

National Chiao Tung University

Institute of Management of Technology

Master Degree



**A Study of The Business Model on a Digital
Content Creation Platform**

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ABSTRACT

Digital multimedia technology has developed rapidly in recent years. The world's annual revenue of game and the broadband video delivery services were expected to reach \$35 Billion and \$3.7 Billion respectively in 2008. Receiving, processing and storing of digital contents became one of the major driving forces for the purchase of latest entertainment and communications devices by consumers.

Under the trend of Information Convergence, this thesis explored the applications, technologies and business models of a digital content delivery platform. Digital multimedia content creation will boost the business of on-line interactive advertisement, mobile audio and video services and mobile value-added data services. Key issues include a high quality and efficient digital content creation platform, broadband delivery infrastructure, a user-friendly and secure charging mechanism, and a system to manage digital rights.

Key words: Digital Content, Electronic Consumer Product, Multimedia Creation Platform, Mobile Business

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I am going to leave the school days which is full of the sadness at the school and the memories with familiar friends. I learned the conservation from the University Institute of Engineering Science and the Management of Technology curriculum. Hope that what I learn could be used on all kinds of applications in the future.

In the student life, I feel most grateful to my family for their support and tolerance. They and my classmates, my friends are always my source of power. They are my best spiritual support. Also thank you for the happiness and the friendship that could make me learn to deal with people well. Thank the seniors for the guidance and help in my thesis. The most important is the teaching guidance in an elegant and bright way from Dr. Yu. Let me have some experience of the operation on business models.

Dedicate this study to my grandmother in heaven.



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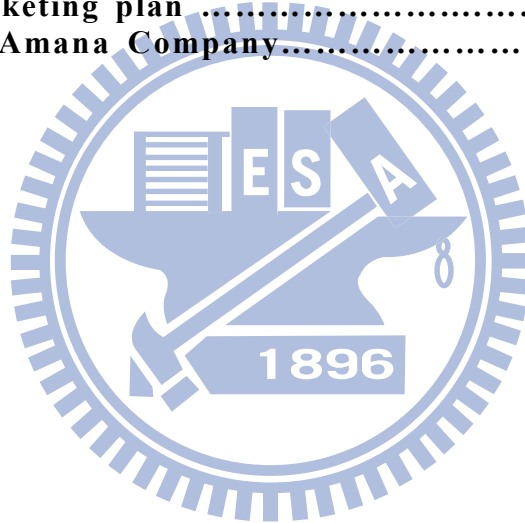
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1. Introduction

1.1 The Research Background & Motive

Because the manpower is highly concentrated and the margin is less in the capital-intensive industry, the economical advancement is going from the agricultural civilization to the industrial age. The economy is moving into the knowledge economy with discrepant directions. The Japanese strategist scholars analogize that the knowledge economy is like a new land which we have not seen yet. It exists in the collective sense of people, and it will keep influencing the global economy, politic, society and the commercial business. According to the Knowledge-based economy report from OECD, the employable population in service industry is 72.9%, and the GDP value is 73.3%. Hence, the mainstream of the economy in all developed countries is going from the labor service to performing the knowledge service, which would be the next potential power of the economy and replace the manufacturing industry. According to the data from Chung-Hua Institution for Economic Research, the ratio of the knowledge-based employment is under 15% before 1980, but it climbed over 20% in 2000. The result shows that the trend goes to the knowledge-based economy. To be in the moment of economical digenesis, the impacts on our economic conditions in the future are:

- 1.The challenge of the rotation on knowledge-based economy
- 2.The competitive implement in new economic age is innovation
- 3.To adjust the manpower composition to knowledge-based employment

The similarity between the products is due to the maturity on the market. But if there is no new value to be infused, the knowledge-based economy might go into the decline margin age. Nowadays, the product is from standard goods to different commodities and the peripheral service, experience firsthand. The additional value raises, therefore the aesthetics and the knowledge ability manifest the importance in the originative organization and the culture. The ICT industry leads an impetus to knowledge-based economy. The business activities in PC industry have been prosperous by the growth of internet since 1980. The friction-free economy is the key characteristic in the internet business. Also it would promote the cost down during the fabrication, sales and logistic support. The technologies of data compression, streaming media and communication are matured, consequently the media industry are on the upgrade. Since the handy function of the technology and the internet, the global multi-media industrial structure changes a lot. To cite an instance, music, TV, movie and broadcasting are orientating to digital and internet access. Therefore, the industrial territory faces the recombination condition.

Information and Communications technology convergences the constructional transition on the telecommunications, information and the media industry. It influences not only the original industry, but also the new media content. The computer receives all information around world and becomes the main entertainment tool at home. Besides the internet content, the computer could also provides the script, photos, voices, even the movies. To follow the digitalization, the multi-media shall adopt the technology to set up a platform which would provide a process to produce the multi-media content. Then it would match the need on the market.

In 2001, China joined the WTO and became a growing economical region in these decades. Depending on the agenda of WTO, China planed to open the service industry in 2005. The foreign enterprises would enhance the market sales by adding the advertisement budget for broadcasting in worldwide activities. The trend is fit for the

multi-media industry. The operation of the cross-media platform converge the media creation value chain and set up a new Paradise Shift. The technology, manpower and capital of the multi-media in Taiwan reach a standard level. However, the professionals work for their own scope and focus on the creation regardless of the knowledge on marketing and application. The consumers requires the multi-media application, therefore it is necessary to develop the multi-media creation platform. The key competition in 21 century would not be bounded by the goods and service. To face the competitive environment and keep originality, the manager should manage the business knowledge property that would aid the opportunity in knowledge-based economy. Digital multi-media creation is belong to concentrated knowledge and intangible assets industry in new economy. Hence knowing the effective operation model would assist the growth of the industry in Taiwan.

1.2 The Objective of the Study

Nowadays, all kinds of information (the characters, sound, cartoon, image, and figure) are mostly expressed with digitization form. Therefore, the materials are not only involved in computer, but also all source in our daily life. The conveyance will pass by internet network or other convenient channels as the restriction of the modeling will be fewer and fewer. So, the content will be more abundant. The economy in U.S.A. is in the superior period at 1990's. It is related to the information technology of the enterprises in the family. The professor and concurrently founder, who host the media laboratory of Massachusetts Institute of Technology (MIT), Nicholas Negroponte calls it as "Digit Converges". Suppose that the era of converging on information comes, the main topic of next generation will be the content. Digital media accords with the characteristic of the knowledge-based economy and innovative service. But the value chain of media industry is lack of combination at present, and lack of suitable marketing tactics. After the discussion on relevant research would be the conclusion on the business model of digital media creation platform in the study. The main research purpose and topic are as follows:

1. Probe for the characteristic and management topic about knowledge-based economy and service;
2. Probe for the value chain in the related industry and the marketing module;
3. Probe for the key factor of the operation model;
4. Analyze the market scale and the trend on digital media industry;
5. Summing up by relevant research and the background of the industry, the investors' opinion and commercial experience could form a operation model on the digital creation platform;
6. Implement the operation model to the platform and the start-up company;
7. Suggest the digital media industry, and the expansion of the application.

The main topic of this research—Digital Studio Service Site would operate the intact media structure and the completed value chain to set up the discussion zone for the creator, the case list, the budget platform and so on. It would offer the platform for the recruiting and training the human resource in the digital creation industry. So that would combine the value chain and it would support the Asia market inn the next 10 years. After all, the result would be the competitiveness of the industry.

1.3 Methodology and the Structure

Because the digital creation platform is at the beginning stage in the digital industry, the related literature and the actual data are hard to get. The related variables are not clearly in the industry; therefore, this study has not been engaged in the causes and

effects, this research would focus on the exploratory study. The method includes the literature analysis; visiting the experts; focal point group; and the analysis on the similar cases. This study would aim at the industry environment about digital content creation platform; the technical conformity application and the possible business pattern. Besides, the research would collect the related data on the market, and then run the data analysis in order to investigate the position in the media application to different stratification. Hence, the result would show the competitive advantage by the interviews on the experts.

1.3.1 Document Analysis

The main purpose of document analysis is to find out the results on the study through the data analysis. The difficult is to survey the meaning related to the study among large information and to reduce the useless data. So the important messages would be defined in the thesis and the study would finally set up the structure. The target mission on the document analysis is based on “description”—to response the basic questions. This study adopt the method of document analysis, the four steps are: generally survey, classified, abridgement, critique and proposition. There are 3 measure types: Primary source, Secondary source, and Bibliographic Instruments. Qualitative analysis is standard and exact. It depends on the detailed description which is called thick description. The readers could realize the analysis results and explain immediately. The researcher should notice the goal of the study and point out the value inside the data collection.

This study adopts the document analysis and it would go through the literatures. The systematic definition, valuation and the sum of the approval comes from the documents and the results of all related studies. It would help us to know the past in a limit scope and explain the status nowadays and to forecast the future. But the limitation is that it might be adopted in the specialized topic, historic topics, systematic topics and comparison topics. There might be a time lag during the real case and the documents, therefore, to supplement with other method would make the research more completed.

The digital media production is a new service industry in Asia, the whole structure on the market is still setting up by all participators. We can not get lots of data and forecast the development in the next stage, what we can do is go by the document analysis and know the opportunities in the future. Hence, this study would infer the operation business model and investigate the outcomes of the digital content industry. To invest under the unclear situation on the market is a highly risk activities. Therefore, it is helpful to analyze the competitive strength of the target market and control the movement on the market.

1.3.2 Profound Interview

Profound interview means to hold a semi-structured interview with one by one, it is go through the devices of the background data and cut in the main core of the research to find out the related opinions. By profound interview, we would get lots of detailed information and unexpected data as well. We can gather amount data during the semi-structured interview. The content of interview would be revised, sweep depending on the outline and the interaction between the survey candidates. In the beginning, we can ask serious well-structured questions and then the problems with open answers. The method is mixed a stipulated construction and non-construction features. The visitor could control the process of the interview to get more exhaustive materials. Finally, the research would infer the chances & opportunities of the digital content creation platform in Asia permeating through the method of intersecting all the information.

1.3.3 The Framework of the Study

On the basis of the features of digital media in the knowledge-based economy, this study would combine the perspectives from the venture capitals and discuss about the commercial value and development in accordance with the digital content creation platform according to the inferiority data analysis and the interviews with the experts. The structure of this research is as the figure 1-1 as follows:

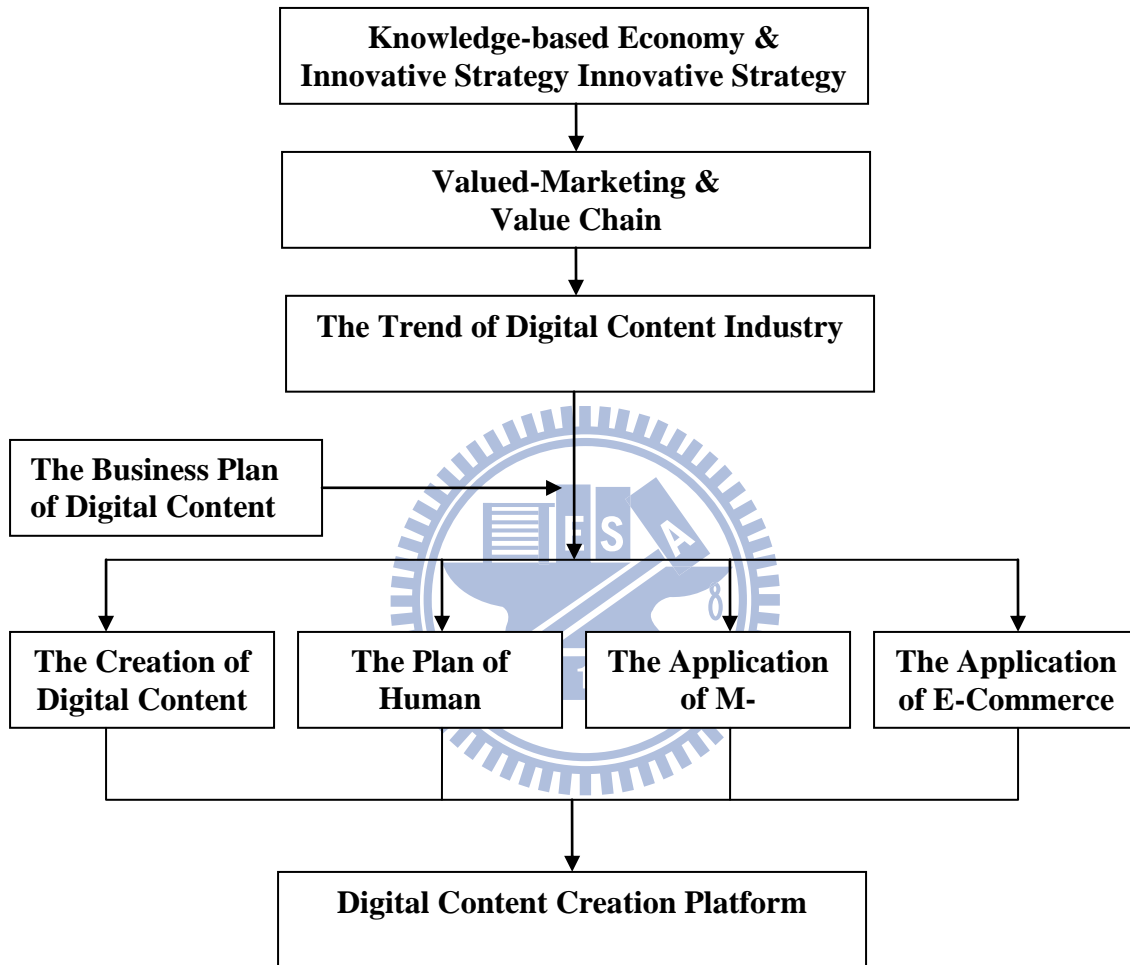


Figure 1-1 The structure of the study
Source: Marshal by this study

1.4 The Content and the Procedure of the Study

This technological process of this study is as the figure 1-2 as follows. Chapter 1 would include the background; the motive; the goal; the structure; the subject matter and the procedures; the object; the scope and limitation of this study. Chapter 2 would counter the digital media industry by the document analysis including the knowledge-based economy, service innovation, the value-chain and the marketing survey. Finally, it would discuss the new application of digital media — the key elements and the business of mobile-commerce. Chapter 3 would introduce the market status and the trend of digital media industry. It would analyze the current condition and the coming future in all countries, especially the Asia market. Chapter 4 is the core content of the operation model about the digital content creation platform. This study would go through the interviews of the experts and the result of the document analysis. The example is Amana Company. The suggestion on the technology, the capital, the market, the manpower would come from the theory model and the view point of the participators. Then the discussion is the convergence of how the digital content creation platform operates. Finally, the study would gather all results in the chapters and draw a conclusion to the comments on the digital content industry.

