP. The biggest benefit of the PSP is its portability. The consumers can bring the PSP wherever they go. The consumers can also bring the PSP to their car. This idea, connecting their car and home environment, must be impressive to them. Having the new PSP, which can connect to home network from the car, means that it is not necessary to carry the music content from home to car. The digital home products will be accessed from the car, and music content will be transferred and just played in the car. This is what iPod can not do. iPod user has to select and bring the contents to their car. Another benefit of the PSP is large and clear screen, which can provide a navigation function. In the United States, 760,000 car navigation systems devices were sold in 2005, which is 33% more than last year (Response, 2006). The car navigation is not used widely in the United States. One of the reasons is the price of the product. Providing the car navigation system to the Americans with

the affordable price and more casual style might change their attitude.

How can Sony realize this SONY Digital Home Model? Sony can use a wireless technology, WiMAX. It can help to access the home network from the car. WiMAX is a standard-based technology enabling the delivery of last mile wireless broadband access as an alternative to wired broadband like cable and DSL. WiMAX has the characteristic of both wireless LAN and mobile phone. WiMAX provides fixed, nomadic, portable, and mobile wireless broadband connectivity without the need for direct line-of-sight with a base station. It is expected that WiMAX technology will be incorporated in notebook computers and PDAs by 2007, allowing for urban areas and cities to become "metro zones" for portable outdoor broadband wireless access (WiMAX Forum, 2006).

Sony's Solution for the Full Integration Stage

After selling the new PSP, Sony can expand these features more. The PSP will be positioned as a central device of the digital home. It can be used not only for the access to the home network but also for the integration of the digital home devices so that Sony can improve customer convenience with the new PSP. The Cell

technology will help the new PSP to enhance their functions.

CHAPTER EIGHT

PROJECT MANAGEMENT

Project Management

The implementation of the digital home model is regarded as large scale and corporation wide "project" for Sony. The project management method must be applied to manage the digital home project which requires the development, the transformation, and the integration of the individual products.

According to Guide to Project Management Body of Knowledge (PMBOK), Project Management Institute (2006) said "a project is performed by people constrained by limited resources and it is planned, executed, and controlled. It is a temporary endeavor undertaken to create a unique product or service." In other word, a project has deliverables with defined quality, cost constraint, and time constraint.

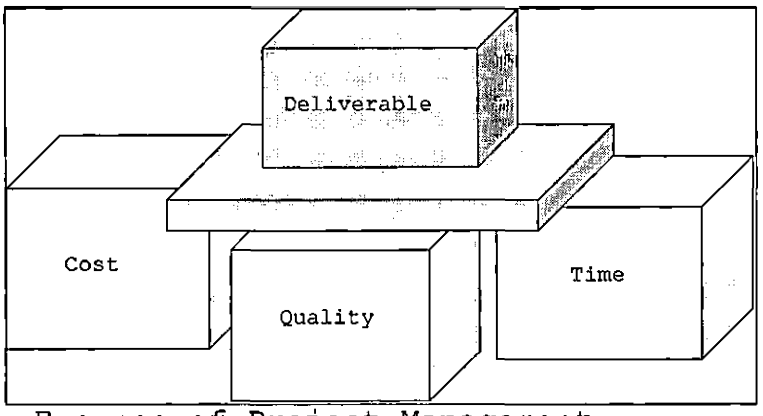

Figure 14. Essence of Project Management

The project management is the combination of skills, knowledge and technologies in planning and controlling project to meet project objectives by delivering all the required deliverables on time and within planned cost (Figure 14). The responsible person to mange the project is called a project manager.

The recent market environment has placed the importance of the project management in the industry. The product lifecycle becomes short. The consumer need is changing quickly. The new competitors enter the market quickly following the pioneer. The speed of the product release and the speed that the companies build up market share are quite important. The project management is a good and mandated method to manage and lead in this environment.

In the Sony digital home project, the project objective is a realization of the digital home model and it composes the hardware products, the software products and the applications. Some products already exist and some need to be developed newly. The applications require the platform of the hardware and the software. The platform should provide the standard interface. This project is very complex because 1) the consumer needs may change, 2) many corporations and individuals are involved, and 3) the new technology impacts the speed of the implementation. The existing organization has its own mission and the digital home project requires the control across the functions. Therefore, the project formation which gets the required resource from the existing organization is suitable for managing this project. The project manager must be the executive level to place direction and control over the whole corporation.