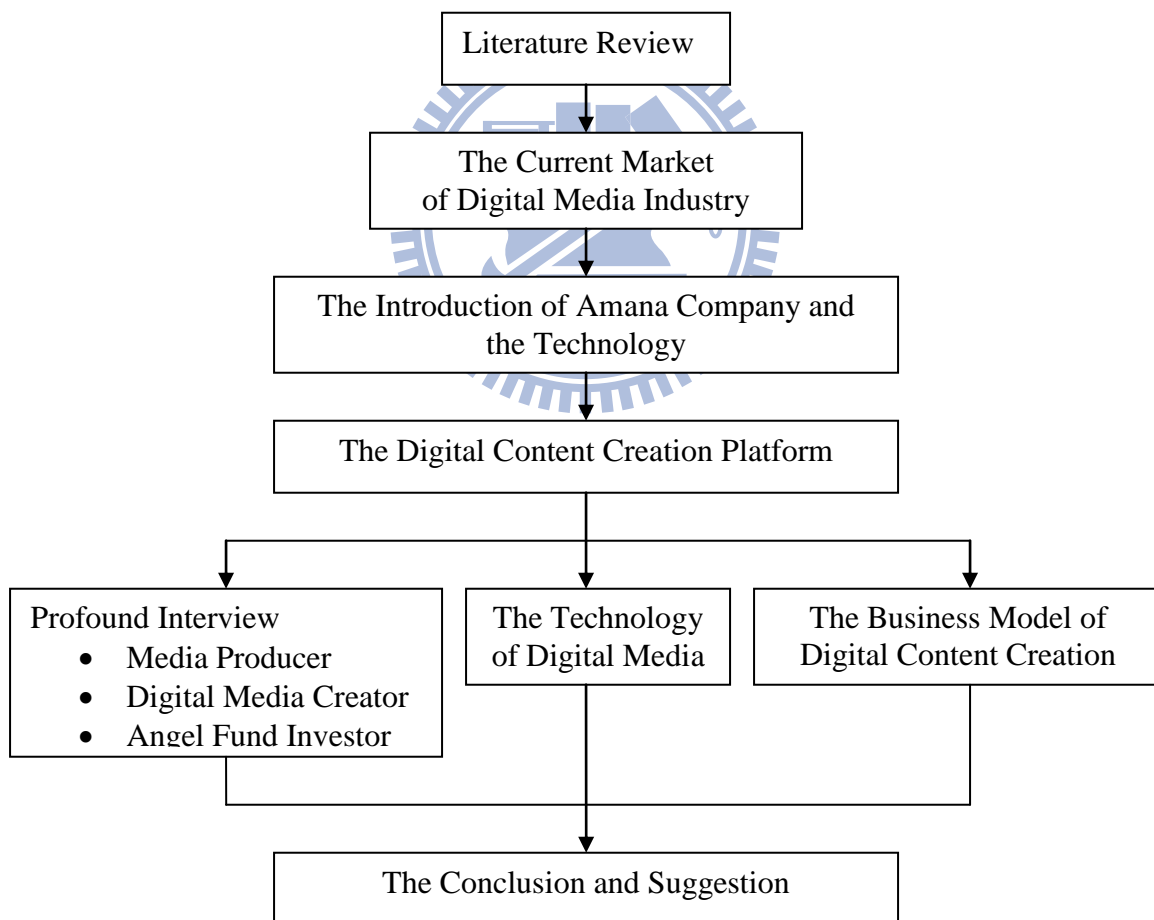


Figure 1-2 The procedure of this study

Source: Marshal by this study

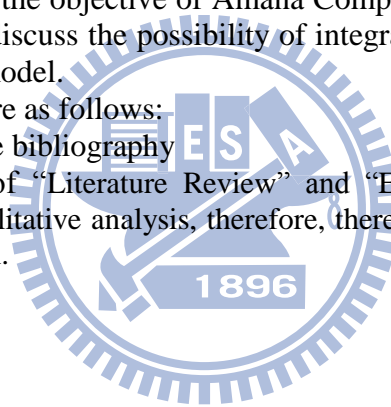
1.5 The Object of the Study

The internet and related technology have improved the convenience on the international exchange service industry. Besides, the development of the broadband network and the interactive technology leads the media to a integrated age which combine the “software, hardware, content and the consumer”. As the description of the scholar, Maney, the image of the integrated media would get the resource between the platforms. For example, the internet could relay the TV broadcast; the website could save the text content of different news. The content of media would not take much cost to be copied even though the platform is so different.

The internet and ICT industry are the main force in our high technology industry. The smile curve theory mentions that the highest ends of the added-value are “R&D” and “Marketing”. It means that the professional science and technology service as the digital media industry possesses the knowledge-based economy and the features of the innovative service. As long as the value chain of the industry is completed and enhanced, it could promote the related industry as the mobile-commerce, the software and the ICT facilities like TFT-LCD. The interlocking chain would upgrade the competitive of the industry and the structure of the economy. This study is based on the new application of the multi-media technology; the objective of Amana Company; the interviews on experts and the capital investors to discuss the possibility of integrated digital media value chain and the practical operation model.

The major limitations are as follows:

1. The limitation of the bibliography
2. The methodology of “Literature Review” and “Expert Personal Interview” are belonging to the qualitative analysis, therefore, there would be the limitation of the subjective perception.



2. Literature Review

2.1 Knowledge-based Economy

“Knowledge-based Economy” means the new economy based on the “knowledge”. OECD defines the meaning: Knowledge-based economy is set up on the produce, allocation and the application from all kinds of knowledge and information. The content of “Knowledge Management” is to comprise a range of strategies and practices used in an organization to identify, create, represent, distribute, and enable adoption of insights and experiences. Since the business nowadays goes to an operation mode of interactive activities. As the scholar, Lorenz, mentioned “butterfly effect”, the theory points out that if there is a little deviation in the initial system, there would be a unstable result. According to the change of one part in the global business would occur another unexpected effect on the other hand. Therefore, if the resource of the business could be combined together regardless of the depart management, it would help the performance to become a better synergy.

According to the scholars who investigate into the knowledge-based economy indicate that “The data is the element of the analysis; the information is the data with content; the knowledge is the meaningful information and the wisdom is the combination of knowledge and insight.” Consequently, those enterprises that pay attention to the economic trend in the future would aware that “Knowledge Management” could assist the enterprises in mastering the core advantages. To set up a system on knowledge management in an enterprise could enhance the performance on the core ability and added value. To take one step ahead, the enterprises could integrate all knowledge among all departments and operate the assets rightly. That function would reduce the lost and add the additional values for the growth of the enterprise.

Debra. M. Amidon makes the study of the business activities as the chart as follows. The business activities start from producing to the mainstream of technology age. The product is the core at the first generation and it is related to original technology highly. There is less communication during the development stage; therefore, the core strategy is belonging to the individual job function. As the growth of the enterprises, the technology combines with the business process, so the knowledge workers based on the information cooperate with each other just on the benefit and the balance in the business. After the enterprises integrate the operations, they could focus on the creation of the customer-oriented market. Customers are involved in the product development and the knowledge of the enterprise is the core competitive advantage. But by the changes on the market, besides the knowledge and technology, to master the dynamic process of the knowledge and the operated model is the key source for the growth of the business and the benefit of the profit.

Knowledge-based workers should value the learning across the functions and gain the knowledge stream, besides the self-management. The enterprise chose to cooperate with the innovative system as the core strategy in order to create the network content under the dynamic environment. During this process, the technology of the knowledge-based workers interact with the environment that is inner and out of the enterprises. Then the products and the service content have the value and the market. Since there is no limitation on the product and the service at the new age, the development of the invisible knowledge-based product and the added value content needs knowledge management in the industry. For simplex industry, the model of symbiosis network could improve the resource, the interaction between the technology and structure the value chain of the

industry. To view the level of the country, what would impact the development of a country in the next generation would depends on the effective knowledge integration and management, then the country could response the competitive environment and enhance the whole economy.

By the condition of the interdependence economy, the enterprises in the same industry could share the advantages of the exploration from the knowledge. To master the organization itself effectively and to find the mutually beneficial partners are the progression manners; especially on the invisible assets and the transformation of the technology.

Table 2-1 The process of product and the development of the enterprise in knowledge-based economy

Product	1 st Generation: Product	2 nd Generation: Engineering	3 rd Generation: Enterprise	4 th Generation: Customer	5 th Generation: Knowledge
Core Competitive	Function in isolation	Business associates	Technology and Business Integration	Customer research and development integration	Collaborative innovation system
Change Factors	Luck is not predictable	Inter-dependence	System Management	Acceleration of non-continuous changes	Dynamics of kaleidoscopic
Functions	Functions of the first	The separated cost	Balanced risk and receipts	Production rate paradox	Quiz / impact
Construction	Functions of the drive	Matrix	Distributed collaboration	Multi-faceted community	Symbiotic network of work
Manpower	Competition between us/they	Cooperation before action	Structured collaboration	Concerned about the value and capabilities	Self-management
Procedure	Very little exchange	Project by project	Objectives of R & D portfolio	Information feedback loop	Cross-border learning and knowledge flow
Technology	Initial	Data-based	Information-based	technology as a competitive weapon	Intelligent knowledge processing

Source: Debra. M. Amidon, 1996

Drucker adopts the breakthrough knowledge as the new knowledge. It means that the knowledge is never showed before in the product or service; or means that the knowledge which is never used. How to transfer and expanse the new knowledge in the enterprise would assist to add the value on the product. That needs to set up an education system and an efficient learning. Moreover, the education on the knowledge-based

economy moves from the method of passive lessons to the active lessons on the major students. New conceptions and technology come out during the procedures of the products. These new ideas and technology could motive the creation about the new product, and the process would become to a positive cycle. The new technology and reformed product could be protected by the patents. But it is hard to save the new ideas in a systematic method. Therefore, the valuable ideas disappear from the value system. So, the education system of the knowledge in the enterprise would hold the key to add value.

From this, how to transfer the knowledge and the technology in the digital content industry based on the creation method is one of the forces to improve the development in this industry. Especially at this initial stage of this industry, to train and invest in the human resource is the source for the valuable benefit in the digital content enterprises. After upgrading the technology and the manpower, the creators would make their own products and cooperate with others in the creative network system by the ways of self-management and interactions with the customers. Then it would set up a valuable content system to fit the market demand.

2.2 The Related Research of Innovation and Innovative Strategy

The basic definition of innovation is to adopt the new technology and knowledge on the market; to provide the customers the service and the products. Gary Hamel mentions that the first innovation comes from the labs in the book of “Leading the Revolution”. For the aspect of technical innovation, the capital investment is important relatively. Then the innovation comes from the marketing and the operation model just like the channels of Dell. Hence, the scale of the enterprise would play an important role in the innovation. It is considered from 3 aspects of the innovation: One is the innovation on changing the current status. It starts from the structure of the organization and the life cycle of the value chain. View the point of the business operation; it would be involved in the improvement of the operation model. As the view of the technology; the innovation comes from the design and the procedures.

Table 2-2 The development of the innovative strategy

Mode	Customer Interface	Core Strategy	Strategic Resources	Value network
Content	Dynamic relationship with customer	How to locate the basis of business competition	Unique source of competitive advantage	industry partners
Innovation Model	1. Innovative pricing structure 2. The new service channels, Marketing Innovation	1. New product market positioning 2. The basis of innovation and differentiation 3. Challenging enterprise mission	1. Process innovation 2. Core Technology , Technology Innovation 3. The use of innovative knowledge	1. Supply chain innovation, supply network 2. Collaborative creation, collaborative design 3. The new partnership

Source: Gary Hamel, Stan Shih

Debra M. Amidon define the knowledge innovation as “For the outstanding of the enterprises; the development of the countries and the progress of the society; to create, to develop, to interact and to adopt the new ideas are the suitable activities on transforming the goods and service to the market. The scholar, Michael E. Porter, think that it is needed to consider about the competitive strategy and the environment during the process of innovation. Gary Hamel views the innovation from the business, it means to think in a new way and find a new position from the original scope. Stan Shih has 6 forms of innovation which is familiar to the theory of Hamel; it is introduced by the whole business concept as Table 2-2. And the new product means to use low cost, to improve the old product and to create the new products which is never happened on the market. It includes the concept of invention and process of commercialization. The innovation at new age comes from the whole business concept including the scale, the technology, the operation model and the human resource.