Digital Home Project Definition

The Sony Digital Home Model is implemented in the multiple stages. The first stage is almost completed and individual consumer electronics products are in the market. The second stage is the Partial Integration Stage, where the products are converged to the digital home

concept. There are many projects occurred corresponding to each product. The type of the project can be varied, and the project candidates are the development of the digital home standard interface, the PSP enhancement, the home & car connection, the hardware and software product development, and application like home & car connection (Figure 15). The third stage is the Full Integration Stage, where the integration of products is done completely through the digital home concept and the applications are available. Same as the Partial Integration Stage, the multiple projects will occur. It is mandated to integrate each product under the umbrella of Sony Digital Home Model.

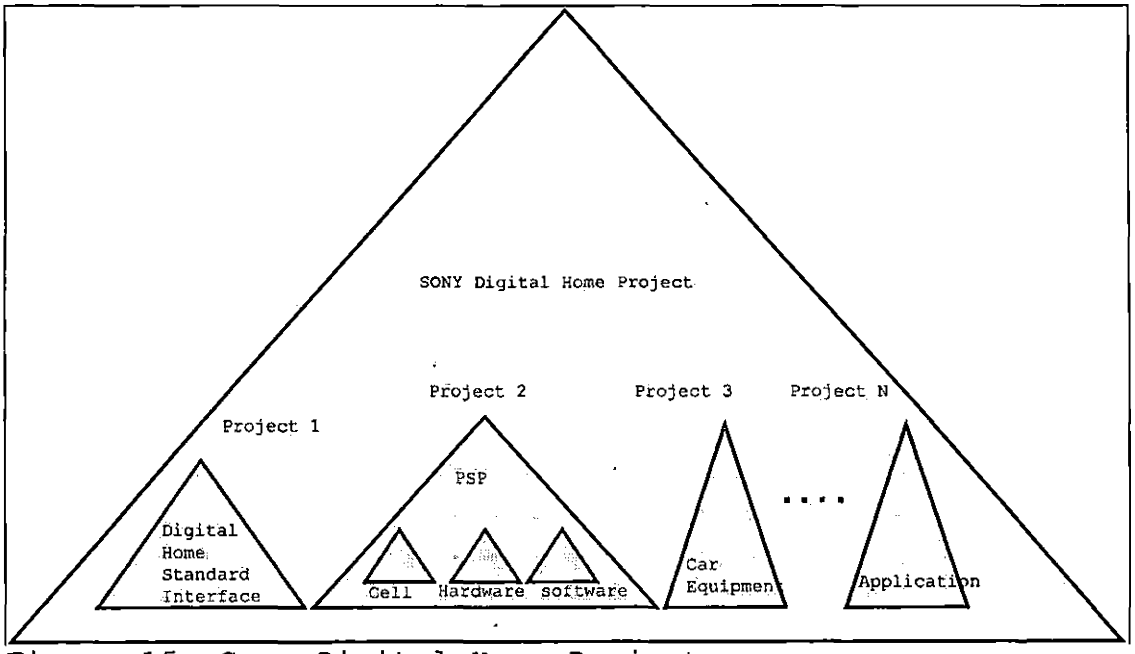

Figure 15. Sony Digital Home Project

The digital home project is quite unique compared to the traditional single project, where the project is completed and the project team is released. To mange multiple projects, the process of managing the multiple projects has to be introduced in addition to the project management for single project (Figure 16). Though it is called the program management and some additional techniques like inter project dependency have to be applied, the essence of managing project is the same as the project management.

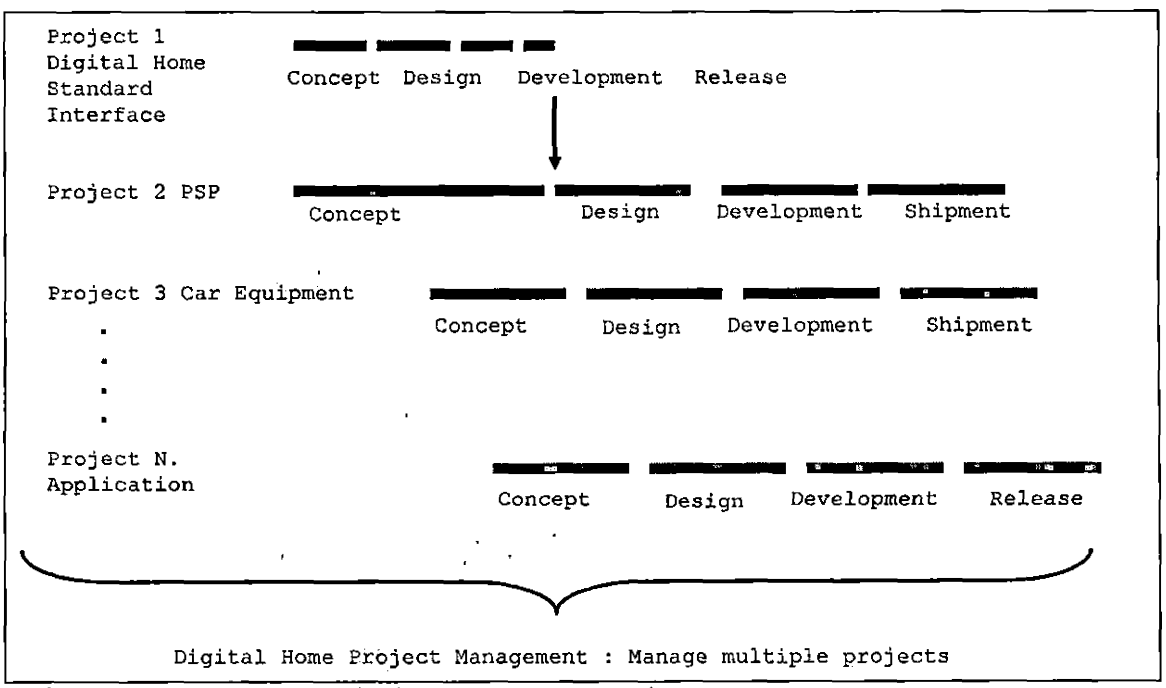

Figure 16. Sony Digital Home Project Management

Stakeholders

There are many corporations, organizations, and individuals who are involved in the project. They are called stakeholders. The key stakeholders are in the position to make the decision on the project direction. They can be the sponsor executive of the project and/or the management in the user side and it depends on the project characteristics. The Sony Digital Home Project is not just the hardware and software product development. It is implementing the concept of the digital home. The expected key stakeholders are as follows;

Committee member of Digital Home Standard Interface

Management of Cell manufacturer

Management of car equipment provider

Management of application developer

Management of hardware and software provider

SONY management - CEO, CFO and CIO

The stakeholders may have different opinions. Managing the stakeholders' requirements is important and difficult work. The project manager should remember the primary importance to think of the project objective and manage stakeholders' requirement. In digital home project, the stakeholders themselves may be changed time to time due to the market environment.

Sony's Project Management

Knowledge areas and considerations which are more critical for the Sony Digital Home Project are described here.

PMBOK defines nine subject areas of the project management;

a) Scope Management

b) Risk Management

c) Human Resource Management

d) Procurement Management

e) Quality Management

f) Time Management

g) Cost Management

h) Communications Management

i) Integration Management

Scope Management

In the project management, the project scope should be defined clearly and stay unchanged over the project life. However, in the digital home project, the scope is expected to be changed when market or market trend is changed and new technology has emerged. It seems too difficult to define the complete and fixed scope in the beginning of the digital home project. It is almost impossible to fix all required components of the digital

home at the time of project planning. The practical approach is to define the staging and fix the scope stage by stage. By view of project management, the scope is the base for achieving the objective. It is required to define the initial scope and if the scope has to be changed, those changes are preceded through the change management process.

Risk Management

Risk management involves risk identification, quantification, action development and action tracking. There are many risks foreseen in the digital home project. For example, in PSP project, the new PSP assumes the new Cell by the certain date. If this Cell is not ready by the planned date, the PSP project can not move forward. On the other hand, the design of the PSP can be done if the specification of the Cell is ready. Therefore the Cell shipment is captured as risk in the PSP development project. However, only monitoring the progress of the Cell project and placing the risk aversion type actions are the actions that can be taken in PSP project. Risk actions require the workload and the resource. The resource and the fund should be calculated for the actions for the contingency.