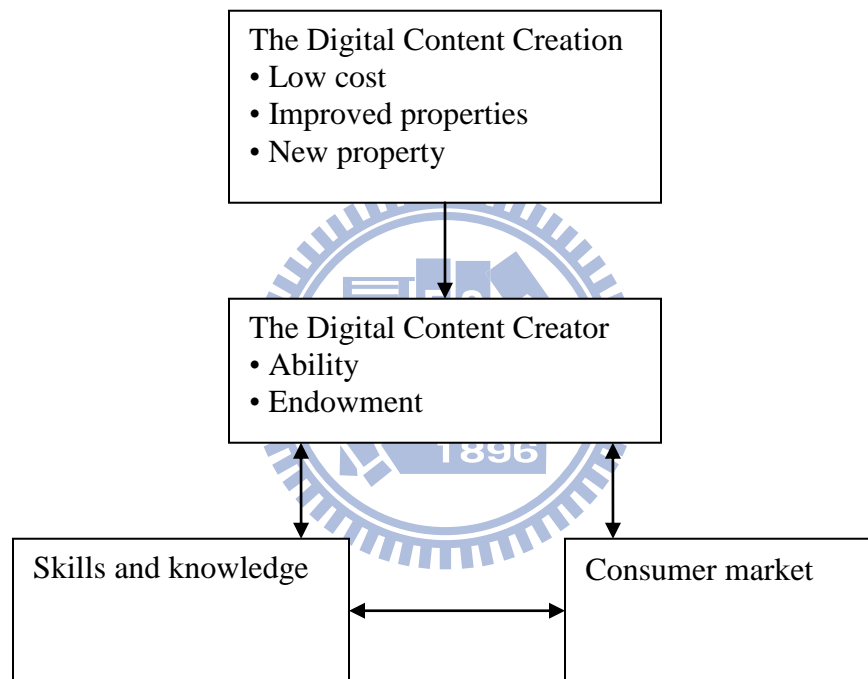


Figure 2-1 The relationship of the knowledge innovation in digital content creation
Source: Innovation Management, Allan Afuah

The innovation is defined as the “new concept” for the organization. The technical innovation means the reformed product or improved service or process. As to the innovation on the business, it means the new concept on the management process and the organization structure. The innovation of business might affect the one of technology. According to Damanpour: The innovation of product means to pull the needs which match with the demand on the market. The innovation of the process means to pull the new elements on the process or service—the raw material, the organization of the work flow and the facilities.” New knowledge would include the factors of technology and the market. The innovation of the technology would pull in the new product and expand the channels of market in digital content industry. That would make the value chain forming a better structure by the development. How to provide the new product and the innovative business

model is the key issue in digital content creation. The first front in digital content industry is the part of technology. The cost and time to transfer the knowledge is higher. Therefore it takes the cooperation of the creators and the customers. The literatures show that the technical knowledge includes: a set of knowledge, the combination of the packages, the methods, the procedures. The knowledge of market includes: the knowledge of channel, the application, the expectation from the customers, etc. Usually, the new product or service itself is an innovative application by the new technology or knowledge.

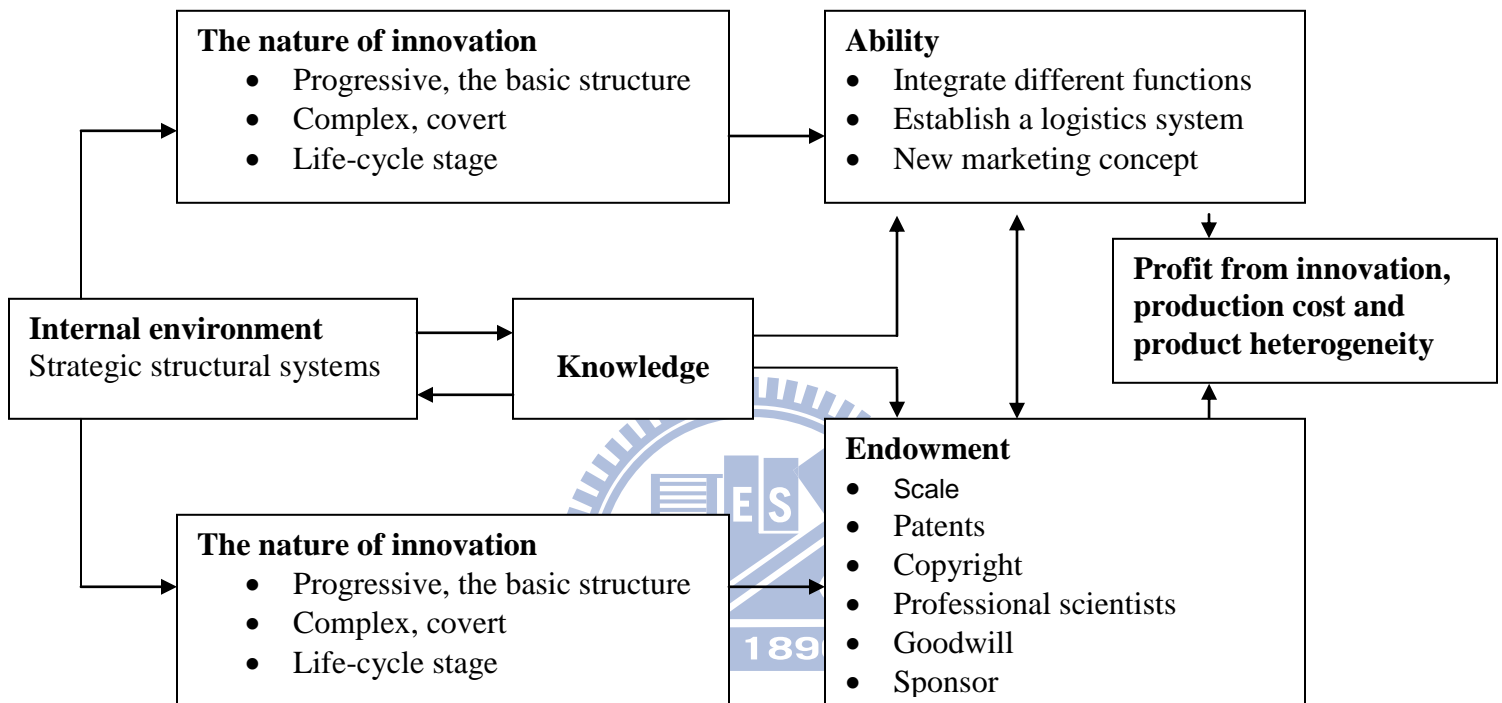


Figure 2-2 How to get the benefit among the innovative cooperation model
Source: Innovation Management, Allan Afuah

It is important to focus on the application of the organizational capital in order to develop the innovation and deal with the knowledge assets. Knowing the key knowledge clearly and share the assets quickly are the 2 core components for the success of the enterprise. Skandia Company lists the innovation of the knowledge as the process for optimization and it would help the interactions for the employee and the business environment. The goal is to bring the success of all aspects for the enterprise. The capital of the digital content creation is the innovative technology and the ability of the creators. The power of innovation exists in the intellectual capital from the zone between the human capital and the structural capital. The creator should cooperate in the organization and change the type for the market orientation. That would create the fortune and improve the digitalization of the society.

According to the view of organization, the innovation could be defined as the effect over the enterprise. At the knowledge-based economy, the source of the knowledge capital could enhance the ability of the product. To improve the knowledge would create more valuable content. If the new knowledge bring out the better product, and replace the original product. The innovation is belonging to a breakthrough innovation. If the improvement of the original product still holds the current capacity, then it is belonging

to the improved innovation. According to the sense of Tushman and Anderson, the improved innovation is a kind of improvement on the ability as the improvement of the competence enhancing. Usually, the innovation is belonging to the improved innovation.

For most enterprises, to keep the innovation is the key of gaining the competitive advantage. Most enterprise does not know how to keep the innovation and lose the core competitive advantage. But the innovation is not limitation on the high-technical industry. All industry could grow by innovation. The process might be slow. For the level of the economy, the innovation means the changes. Whether the transformation of the knowledge is effective or not would be effected by the “essence of innovation”, “the time of innovation” and “the difference of the culture between the sender and the receiver”. Viewing the inner of the enterprise, the factors are the structure of the organization, the human resource, the technology, the communication and the strategy. It needs the incentive for all members, the capital source for the innovative strategy and the support of the higher level managers. The strategy includes the organization, executive system and suitable members. The source of innovation might come from one section of the value chain, such as the supplier, the customer, the competitor, the complementary roles and the labs.

The enterprise could consider s strategies as follows, to keep the innovation and the life-cycle of the product.

1. Block—— prevent the imitation
2. Team up—— from an alliance
3. Run—— produce the new product to lead the market and replace the original one

For the digital content industry, the key point is not the information but the concept of the innovation and the express methods. How much value would that innovation return to the customer and the organization. The improvement of the digital content is related to the IT technology. The forming of the digital content platform is from the improvement of the technology and it needs the cross function on the service. The digital content creation platform could provide the innovation of the technology and improve the quality and the ability of the enterprise. According to the creation of the service model, the strategy is like the “Run” strategy. To launch new products and new content is the key. The new elements in the content are the value of the products. If the creator can cooperate with the customers and come out the decision of the content structure and the channel, it can assist the innovation in digital content industry.

2.3 The Research of the Service and Valued-Marketing

To adopt the different method on the same market would be better to adopt the useless marketing method. To create the invisible value would make the enterprise become a leader on the market. Such as the MP3 player, Apple Computer launched the iPod on the market in 2001 and got a great sale. It opened a new market environment of MP3 player. Although, the storage of iPod is belonging to the hard disc; the rest parts of the MP3 player is made by Flash on the 65% market. Therefore, Apple Computer planed the MP3 player with Flash memory inside in 2004 and sold iPod Shuffle in 2005. At the same time, Apple Computer set up the on-line music store named iTunes to force the sale of iPod. Because of the on-line music service, the sale of iPod increased in the first 3 years rapidly. This is a successful case of Services and Value Marketing.

The ICT industry and the service industry are the main stream in the economy of 21 century. The service industry in U.S.A merging with internet and telecommunication of

other countries grow up obviously. The enterprise should focus the target on the invisible service level and reply the requirements from the customers. Besides to provide the original product and service, to keep the successful operation model and suitable business scope is the way to explore the business volume. In the meanwhile the enterprise shall go for the new product; the opportunity of growth by the investment plan; deal with the new buyer and find new niche market. Apple Computer sells another consumer electronic product in one hand and keep the PC sales on the other hand. The strategies create a new market and take the trend of digital music player. Apple Computer provides the digital music right for the customer and upgrades the value of service with good quality and performance. It helps Apple Computer to become a consumer-electronics enterprise.

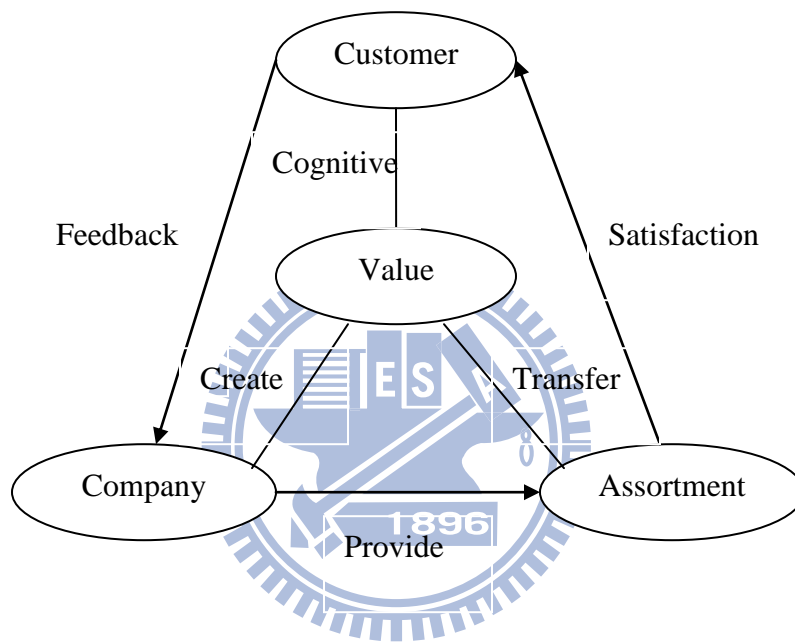


Figure 2-3 The modus of the interaction on values
Source: Value Chain Management, Carliss Y. Baldwin

Since 1980 in U.S.A, the development of the service industry is leading the economy in 70% of the entire U.S. GNP. The manpower of service reached over 70% of the U.S. national labor force. Because the life-cycle of the service industry is short and it is harder to defined, the entry barrier is lower for the competitors. In addition to the performance, the qualification and the standardization, if the members can not provide more service, hen it is easier to be copied and hard to make the segments. So the creative ideas, the new process and the central resource are important to show the advantages among verified prices and service. It also creates the new value on the market. If the service industry could keep providing new products and service types; and keep investing the R&D scope, there would be a stable growth in the industry. How to reach the result of the purpose is to plan the strategy which is fit for the enterprise system and to allocate the assets such as the brand name, the patents and the core competitive ability. Investing the resource of the enterprise in the creation and the development of the technology would make more value on the customers.