Human Resource Management and Procurement Management

The digital home project must involve various parties, such as external corporations, Sony subsidiaries, and Sony. To be successful, the role and the responsibility of each party should be defined clearly and understood by each party. The contract shall define roles and responsibilities of each party and treated as baseline for the project management. Even in Sony, many divisions are involved. The same scheme, such as the document of understanding, must be introduced between the divisions. The contract type is determined based on the role and responsibility. Time & Material contract should be used for technical advisor and consulting type engagement. Fixed Price contract should be used for the party who commits the deliverables in defined timeframe and budget. The project scope is sometimes vague among the stakeholders, in the beginning of the digital home projects. Staged contract can be a good selection. First stage is Time & Material contract and work is to develop the detailed model for implementation. Second stage is Fixed Price contract and work is for the whole implementation. This can avoid unnecessary rework and dispute over the scope and the requirements.

Quality Management

The quality requirement must be defined precisely. It needs to be recognized that high quality requires budget and time. One strategy of SONY brand is high quality. The quality of the digital home products means many things.

- Reliability of hardware (no trouble, real time engineering support, etc)
- Product Safety
- Availability of applications (no trouble, quick recovery from problems, etc)
- Security strength (anti virus, personal identification, car identification, etc)
- Design quality (easy to use, originality, etc)

The problem with SONY lithium ion battery in summer 2006 shows the flaw in quality control of the manufacturing process. In addition, the quality control process after the shipment did not work well. The delay of recall made the impact on the customers and the PC manufacturers even larger.

Time Management

The proper measurement to evaluate project progress must be introduced. For this concern, Earned Value Method (EVM) is an appropriate method. Earned value is an outcome from the project activities and it provides more accurate

information of the project progress (Figure 17). The EVM is common method in project management and used in many projects. It provides data how the project is delayed in terms of both schedule and cost.

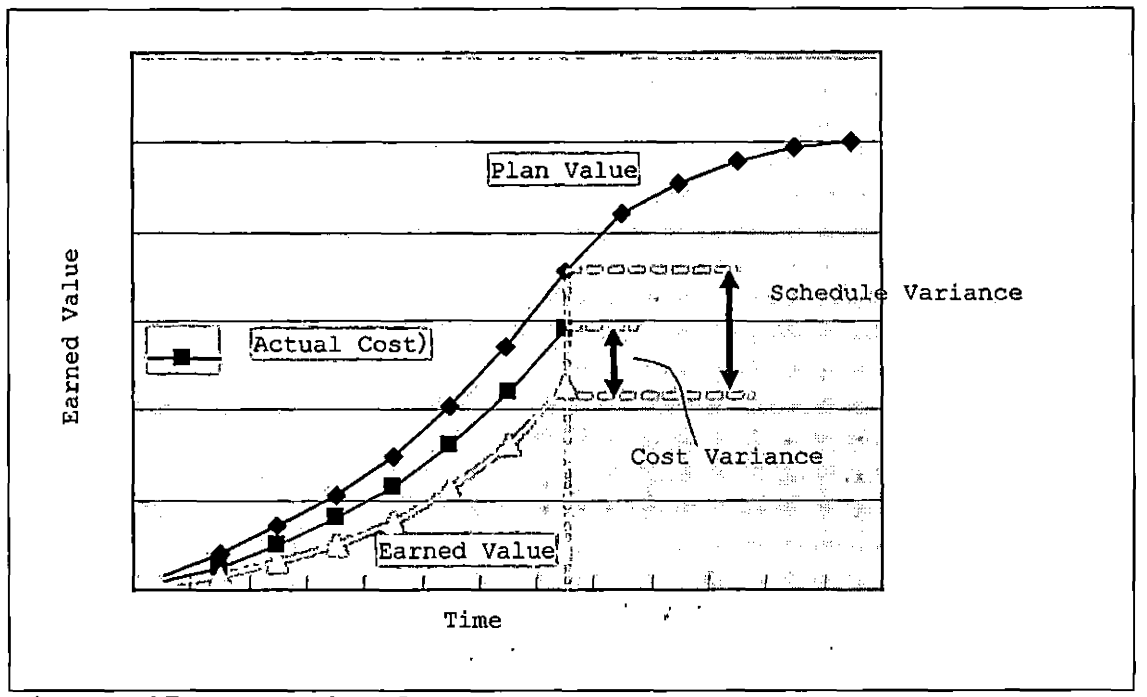

Figure 17. Earned Value Management

Cost Management

Project is a defined business and it has planned profit and cost. To make sure the profit is secured during the project, the cost tracking is required. The project cost spending must be reported and analyzed according to EVM standard. Once the project cost overrun is foreseen,

the project manager has to define the action to recover the project cost plan or restructure the plan.