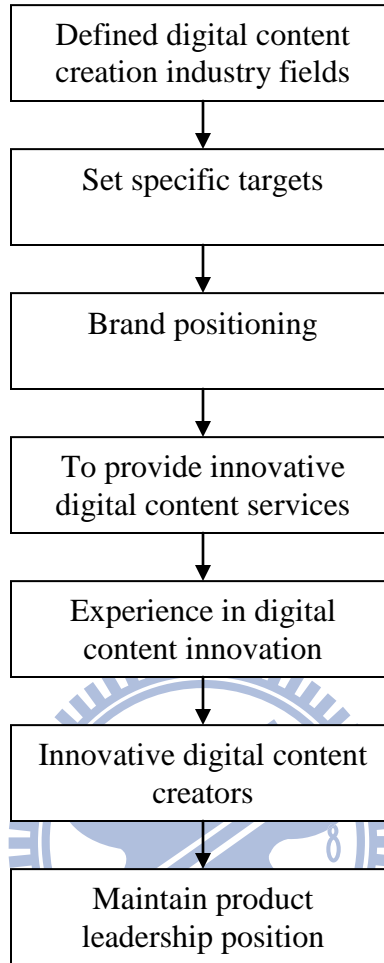


Figure 2-4 The definition of service marketing on digital content product
 Source: “Service Marketing” and marshal by this study

Table 2-3 The marketing model of the digital content industry

Principle	
Purpose	Constantly self-transformation
Business model	To find new cooperative mode of operation with customers
Innovation	Product development with customers
Goal	Improve the time value of customers
Value	Constantly integrating the customer experience, provide more service and product content
Object	Marketing for individual customers, expand customer base, continued profitability

Source: “Service Marketing” and marshal by this study

To set up the digital content creation platform would save the service knowledge and modify the original service model. It is a creative service module and technology for

the creator and the investor. To enhance the human resource and define the service level, the customer scope would assist the performance, the profit and the loyalty of the customers.

2.4 The Research of the Value Chain

Michael Eugene Porter mentioned the value system and the industry value chain in 1985. It includes the supplier and the customer. The theory is to analyze the maximum profit in the business activities and the invisible process to enhance the value for the enterprise. Porter thought that it is good to modify the enterprise system by the value chain and find out the competitiveness by the activities of design, marketing etc. By the effective of the value chain, the enterprises acts in the competitive scope would affect the competitiveness. If the enterprise could link the supplier and the buyers, then it would enhance the competitiveness.

The goal of the enterprise is to make the “Value Creation”. The enterprise could provide the value creation by the competitiveness. The Value chain can help the enterprise to make some strategy decisions. The enterprise could get the competitiveness from all opportunities. To gain the maximum profit, the enterprise should decide the resource allocation on suitable business segments and reduce the cost.

There are 2 factors of cost advantage and differentiation: the “Competence” and the “Endowment”. The competence means that the ability to provide the service and the product of an enterprise. The endowment means the resource of the enterprise besides the competence. To provide lower cost of product and service or to sale the higher price atoning for the extra cost of the differentiation would make the profit. Especially it is important of the intellectual property rights nowadays, the entry barrier is higher. That would assist the enterprise to provide more products of differentiation.

Most enterprises adopt the value system to analyze the business process and find out the niche. According to the internet and the global IT industry, the marketing strategy and the business model are restored. The decision making is faster as the knowledge is becoming the resource of the fortune. The traditional value chain is not enough for the enterprises.

To review some key factors of the knowledge value chain of the enterprises could figure out the business strategy which is fit for the organization, internal system and the local environment. If the enterprises could merge the internet and the intellectual property, and manage the actions of the knowledge workers, the enterprise would enhance the special competitiveness which is hard to replace and that would become the knowledge assets. The cycle would be formed for enhancing the internal knowledge value circle.

When the enterprise is setting the knowledge value chain, it should consider all aspects and integrate with the organization. To coordinate the R&D, marketing and the rest activities would reduce the ability of creation. The human resource that hired by the organization culture would make the concept and the leading model. The examination of the performance would affect the internal human resource also. The environment and the new opportunities would affect the ability of the enterprise. Besides the ability of the creators, the sense of the market and the prices is important for new digital product plan. The performance of the operation model, the completed system and the local market are all the key factors of the business model.

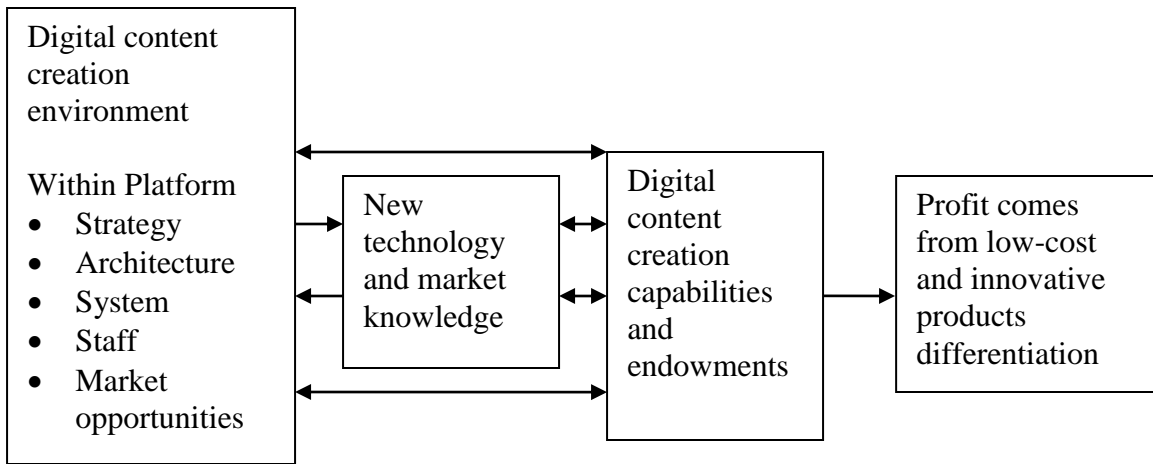


Figure 2-5 The effective of the environment

Source: Innovation Management, Allan Afuah and marshal by this study

Timmers mentioned that the value chain is based by the customer viewpoints and the business model not by the viewpoint of the suppliers. The traditional media includes production, distribution and exhibition. Wirtz divided the value chain of digital media into 5 parts: content/service creators, content/services aggregators, access/connecting facilitators, value added service providers etc. Wirtz emphasizes the value chain of the media and the communication market is restructured. The reconfiguration means the core activities are restructured and assembled as a new value chain. Chan-Olmsted and Kang mentioned the broadband TV value chain; it is divided in creator, packagers, value-adding services, distributors and the navigation/interfaces suppliers. Collis, Bane and Bradley divided the value chain as the content provider who creates the functions for the consumers; the packaging who selecting and bundling the content; the transmission who owns the communication equipment which is prepared by the software manipulation and the terminals.

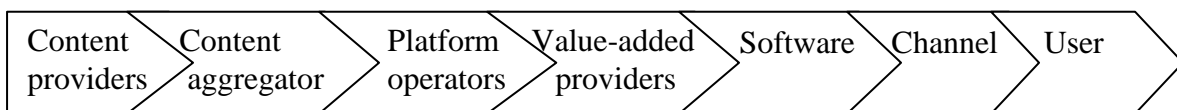


Figure 2-6 The value chain of digital content creation industry

Source: Marshal by this study

2.5 The Study of M-Commerce

The mobile communication is an important tool now, as the vendors join the development of the software and hardware. The application is more popular. Hence, the mobile business model becomes a new operation with the customers. Lots of gaming companies create different mobile game for entertainment and transform the messages at leisure time. The content, community, connectivity, commerce, context, communication are merged on the internet. Especially the digital content attracts the consumers to get more information mobility. Nokia provides “Club Nokia” for new product information and instant messages by photos. Sony created the mobile gaming product for next generation. Yahoo and MSN created the instant messages on the mobile device. AOL Time Warner changes the culture for customers to get the information at anytime. NTT DoCoMo promoted the successful mobile function named I-mode and owned over 2.5 million population. The content on the internet includes news, entertainment, transformation and data storage. It is provided by the digital content creator with the property right and become a new channel of the brand image.

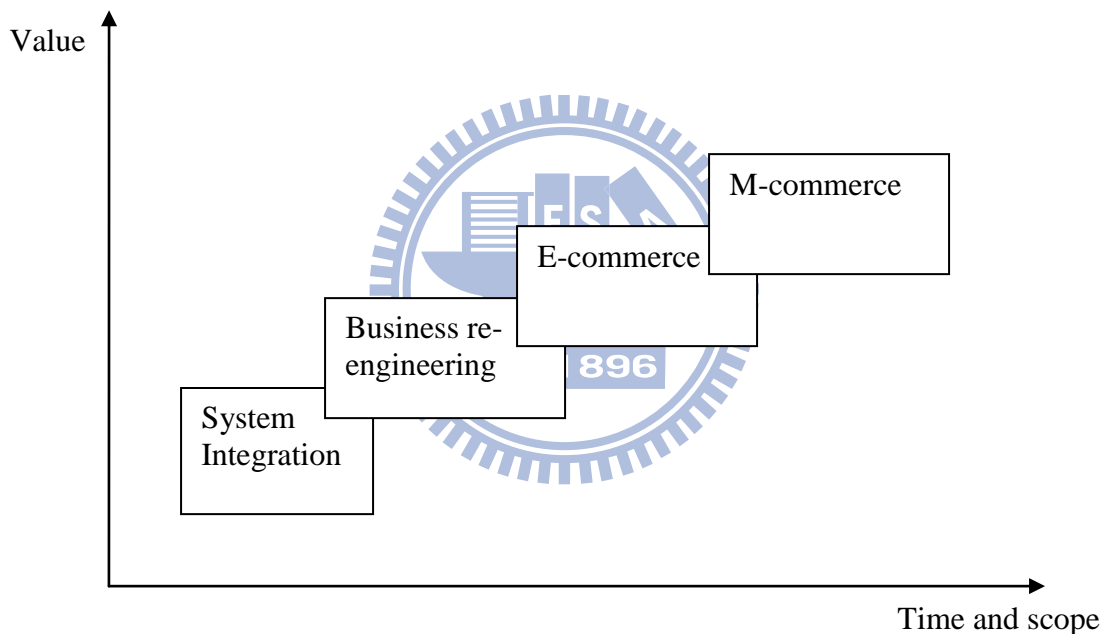


Figure 2-7 The progress of the business model

Source: M-business: the race to mobility, Ravi Kalakota, Marcia Robinson

As the improved by the IT technology and the equipment, the M-Commerce expanded in the internal business and affects the relationships in the industry. Vincent Cerf mentioned that the internet would be global. Since 1995, the internet assisted the business connections of the M-Commerce. The digital type document could enhance the process of the business in Quick Responses. Since the mobile NB could help people to control the communication with others and bring the new opportunities from the information. The M-Commerce is reliable in the real life. The M-Commerce is possible in the life as the 3G technology could expand the data and Wireless packet could replace the telephone call. Allocating the capacity of the data and force the interactions of business, customers, internal employees, the suppliers, the competitors and all stakeholders.

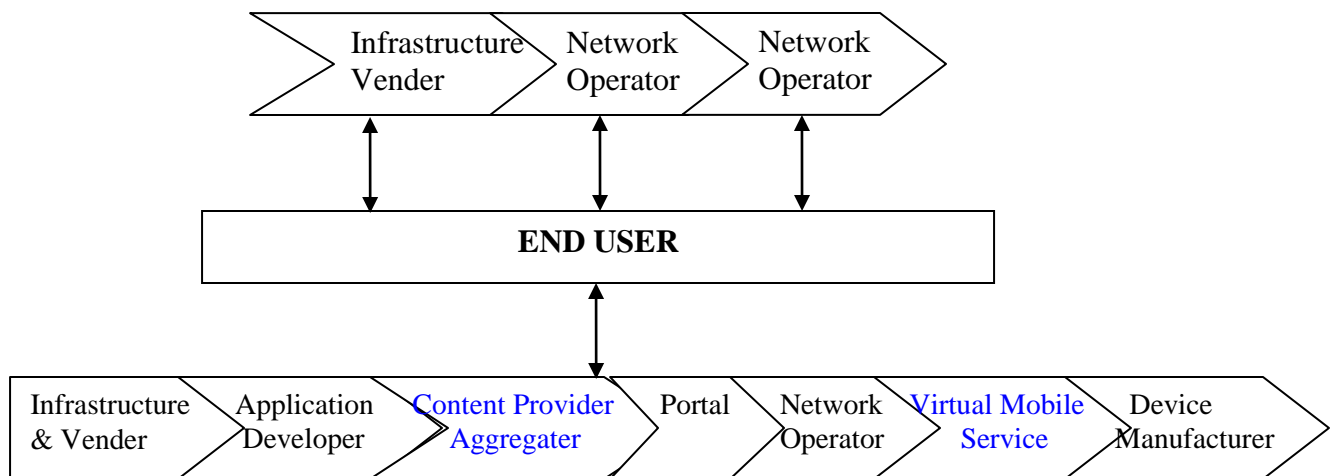


Figure 2-8 The role of the digital content in M-Commerce

Source: M-business: the race to mobility, Ravi Kalakota, Marcia Robinson

Since the accessory equipment and the internet are matured, the software could provide the customers and the instant content is necessary for the consumer. The value-added content and the virtual mobile service are required for the creators. The link of the wireless, internet and the e-commerce assist the applications of all mobile business and entertainment. Since the digital content could be customized as the management of personal data enhancing the economic culture.