Communications Management

The effective way of communication between the stakeholders should be established. The formal reviews are set at major project milestones to share the project status and discuss the actions required. In Sony Digital Home project, multiple projects and many stakeholders are involved. The communication strategy and plan is critical for the project success.

Integration Management

Integration Management involves project planning and project execution. To make projects successful, Project Management knowledge and expertise are required. The digital home project is regarded a large scale and complex project and composing many projects. It is somehow difficult to assign experienced project managers for all projects. The establishment of Project Management Office is effective to provide common framework of project management and support each project.

To be successful in Digital Home market, the speed of implementation is a key, Project Management is critical solution for implementation of the enterprise level

initiatives which requires development, transformation and integration of the individual products.

APPENDIX A

QUESTIONNAIRE

Questionnaire – Digital Home

We are MBA students who are working on a MBA project. We are surveying students' attitudes toward "the digital home." We appreciate your help in completing this questionnaire. All responses shall remain anonymous. Please answer the questions and thank you for your assistance.

1) Have you ever heard of "the digital home?"
   1, Yes 2, No

2) Do you know what "the digital home" is?
   1, Yes 2, No

The term, digital home, refers to a wired and wireless interoperable network of Personal Computers (PC), Consumer Electronics (CE) and mobile devices in the home enabling a seamless environment for sharing and growing new digital media and content services. For example, you can watch the movie contents, which are stored on your PC, on any TV screen in your home. Another example is that you can control an air condition or a TV recorder at home from your cell-phone.

3) What do you expect in the digital world? (multiple choices are allowed)
   1, entertainment 2, communication 3, education 4, medical 5, home security

4) What else do you expect?
   (_____)

5) How much money can you spend on your digital home devices?
   1, $0 - $499 2, $500 - $999 3, more than $1,000

For each of the statements below, please indicate the level of your agreement of disagreement.

6) It is very convenient to connect my car and the digital home environment. (For example, you don't need to bring music contents to your car. You can just browse and playback the music library from your car.)
   1, Strongly Agree 2, Agree 3, Neutral 4, Disagree 5, Strongly Disagree

7) I do hesitate to expose myself in the digital home environment because of the security problem.

1, Strongly Agree 2, Agree 3, Neutral 4, Disagree 5, Strongly Disagree

Here are some questions about you

8) Gender

1, Male 2, Female

9) Which of the following categories best describes your age?

1, 18 - 23 2, 24 - 29 3, 30 - 35 4, 36 - 41 5, above 42

10) How many people are living in your home right now?

1, one 2, two 3, three 4, four 5, five 6, six 7, more than seven

APPENDIX B

RAW DATA OF THE SURVEY'S RESULT

		Have you ever heard of "the digital home?"	Do you know what "the difital home" is?	What do you expect in the digital world? - Entertainment	What do you expect in the digital world? - Communicat ion	What do you expect in the digital world? - Eduoation	What do you expect in the digital world? - Medical	What do you expect in the digital world? - Home Security
N	Valid	100	100	100	100	100	100	99
	Missing	0	0	0	0	0	0	1

What else do you expect?	What else do you ecpect?	How much money can you spend on your digital home devices?	It is very convenient to connect my car and the digital home environment.	I do hesitate expose myself in the digital home environment beoause of the security problem.	What is your gender?	What is your age?	How many people are living in your home together?
100	100	100	100	100	100	100	100
0	0	0	0	0	0	0	0

Have you ever heard of "the digital home?"

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	24	24.0	24.0	24.0
	No	76	76.0	76.0	100.0
	Total	100	100.0	100.0	

Do you know what "the difital home" is?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	19	19.0	19.0	19.0
	No	81	81.0	81.0	100.0
	Total	100	100.0	100.0	

What do you expect in the digital world? - Entertainment

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	83	83.0	83.0	83.0
	NO	17	17.0	17.0	100.0
	Total	100	100.0	100.0	

What do you expect in the digital world? - Communication

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	81	81.0	81.0	81.0
	NO	19	19.0	19.0	100.0
	Total	100	100.0	100.0	

What do you expect in the digital world? - Education

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	61	61.0	61.0	61.0
	NO	39	39.0	39.0	100.0
	Total	100	100.0	100.0	

What do you expect in the digital world? - Medical

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	36	36.0	36.0	36.0
	NO	64	64.0	64.0	100.0
	Total	100	100.0	100.0	