The digital content is helpful for the consumer-electronic products and the mobile communication. Depending on the operation of the digital content, the IT technology could merge the digital content. The creators could access the technology and the data. The capacity and the technology would be integrated together to reduce the cost and the resource problems and focus the capital on the main service items. Since the value chain of the digital content could be integrated vertically, therefore the added value for the M-Commerce would be more in the activities. For example, the development of the Telematics adopts the Telemetric Communication Unit and the global service system. Therefore, the digital content could provide the invisible assets of the brand name and the After-sales service as a completed service system.

2.6 The Study of Strategy

The view point of Michael Eugene Porter on strategy is that strategy is a form of discipline. The enterprise should have some kind of core competitive and be willing to make the difficult decisions. The other view point of strategy is the enterprise creates the living space, choose the direction, and maintain the competitive advantage and the policy aspects. Chandler, Henderson and Venkatraman consider that the organization should allocate the resource and the excuse plan depending on the environment, important of the degree and the scope.

Therefore, the business strategy is a suitable position the enterprise should choose rightly on the market. Henderson & Venkatraman considers the ability, the structure and the activities of the organization. The relationship with other vendors and the government are important in the business environment.



3. The Digital Content Market Status and Trend

3.1 The Definition and Scope of Digital Content Industry

The Digitalization including the telecommunication, entertainment products, and other digital technology becomes the core trend at digital media age. It needs more elements of humanities, design, talented person, funds and new technology like the data compression and transmission technology. Therefore, the policy of digital TV and broadcasting is more important by time. The definition of digital content industry by the structural angle is "The digital content which is produced, delivered and broadcast by the digital technology". The definition by the value chain is "Content creation and design model; Digital audio and video products; Interactive of multimedia". The digital content industry in Taiwan includes multimedia software, embedded system, content production, digital entertainment, digital learning, wireless communication network content services, ISP value-added services, B2B e-commerce software, ASP and other network applications etc. The output has reached NTD 1,334 billion in 2001. The Executive Department define the "Computer Systems Design Services", "Data processing services", "Information supply network industry", "Software Publishing" as the scope of digital content industry since 1991. There were 5,350 participators in digital content industry in Taiwan before the end of 1991, it increased 1.3 times over 1986 years as the staff employed increased 1.3 times. The Industrial Development Bureau defined the digital content as a kind of technology and service which combine the image, text, video, digital learning, mobile content, internet, software and the digital publish. In addition to the technical level of broadband Internet access technology, the broadband video network includes with the flow characteristics of the media exchange. It combines the traditional media and new interactive media network with the election mechanism. The combination includes the media features, the services and technical characteristics of cross-media.

Due to the quality of the digital content, it could provide more service and enhanced content or interactive program. Lots of countries would transfer the analog program to digitalized content and watch the program by computer and digital television. There would be more functions with video software, real-time information, paging messages and data search. The digitalization would combine the entertainment TV, internet and telephone to provide the completed service. Many governments would like to pull the HDTV by digitalization, and make the communication more open. That would assist the development of the consumer electronics, the IC industry and the PC industry. The advantage of digitalization is the high quality. The dynamic-scalability function would play the digital TV program and transport 4 ~ 5 programs at the same time.

The internet media started from 1960. It was developed by the Advanced Research Project Agency (ARPA) in USA. The network included the research institute, military base and research project agency and named linkable internet. The internet formed by Balt, Barenok and Newman Company. The use rate of internet in USA reached the level of 750/1000 people at North America and the level of Western Europe would closed to North America in 2005. The number of the user on the internet in Main China reached to 1,700 ten thousand in 2000. CIA forecast the number of global user on the internet would be 7 hundred million and 6,500 ten thousand in 2005. The global penetration rate of the internet user would be 11.8%. No matter the development of the economy in the 3 areas would change or not, the technology and users would keep on going. By the Metcalfe's Law: The value of internet is showed by the square of the user number. As the number of the user goes more, the value goes higher. It would facilitate the rich and instant source of messages from the power of the users.

The online media would become the application of the digitalized service and bring more needs of the broadband service. The condition would modify the mode of users and make the IT technology become the media center at enterprises and home. The digital

content products would enhance the PC, internet, cable TV, games and consumer electronic products. The user could get feedback quickly and find out the knowledge capital from the data center. If the digital technology could be combine the text and video to set up a digital media platform, then it could create the market needs for the digital age. If the digital technology could combine the equipments of all enterprises and research institutes, the streaming would become the Virtual Organization which could be force the resource of the organization and the human resource. The outsourcing could make the functions more professional.

3.2 The Current Condition of the digital Content Industry

The IT industry is based with real competences and it is helpful for the digital content industry. If there would be more resource and policy in the legislation, talents funds and marketing, there would be more potential in the multi-media scope. The output value of digital content industry reached 3,700 hundred million in 2006. Frost & Sullivan evaluate the output value of the digital content would be 6300 thousand dollars in 1998. Jupiter Communications shows that 60% news, entertainment and the sport website provide the digital content in 1999. Kajun Associates forecast the market would be 44 hundred million dollars in 2010.

MIC points out that Northpoint, CoolCast and clearBand in USA cooperated with each other and provide the service of interactive TV program and digital content. The digitalized technology helps the content goes widely on earth but the operation model and the access still need to be considered. Business Week forecasted that the global media industry would be formed by Time Warner, Disney, Viacom, News Corp, Sony and Seagram. AOL cooperates with time Warner and provides the digital program, movies, music. It achieved the cross-platform effectiveness. The Operators include communications, media industries and consumer electronics. Different professional background would be placed on the different position in the value chain. The technology would enhance the quality of media stream.

3.2.1 The technology of digital content is progressing

The multimedia software is related to the shaft of wireless communication and broadband. It is affected by the multi-media and digital communication. Also, the value would be increased by the efficacy of digital image, animation, game and combined 3D application.

3.2.2 The main stream of media industry is digitalization

Since the middle age of 1990, the communication is completed by digitalization. And it would become the main stream of interactive media. Digitalization becomes the key technology in commercial and multi-media. Hi-Vision program would be the next generation at digital age. Virtual studio and animation effects are involved in the development of digital TV. The media equipment like AJ-HDC27V of Panasonic would be designed for the digital electronics. Satellite digital transmission system developed by Boeing Company is combined with Computer Games, Animation, VOD and Digital Art. It would save the cost and reduce the process of movie producing and attracted lots investment.

3.2.3 The combination of digital media and broadband industry

According to the high added value of digitalization on TV program, movies, game and music; USA, Japan, Korea and China are focus on the structure of national internet and communication. It would include the assets of the culture and enrich the digital content.

3.2.4 The digital content would be combined in E-commerce and communication

The E-commerce needs the technology of digitalization to link the software and communication. For example, the automotive company plans a platform for the vehicle components business on line, and it could reduce the procurement funding. MIC integrated

the enterprises like BenQ and AUO to set up a Electronic supply chain integration platform. The Hub service is set by the internet and gotten access to the data center as a cycle of supply chain including information, capital and transportation. It could save about 9.5 billion in costs. In order to achieve the humanity interface, the digital content would adopt the graphical user interface (GUI). All the information shall be compressed into a digital format. The global E-Commerce shall be considered about the information security and the convenience of the data center, and then it could reduce the cost and prevent the repeated investment of resources. The benefit is the economies of scale and the system integration.

3.3 The Market Trend

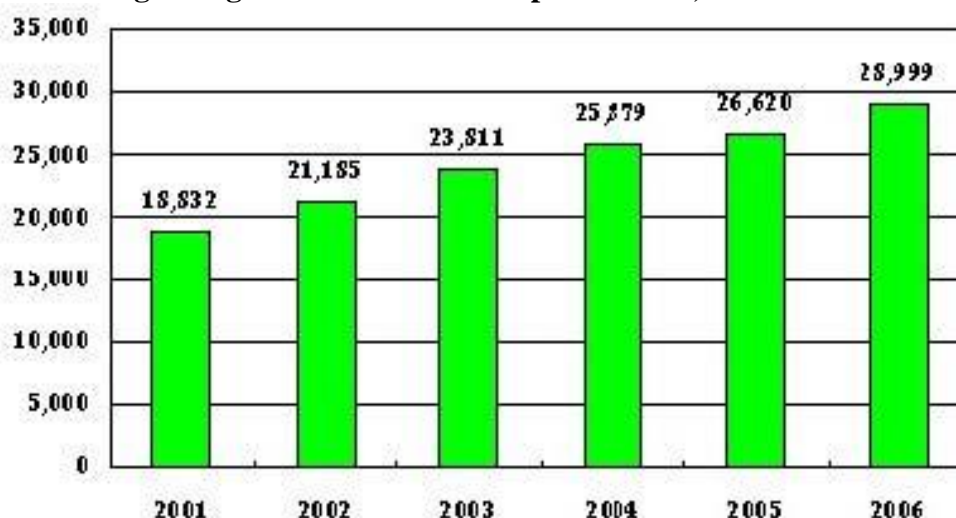
3.3.1 The Global Market

3.3.1.1. Game Market

Estimate that the global market scope of game reached about 340 million dollars. There are about one-third families in USA have the PS2 game. The digital game market of USA reached about 157 million dollars in 2002, and the number would reach to 240 million dollars in 2006. The game market scope of USA has exceeded the movie revenue. The game market scope of Korea reached to 1,230 million and the sales of Game Boy was over 1 million in 2003. The global communication market would go to wireless age in 2008 and the game on the mobile devices would be the trend of next generation. The game device would play with wireless function. Juniper Research predicted the revenue of mobile game would be 97 million dollars in 2008. The PC game would be almost on internet and the growth of the single game would reduce as the online game combined with TV game and mobile game. The revenue of PC game would be 53 million in 2008.

According to the report of Juniper Research “Next Generation Video-Game Consoles”, the global game market would be 350 million dollars in 2008. The game market would exceeded the movie, music market and become the biggest entertainment market. The game market would still focus on TV game, PC game, online game and mobile game in the future. In 2008, PS3, Xbox2 would join the game market and the merchandise could bring the marginal effect by movies, music and fictions. The TV game would reach 200 million and become the main stream in the industry.

Table 3-1 The global games market and output forecast, 2008



Source: National Applied Research Laboratories Science and Technology Information Center

The wireless game report shows that the global mobile game market would be 1.24 million dollars in 2001. The market scope would grow up each year and reach to 44 million dollars in 2006. The Japan and Korea would develop the mobile game in 2001.

The Asia occupies a market leading of 57% on mobile game market as the Asia market occupies a market leading of 61% on global market. Although the Asia market rate reduced from 61% to 39%. The Asia population is almost 20 million in 2006 and the mobile phone is popular at the same time. The mobile game capital might reach to 17.16 million dollars. It would grow 2,200 times as the base of 2001. The technology of mobile phone in Japan and Korea would lead the development in west Europe and global game market.

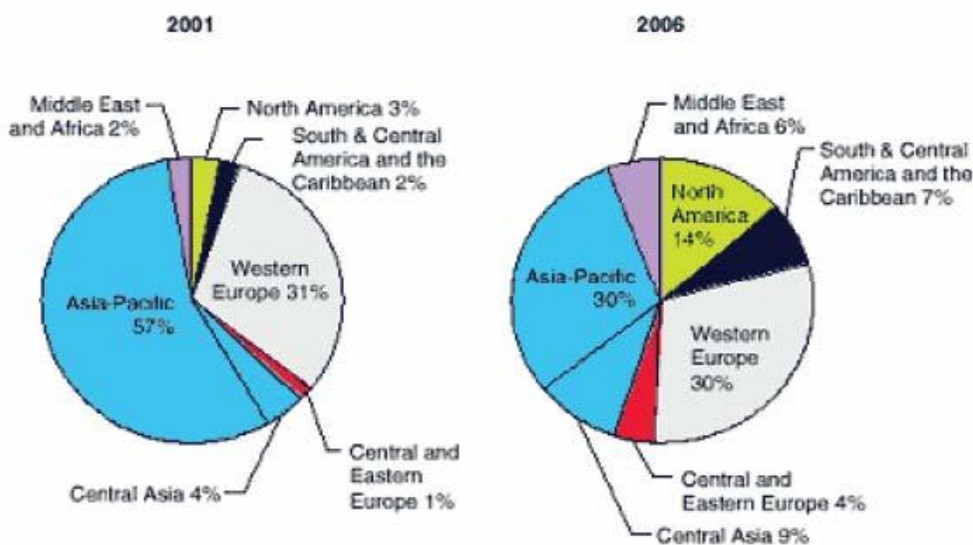


Figure 3-1 Global mobile games market of the regional distribution, 2001 and 2006
Source: Wireless Playing to Win, 2001

To formulate the 3rd generation standard of communication, the 3GPP organization defined the specification of mobile application execution environment, includes 3 topics: wireless software protocol; the Wireless Application Protocol; Personal JAVA; and the J2ME CLDC/MIDP. Especially J2ME could be applied on internet phone, mobile phone, PDA and car computer. Chorus Play and Java/BREW technology could assist the multimedia game. The report “Mobile Games: Text to Rich-Media Games” points out the revenue of SMS game would be 15 million in 2003. The revenue of Java game would exceed 97 million dollars in 2008.

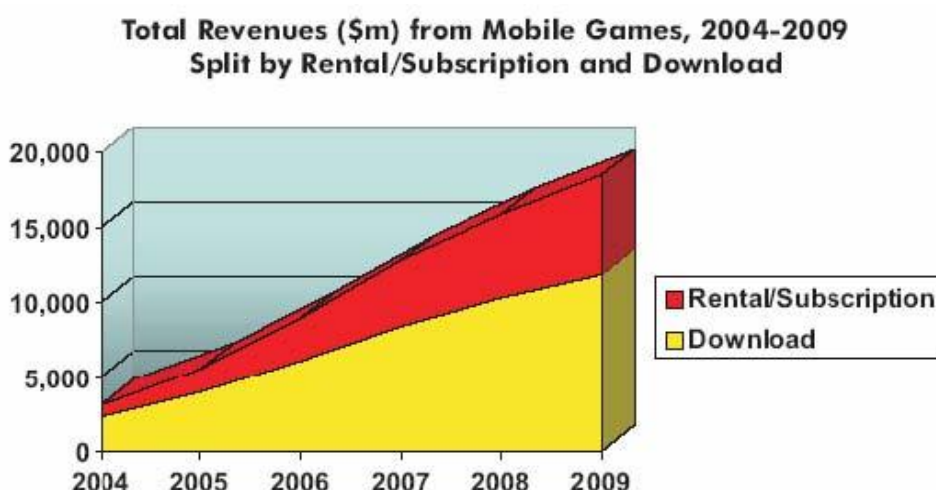


Figure 3-2 Action game receipts output forecast, 2004-2009
Source: Juniper Research, 2005

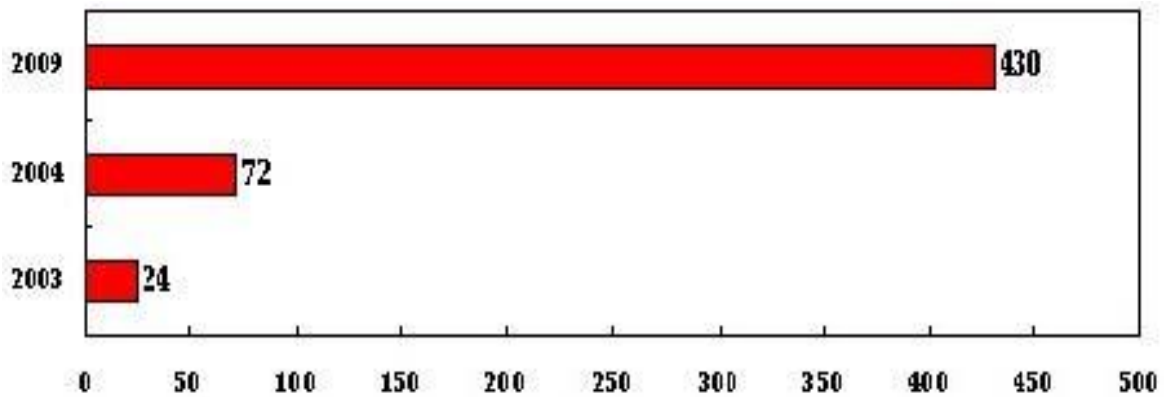


Figure 3-3 U.S. mobile game market forecast (unit: millions of dollars)

Source: Jupiter Research, 2005

Jupiter Research points out that the mobile game would develop in 2003 and reach to 0.24 million dollars. It would grow up to 0.72 million dollars in 2004. The rate of growth is 200%. It would reach to 4.3 million dollars in 2009. To prospect the market, Screen Digest surveys that the revenue of global game companies would be 0.64 million Euro as the amount of mobile game would be 3.4 million Euro in 2003. It would reach to 1.84 million Euro in 2004. The growth rate would be more than 2.9 times. Screen Digest finds out the mobile game would face the high competitive and the mergence. There would be only 2 cases of mergence in 2002 and up to 4 cases in 2003 and then up to 19 cases in 2004. It shows that the mobile game companies would enhance the competitive by mergence.

The main power is the sales of the software. The competitive between the software products is hard. PS2 would launch in 2004 and NPD predicts that the total sales in USA would be 510 sets. The second sale is the game of XBOX, Halo 2 inviting the team of movies "The Matrix" and "Lord of the Rings". The digital content and the media technology are high-level. The sale was 1.25 million dollars on one day and sale of 420 sets in October.

According to research institutions Halo 2 is the first game software of global sales exceeding 1 million dollars. NPD organization published the numbers of the software sales in US retail sales as table 3-2. NPD organization announced the sales number of game software at home. The sales grew up 7% in 2003 and the mobile software game grew up 11% and the mobile hardware grew up 10%. Especially the total sales of game software reached to 99 million dollars.

Design Council points out that the company which values the design would grow up twice than the general company on the stock price. The institute in Korea shows there would be 19 dollars revenue on each investment, especially the art aspects in game and digital movies. Electronic Arts and Take 2 Interactive would develop the game software for PS2 and XBOX as the Madden NFL 2005 and ESPN NFL 2005. This is a notification for digital content creators. They have to cooperate with each other to modify the media format and the support technology. In order to match the hardware, the software should be high quality content, then that would attract the players.

Table 3-2 U.S. game software sales volume	Game Software	Sales estimation
1	Super Mario 64	USD 308 Millions
2	Grant Theft Auto : Vice City	USD 284 Millions
3	Goldeneye 007	USD 250 Millions
4	Grant Theft Auto 3	USD 241 Millions
5	Mario Kart 64	USD 238 Millions
6	Zelda : Ocarina Time	USD 194 Millions
7	Madden NFL 2004	USD 166 Millions
8	Halo	USD 149 Millions
9	Pokemon Blue	USD 134 Millions

Source: NPD Group / NPD Funworld, 2004 year in November

For the hardware aspects, the most important commodity is graphic chipsets as the ATI X800 graphic processors, the time slog is 500MHz, support DirectX9.0 Shader Model 3.0. It combines the high quality and the broadband to explore the game market and the digital content scope. XBOX2 would be ready with IBM Power PC micro-processor as the time clock 3.0 GHz. The core processor would execute 2 instructions while a single cycle, and be provided with 32 KB L1 instruction cache memory and 32KB L1 data cache. Sony invested “Cell” processor for many years, each cell includes 64-bit power architecture processor and eight synergistic processor with 128-bit.

The mobile game market is basically divided to PDA and mobile phone as the Messaging-based Gaming, Web-based Gaming, Downloadable Gaming and embedded game. The main game market is embedded game as the Game Boy play station. No matter the shape or design are all tailor-demand-oriented. In 2005, the Nintendo 21 play station supported the IEEE1394 with 8-inch double-sided DVD disc drive. It is built-in home entertainment features and interacted with the handheld games, and touch-screen.

Nokia get into the mobile gaming market by N-Gage and N-GageII Series. Not only the built-in MP3 and Bluetooth features are on the market, more integration of mobile phones and game consoles are shown on the device. Sony recently launched PSP to the market-oriented game. It is the typical portable multimedia player. The more simples in operation under the convenience of the product launch, and audio-visual requirements of the screen. Digital content creators for the game screen will be processing and video compression technology would be on the right correction. The game with the necessary material, content could produce diverse circumstances, with physical facilities. The expansion of the game software would reach the market performance.

3.3.1.2 Digital Audio and Video Application Market

The application of digital media would grow up rapidly because of the internet and digital TV technology. Besides the improvement of the quality of the image, there would be more applications on the TV platform. For example: Video On-Demand, Personal Video Recording Service and T-Commerce. As the factors of broadband video services on global internet like Yahoo BB, Fastweb, CHT, FranceTelecome. The market of broadband video services would keep growing. In the future , the digital TV would provide more diversity services in the city. In Taiwan, the TV channels would be digitalized over all in 2006.

a) On-line media

The prediction of current global broadband video services market is that the highest value is on broadband media service with 14 million dollars in 2008. The service provider would open the channels for order as the channel of the enterprises or organizations.

Jupiter Research points out that the digital music market would be 3.3 million dollars in 2004; it is growing up 6 times than the number in 2003. Estimating that the value of digital music would grow up twice in 2005 than in 2004. IFPI report shows that the global legal music websites are 50 sites and there are 150 service websites in Europe in 2003. According to the forecasting, the global broadband service would be 37 million dollars in 2008. The business model could enforce the customization service as the source of the revenue.

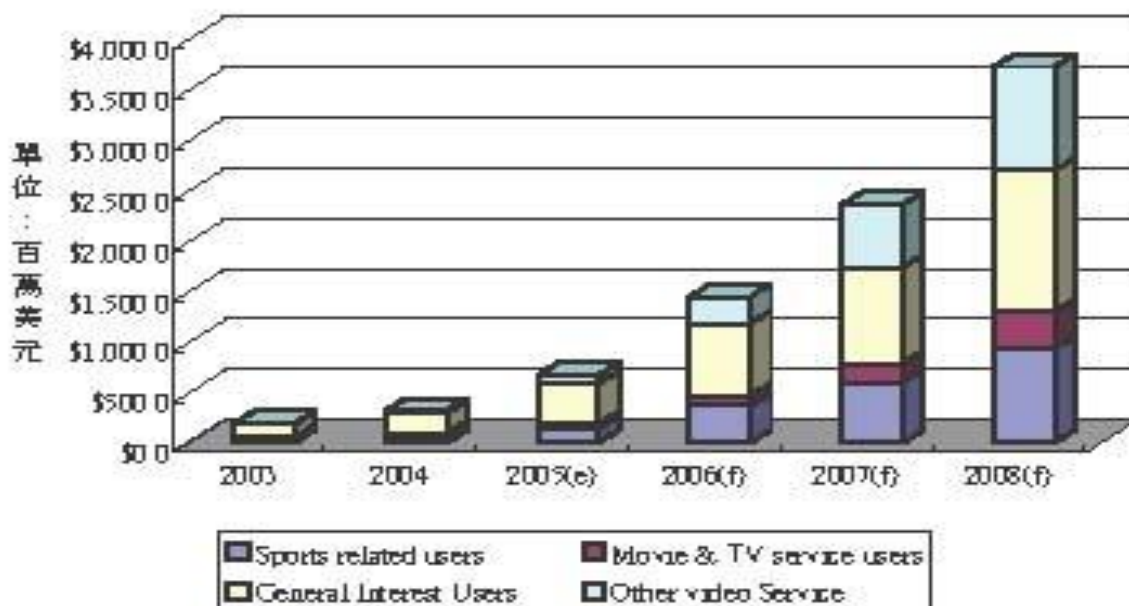


Figure 3-4 Global broadband video content market status and forecast
 Source: In-State, MDR, ITRI IEK, 2005

The supplier in North America could get more resource of the digital content and the local provider could express the content by the communication easily. The revenue of broadband service in North America is 2.5 million dollars in 2005 and the revenue is 39% to over all market. For the companies in Taiwan, the digital broadband could lead the profitability growth on the related equipment.

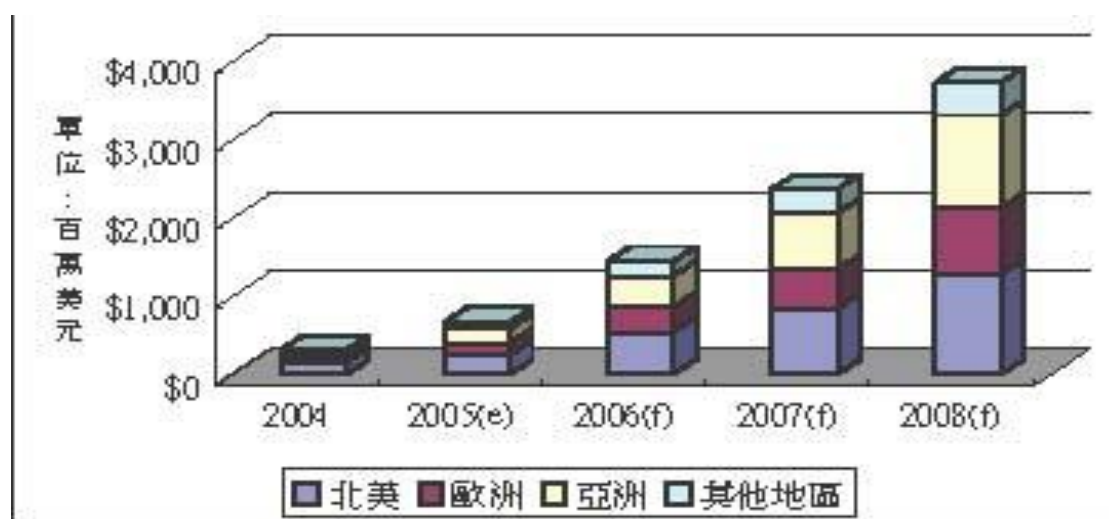


Figure 3-5 Global broadband video services and forecast the status of the regional market
 Source: In-State, MDR, ITRI IEK, 2005

Although online Peer-to-Peer video file shares music with users and the market share remained at 21%, but about 3 million people escape from the traditional way of Peer-to-Peer download content. 27% of internet users would like to pay online fee for mainly digital content. In Europe, Vodafone, T-Mobile, O2 mobile phones has launched with digital music download service by lower price. According to Strategy Analytics estimates that every year the digital content produce 2 billion dollars in business. British Official Chart Co., BPI Statistics found that the UK had legal download music services in 2004, and it grew to 6.1 million. The Germanany pay the digital music service would be up to 1 million each month.