What do you expect in the digital world? - Home Security

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	46	46.0	46.5	46.5
	NO	53	53.0	53.5	100.0
	Total	99	99.0	100.0	
Missing	System	1	1.0		
Total		100	100.0		

What else do you expect?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		74	74.0	74.0	74.0
	Affordable	1	1.0	1.0	75.0
	An easier way of living	1	1.0	1.0	76.0
	Comfort	1	1.0	1.0	77.0
	Cost efficiency	1	1.0	1.0	78.0
	Extreme convenience	1	1.0	1.0	79.0
	Food + Beverage convenience	1	1.0	1.0	80.0
	For it to be fast and efficiemt	1	1.0	1.0	81.0
	Fun	1	1.0	1.0	82.0
	Globalization	1	1.0	1.0	83.0
	Good Music	1	1.0	1.0	84.0
	I commuunicate	1	1.0	1.0	85.0
	Increased technology	1	1.0	1.0	86.0
	Invasion of privacy	1	1.0	1.0	87.0
	Make life more comfortable	1	1.0	1.0	88.0
	Personal privacy	1	1.0	1.0	89.0
	Privacy	1	1.0	1.0	90.0
	Shopping	2	2.0	2.0	92.0
	Simplicity	1	1.0	1.0	93.0
	Stress the environment	1	1.0	1.0	94.0
	Take over everything	1	1.0	1.0	95.0
	Technological advances	1	1.0	1.0	96.0
	The house can clean up for you	1	1.0	1.0	97.0
	Transportation	1	1.0	1.0	98.0
	Virtual Reality	1	1.0	1.0	99.0
	WorR	1	1.0	1.0	100.0
	Total	100	100.0	100.0	

What else do you ecpect?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		97	97.0	97.0	97.0
	easy access to everything	1	1.0	1.0	98.0
	Options	1	1.0	1.0	99.0
	Paying bills(banking)	1	1.0	1.0	100.0
	Total	100	100.0	100.0	

How much money can you spend on your digital home devices?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	$0-$499	43	43.0	43.0	43.0
	$500-$999	29	29.0	29.0	72.0
	more than $1000	28	28.0	28.0	100.0
	Total	100	100.0	100.0	

It is very convenient to connect my car and the digital home environment.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Agree	30	30.0	30.0	30.0
	Agree	44	44.0	44.0	74.0
	Neutral	17	17.0	17.0	91.0
	Disagree	2	2.0	2.0	93.0
	Strongl Disagree	7	7.0	7.0	100.0
	Total	100	100.0	100.0	

I do hesitate expose myself in the digital home environment because of the security problem.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Agree	8	8.0	8.0	8.0
	Agree	31	31.0	31.0	39.0
	Neutral	31	31.0	31.0	70.0
	Disagree	21	21.0	21.0	91.0
	Strongl Disagree	9	9.0	9.0	100.0
	Total	100	100.0	100.0	

What is your gender?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	49	49.0	49.0	49.0
	Female	51	51.0	51.0	100.0
	Total	100	100.0	100.0	

What is your age?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	18-23	66	66.0	66.0	66.0
	24-29	24	24.0	24.0	90.0
	30-35	5	5.0	5.0	95.0
	36-41	2	2.0	2.0	97.0
	above 42	3	3.0	3.0	100.0
	Total	100	100.0	100.0	

How many people are living in your home together?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	one	6	6.0	6.0	6.0
	two	21	21.0	21.0	27.0
	three	21	21.0	21.0	48.0
	four	27	27.0	27.0	75.0
	five	16	16.0	16.0	91.0
	six	7	7.0	7.0	98.0
	more than seven	2	2.0	2.0	100.0
	Total	100	100.0	100.0	

APPENDIX C

RAW DATA OF CROSS TABULATION ANALYSIS

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Do you know what "the difital home" is? * What is your gender?	100	100.0%	0	.0%	100	100.0%

Do you know what "the difital home" is? * What is your gender? Crosstabulation

Count

		What is your gender?		Total
		Male	Female	
Do you know what "the difital home" is?	Yes	16	3	19
	No	33	48	81
Total		49	51	100

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	11.637[b]	1	.001		
Continuity Correction[a]	9.963	1	.002		
Likelihood Ratio	12.519	1	.000		
Fisher's Exact Test				.001	.001
Linear-by-Linear Association	11.521	1	.001		
McNemar Test				.000[c]	
N of Valid Cases	100				

a. Computed only for a 2x2 table

b. 0 cells (.0%) have expected count less than 5. The minimum expected count is 9.31.

c. Binomial distribution used.