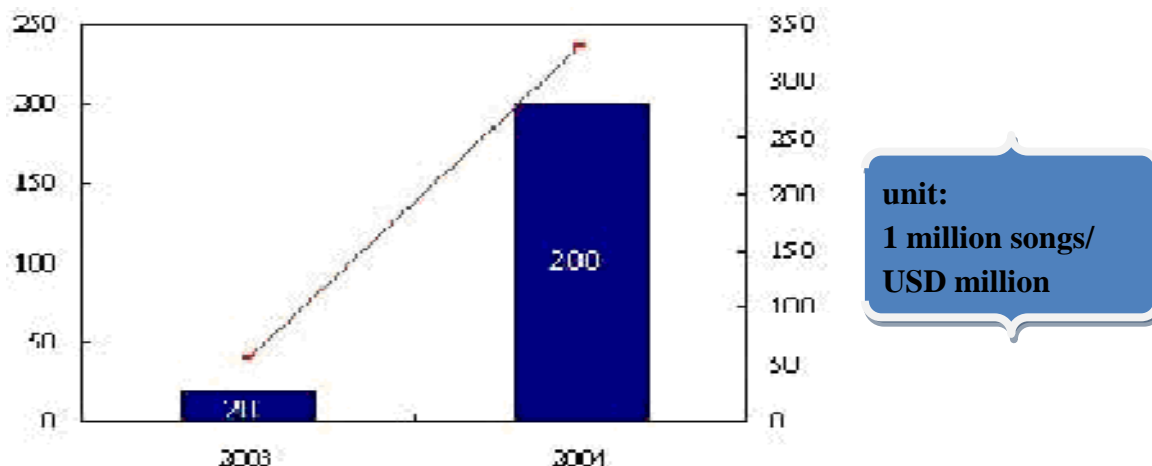


Figure 3-6 The current digital music market (unit: 1 million songs/USD million)
Source: IFPI, Jupiter Research, 2005

According to Nielson Soundscan, the online digital music service by Apple Computer, the number of legal download music would be over 2 million. In 2004, there would be 1.4 million than the base of 2003. On the basis of Pew Internet & American Life Project, about 700 million people download files through iPod or MP3 player. The ratio is similar to iTunes online store for download video files and payment mechanisms. The users of legitimate online music service through the store grow to 22% in 2005.

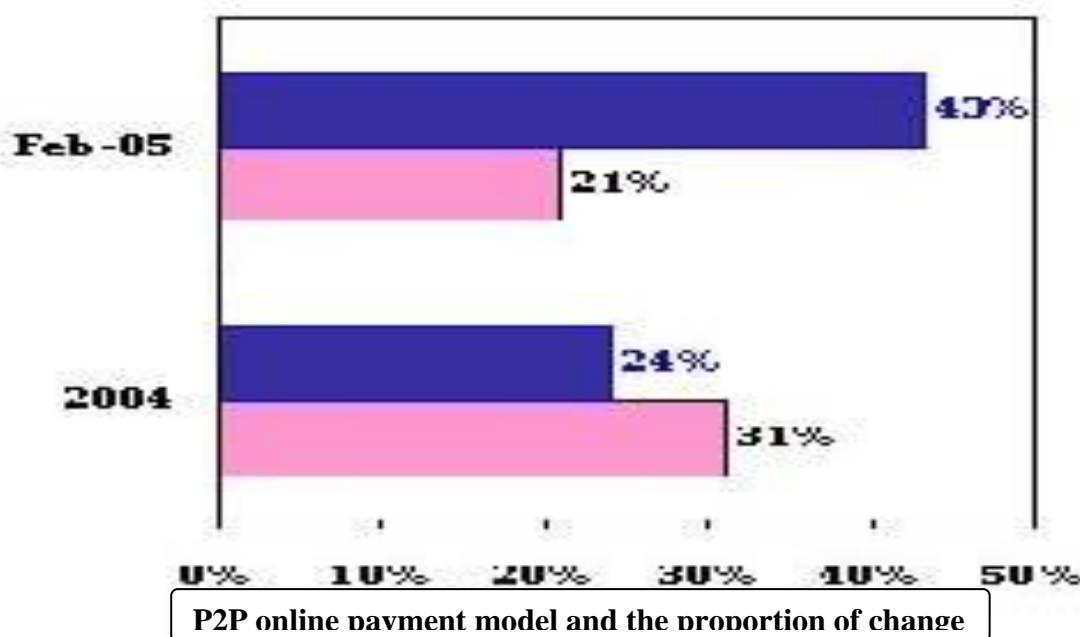


Figure 3-7 U.S. P2P online payment model and the proportion of change
Source: Pew Internet & American Life Project, 2005

The online music market in Taiwan focus on mainly Peer-to-Peer type, it is still belong to the infancy stage. As the iTunes mode of online music service set up by Apple Computer, the enterprises of Taiwan launched KKBOX for streaming media services and it link with broadband internet. The report of Strategy Analytics shows that lots of mobile phones play with chord bell sound but the quality is worse than MP3 player.

In the wake of saturation of the market by year, the growth of broadband video service market in North American slowed down since 2007. The development of equipment would be slowed down and instead, the IP network is the based architecture in Asia. And the main providers of network services in Asia would affect the force of internet service. Estimating that the broadband video service market in Asia would reach 1.1 billion dollars in 2008, it would bring the growth of related equipment market as IP STB, IP DSLAM and Storage. According to the forecasting, it would become the major source of profitability for digital video content and application equipments.

b) Mobile Video

Mobile phone manufactures launched the MP3 palyer models in the first few years. However, besides the source of digital music, there are digital cameras and mobile games with added application. That needs to be supported by the mobile service providers. The service of download digital music expands from US. to Europe since 2003. The European mobile service providers and handset manufacturers aware that the time is ripe. Apple Computer alliance with Motorola. In recent years, the digital music is popular on the internet. The open and legitimate content increases and promote the growth of mobile video transmission market which could drive the capabilities of mobile phone sales.

The volume shipment of handheld game consoles is still higher than the mobile phone games. For the mobile phone manufacturers, they hope to find the consistency with the functionality mode of camera phone. The MP3 music player function has certain attractiveness for mobile phone consumers. Informa reaserch institute consider that MP3 palyers and cell phone should be at the high growing phase. Music is an indispensable entertainment in general life. According to the level of age, it would bring different satisfaction to people. For example, the young people choose popular music and classical, Rock, Blue and Jazz music rhythm. Because the popularity of MP3 palyer and the digital music, it spurs the sales of mobile music. In addition to the diversification of digital media, it enhances the digital music content. The consumers listen to the MP3 music by mobile phone and download music via internet. However, the miniaturization technology make the the mobile phone embedded with different entertainment functions. Handset manufacturers face the operation and electricity issues with new functions or the problems with handwriting. Therefore MP3 mobile phone is designed by different functions. It can increase the sales by form the consumer patterns.

According to the statistics of Strategy Analytics, there are about 6 million music mobile phones in 2004 and the report predicted it would grow to 1.1 million in 2005. The growth rate is up to 96%. As for the global music mobile phone shipment in 2008, the annual average growth rate would be at 65%.

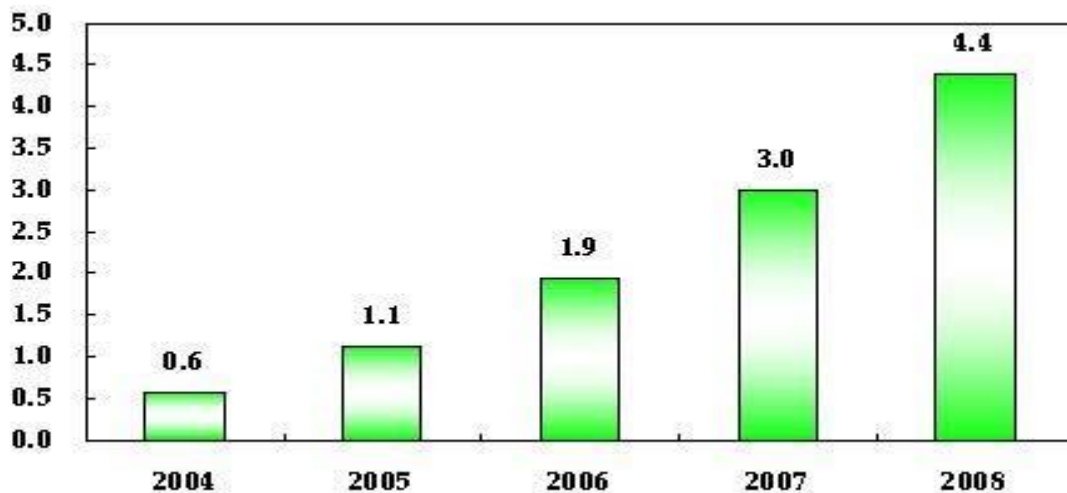


Figure 3-8 Global music mobile phone shipment volume trends (unit: million)

Source: Strategy Analytics, 2005

As the beginning of the music mobile phone service website in the future, the legally download music from a portable digital device expand to the smart phone. Nokia launched the high-end multimedia mobile phones with music palyer and camera features embedded with MP3 digital files and 4GB micro hard drive. It is applicable to 3G and WLAN. If is estimated that the digital music palyer mobile phone sales volume is about 4 million units. The mobile phone manufacturers could improve the quality of music palyers and provide the download MP3 files. After establish the digital music service model, the quality of MP3 music could better than the quality of current mobile phone. For mobile digital content service providers, it could increase the income of non-voice scope. For the mobile device manufacturers, it could increase the sales volume of mobile phones sustainably. Accoding to the differences of the infrastructure in global mobile communication systems and the different of consumption habits, the demand is different on mobile phone. In the high penetration rate of mobile phone countries as Japan, Korea, Western Europe and North America, the consumers have general functions of voice communication. They would have more willing of mobile media and games functions on communication. Therefore, the digital media creation would focus on mobile video transmission as a market orient development.

c) Combination of Digital Audio Player and Video Content

IDC research published the data that the global MP3 market demand would be up to 2.5 million sets in 2005. There would keep on the 20% rate of MP3 player market from 2004 to 2008. Although the various forecasting on the overall market sales volume of MP3 palyer between different companies; various companies are optimistic for the MP3 players. The MP3 palyer market of Taiwan in 2005, the overall sales volume would reach to 2 million sets. As to the market size, the MP3 player market of Korea would be amplified to 1.8 million sets in 2004, there would be 2.5 million in 2005. Besides increasing the market share MP3 palyer in Korea, Samsung planned to use the brand image to enhance their product image on the global market.

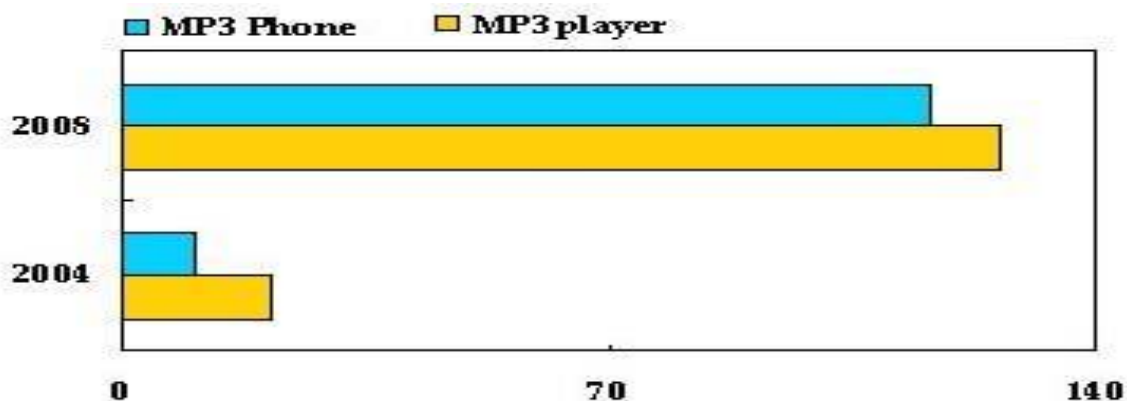


Figure 3-9 MP3 mobile phone and MP3 player shipment volume forecast (unit: million units)

Source: Informa, 2005

Napster created the P2P music sharing program on network in 1999. Many companies continued moving on the MP3 player market, the market volume keep enlarging. It would speed up the replace of MP3 phones. Therefore, the simple MP3 player with basic-level features in the future would speed up the replace of MP3 mobile phone. Digital music players would combine with the operation of the digital music sites on internet.

According to the market survey report of iSuppli about MP3 player in 2005, the MP3 player shipment volume would be 37 million in 2004. It is estimated that there would keep sustained growth in the next 5 years. The number would be 1.32 million units in 2009. After the manufacturers enter the market, the 4 major factors of consumer purchase intentions are price, brand, function and ID design. HDD-based or Flash-based MP3 players would be more diverse and more innovation to consumer goods. As the influence of the sales on iPod and MP3 players, there would be more manufacturers of MP3 players and service providers on the market. The market is significant in Western Europe. The quality of online video program is bad since the insufficient bandwidth which would not meet the needs of online video. However, as the popularity of the broadband and streaming media applications, the payment platform is ready for the audio visual program. For example, the proportion of users who would like to download movies or consider the online media in United State is closed to 40%. Therefore, the development of the growth on digital video creation would be from USA to Asia and Europe. The music and video files could be integrated by the digital content creation platform in addition to the digital TV and wireless broadband. The value of digital content market is higher than the original media.