Crosstab

Count

		How many people are living in your home together?							
		one	two	three	four	five	six	more than seven	Total
What do you expect in the digital world? - Entertainment	Yes	6	17	15	25	13	6	2	83
	NO	1	4	6	2	3	1		17
Total		8	21	21	27	16	7	2	100

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)
Pearson Chi-Square	4.297[a]	6	.636	
Likelihood Ratio	4.750	6	.576	
Linear-by-Linear Association	.661	1	.416	
McNemar Test				.[b]
N of Valid Cases	100			

a. 9 cells (64.3%) have expected count less than 5. The minimum expected count is .34.

b. Computed only for a PxP table, where P must be greater than 1.

Crosstab

Count

		How many people are living in your home together?							Total
		one	two	three	four	five	six	more than seven	
What do you expect in the digital world? - Communication	Yes	5	19	17	24	11	4	1	81
	NO	1	2	4	3	5	3	1	19
Total		6	21	21	27	16	7	2	100

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)
Pearson Chi-Square	7.736[a]	6	.258	
Likelihood Ratio	7.134	6	.309	
Linear-by-Linear Association	4.275	1	.039	
McNemar Test				.[b]
N of Valid Cases	100			

a. 8 cells (57.1%) have expected count less than 5. The minimum expected count is .38.

b. Computed only for a PxP table, where P must be greater than 1.

Crosstab

Count

		How many people are living in your home together?							Total
		one	two	three	four	five	six	more than seven	
What do you expect in the digital world? - Education	Yes	4	15	13	13	10	5	1	61
	NO	2	6	8	14	6	2	1	39
Total		6	21	21	27	16	7	2	100

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)
Pearson Chi-Square	3.360[a]	6	.763	
Likelihood Ratio	3.363	6	.762	
Linear-by-Linear Association	.429	1	.512	
McNemar Test				.[b]
N of Valid Cases	100			

a. 6 cells (42.9%) have expected count less than 5. The minimum expected count is .78.

b. Computed only for a PxP table, where P must be greater than 1.

Crosstab

Count

		How many people are living in your home together?							Total
		one	two	three	four	five	six	more than seven	
What do you expect in the digital world? - Medical	Yes	1	8	10	9	6	3	1	36
	NO	5	15	11	18	10	4	1	64
Total		6	21	21	27	16	7	2	100

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)
Pearson Chi-Square	3.119[a]	6	.794	
Likelihood Ratio	3.210	6	.782	
Linear-by-Linear Association	.823	1	.364	
McNemar Test				.[b]
N of Valid Cases	100			

a. 6 cells (42.9%) have expected count less than 5. The minimum expected count is .72.

b. Computed only for a PxP table, where P must be greater than 1.

Crosstab

Count

		How many people are living in your home together?							Total
		one	two	three	four	five	six	more than seven	
What do you expect in the digital world? - Home Security	Yes	2	11	9	12	7	4	1	46
	NO	4	10	11	15	9	3	1	53
Total		6	21	20	27	16	7	2	99

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)
Pearson Chi-Square	1.151[a]	6	.979	
Likelihood Ratio	1.160	6	.979	
Linear-by-Linear Association	.041	1	.839	
McNemar Test				.[b]
N of Valid Cases	99			

a. 8 cells (42.9%) have expected count less than 5. The minimum expected count is .93.

b. Computed only for a PxP table, where P must be greater than 1.

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Do you know what "the difital home" is? * How much money can you spend on your digital home devices?	100	100.0%	0	.0%	100	100.0%

Do you know what "the difital home" is? * How much money can you spend on your digital home devices? Crosstabulation

Count

		How much money can you spend on your digital home devices?			Total
		$0-$499	$500-$999	more than $1000	
Do you know what "the difital home" is?	Yes	3	7	9	19
	No	40	22	19	81
Total		43	29	28	100

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)
Pearson Chi-Square	7.679[a]	2	.022	
Likelihood Ratio	8.264	2	.016	
Linear-by-Linear Association	7.328	1	.007	
McNemar Test				.[b]
N of Valid Cases	100			

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 5.32.

b. Computed only for a PxP table, where P must be greater than 1.

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