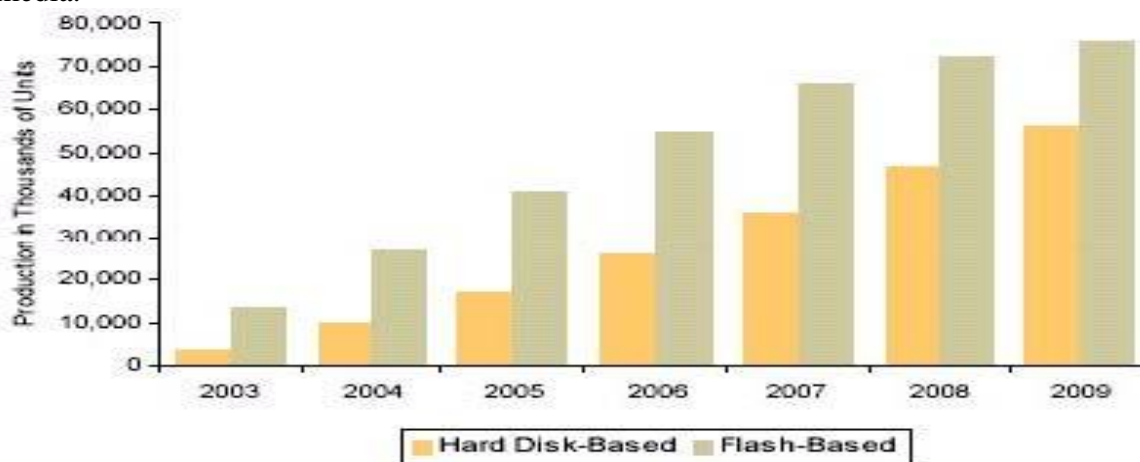


Figure 3-10 Worldwide market forecast of MP3 player shipments

Source: iSuppli, 2005

In the future, the digital music player would possible to the mode of iPod type. iPod is not only a MP3 player, also the iTunes is not just a download music software. iPod is combined with iTune by the existing music industry and shaping the digital content industry. The main palyer in entertainment industry is based on PMP. The famous Korean company launched the iRiver similar to iPod product. Sony chose to entry the hand-held media device industry by game console. The shipping unit of NDS is 5 million on the first sale day. Gizmondo product is still on demand and the sales volume reached to 5.6 million sets. However, the the digital creation would combined with the hardware equipment and extand the image and sound. The digital media creation processing would affect the consumer electronics. The manufacturers would develop wireless technology to expand the media transmission; the digital media application; the integration of video image; the wireless network and GPS technology. In the game industry and the handheld media palyers, there should be more innovative products and service model to expand the compression technology. The facilitators would be easier for consumers to download the multimedia content.

d) The application of Game and software

Because many coordination and planning, the digital content creation is shown by the multimedia forms. If the hardware can be matched with the game console, it would lead to result in a considerable utility. Because the game console market would be 6.16 billion dollars. Such as the 1/3 profit of SONY comes from the game market. Many features of PS3 are quite similar with the software game device. It would support the digital music downloads with blue-ray DVD specifications and video conference with built-in Wi-Fi wireless. The device could play the JPEG image and MP4 video with the effectiveness of portable multimedia players (Portable Multimedia Player, PMP). Therefore, digital media content creation games are related to the growth of the industry and able to benefit the manufacturers in Taiwan. It would be developed as the entertainment center device and linked to the network with high image resolution. It allows people to support the synchronization of high-definition TV.

e) Others

At present, many countries that are driven by the policy of government would convert the analog TV system to digital TV system. The program providers invest the conversion system, at the same time they would like to have more sales channel to sell the digital and video programs. There would be a great change because of the digitization in the traditional movie industry. There would be 30% traditional cinema conversed to digital cinema in 2006. There would be lots advantages in digital photography.

First of all,, it can save costs in particular, the cost of film. Secondly, the transmission of digital moves could broadcast by the eatellite to save the copy cost and to deter the prracy from the copy. By obtaining the authorization of music production, the consumer electronic manufacters let the consumers access the software from the internet legally and download the digital music through innovative business practices. Digital audio and video files can be legally downloaded on the internet by the server. By simple, synchronization with video Web site and combined with different player.The users could be separated from the shackles of computer and enjoy downloading the music anywhere, even if the user is moving. For example, the vehicle can also play and stored the digital music. The household goods and entertainment applications with wireless technology can achieve the demand.

The digital audio and video products can be applied at any corner of the office, car and house.

3.3.2 The Trend and Digital Content Application

a) The Internet Advertising Comes to Video-Based

How to express the attractive advertising effectively and convey the message is important. Lots of pattern is applied in advertising which includes floating ads, the large

version ads and explosion-type E-Mail marketing, streaming media ads, mobile advertising and integrated marketing planning. These models are the attempts on the new media. The benefit of the internet advertising is greatly. Digital content creation could increase the value of the original movies and expand the adoption of digital advertising with high-quality.

Combined with the creative content in advertising, digital content creation products could play variety advertisings by the multimedia as the broadcast effectiveness.

b) The Development of the Website

Since the quality of video program on the internet is not good in the past days. They are for advertising purposes and free of charge. However, with the broadband and the popular of streaming media, the visual programs on the network becomes to charge. About 21% proportion of the internet users in USA are willing to download movies. If adding the possible users, the proportion would be 39%. On the condition of 35.3% households using the broadband network, the download program by PC would be more and more popular.

On the other hand, due to the policy implications in USA, the analog TV would be converted to digital TV. The manufacturers invest lots of cost and want to set up the conversion more system and receive more receipts. In the future, there must be more improvement programs to increase the cost in order to attract the customers. It can be predicted that the boundaries of PC and TV would be vaguer.

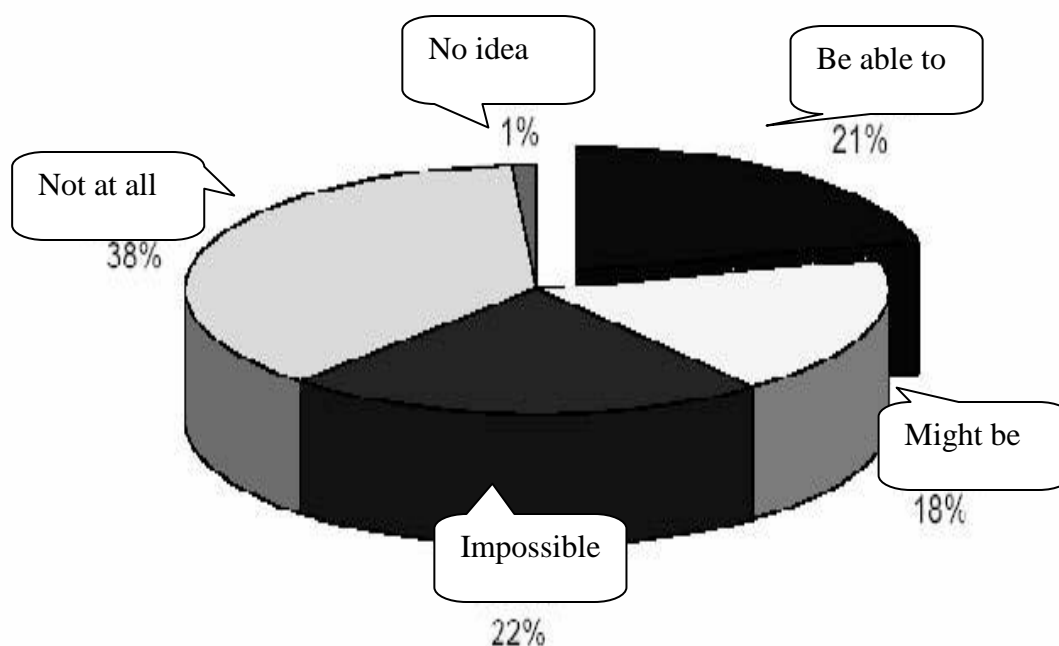


Figure 3-11 The willing of U.S. internet users to download videos
Source: eMarketer, 2002

For example, the MovieFlix.com web site which was set up in 1998. The payment way is USD 5.95 per month for unlimited watching streaming programs. The members are over 6,500. Although the revenue of the web site is currently not high enough, the order has attracted the major films companies to join in. for example, the investors includes MovieFlix.com, MGM, Paramount Pictures, Sony Pictures Entertainment, Universal Pictures, Warner Brothers. The other web sites Movielink are also funds by Warner Brothers, Paramount Pictures, Universal Pictures, Sony Pictures Entertainment and Metro-Goldwyn-Mayer.

Table 3-3 North American major online video site

Free Site: Name/Members		Patment Site: Name/Members/Payment way		
AOL MovieFone	3 million	Cinema-now.com	1,000	\$9.95/m
AtomFilms	3 million	Hollywood Reporter	-	\$1.95/m+PPV
ifilm.com	4.5 million	IMDb.com	-	\$12.95/m;\$99/y
Hollywood.com	6 million	Kkrs.net	753	\$4.5/m
Yahoo!	6 million	Movieflix.com	6,500	\$5.95/m
		MovieLink.com	-	\$1.99 for 6days

Source: eMarketer, 2002

c) The Rapid Growth of Interactive TV

In accordance with the provisions of the FCC, more than 1,300 commercial TV station in USA would start the digitalization before the first day of May, 2002. However, over 43% of the TV applied for extension to FCC as the waivers. Therefore, only about 400 TV sations are broadcast digital TV programs so far. There are 70% in US households are using Cable TV. But currently, the available HDTV content in the cable industry is very little; some even charge extra. For example, the Comcast in the Philadelphia area such as HDTV cable TV services provider would charge extra 10 USD monthly. So far, FCC did not require the cable opoars to provide the digital TV programs, but FCC would make the request in the future. According to the estimation of DVD Entertainment Group, the volume of the DVD players would be more than 3 million units in USA. As long as the consumers have the DVD player, they would like to buy a high quality picture with the home theater in TV products.

Therefore, the DVD market is indeed improving the digital TV market. Although more than 75% households are able to receive the digital TV broadcasting within the range of services. The consumers can access few digital TV channels. The biggest controversy is that if the provisions define the cable operators to offer digital TV content, it is equal to ask the cable operators to offer two versions as analog program and digital program. This would take more resources in bandwidth. The cable operators would prefer to use the bandwidth on other services such as VOD. According to the research of Forrester, the consumers in USA would like to increase the functionality of TV. The 7 items in the 10 items are PVR (Personal Video Recoders) and VOD (Video on-Demand). The features in PVR include the ability to skip the commercial ads; to watch TV and record another program; to have program guidance; to pause the live show program. The VOD-related functions are on demand movies and on-demand programs and other network. VOD and PVR device in USA increased significantly. The users increased from 2.9 million and 0.9 million in 2001; and from 9 million to 1.95 million in 2002. Forrester expected the number of the customers would keep growing. There would be 23.26 million and 9.56 million in 2004. The turnover would be also from 300 million and 250 million in 2001 to 2423 million and 286 million in 2004.

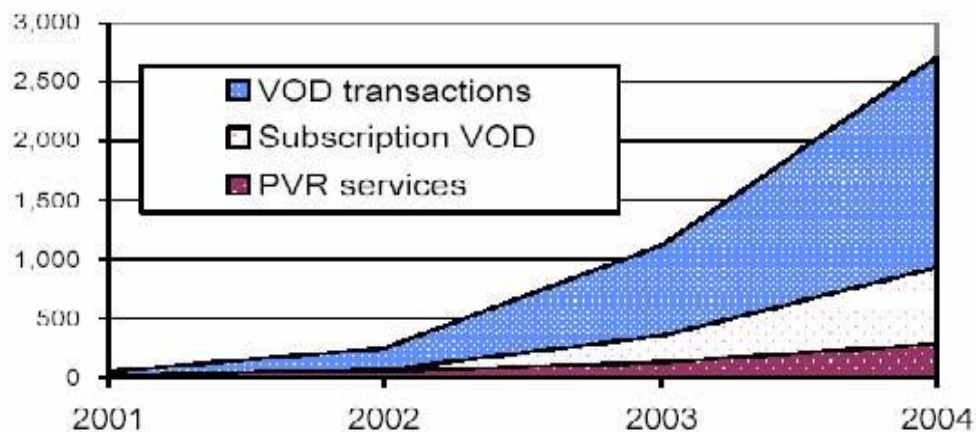


Figure 3-10 U.S. PVR, VOD Turnover (Unit: millions of dollars)
Source: Forrester, 2002

According to the related report of Consumer Electronics Association (CEA), the sales to dealers of digital TV (DTV monitor and integrated DTV sets) would reach 2.25 million units. The sales to dealers of digital TV (DTV monitor and integrated DTV sets) in USA would be 2.25 million units in 2002. The shipment volume would grow 58% than 2001. The average price would be from USD 1,835 in 2001 and decreased to 1,635 in 2002. So far, the driving factor of the growth on digital TV market would include the reducing of the product price and the popularity of DVD products. As to watch the high-quality content of digital TV program, it is relatively minor factor on market in this stage.

d) The Application of Multimedia Software

The digital media creation is combination of software development and developing towards the package technology. For example, to set up a multi-media co-development platform on line with software media, it is good and not only for multimedia design, game development scene and animation effects such as audio and video content application development. The Integration Server Software Platform (ISSP) market would be 24% annual compound growth rate by an astonishing speed and the rate is beyond the server software platform. According to International Data Information (IDC) report, "The market forecast of the integration server software platform in Asia-Pacific(excluding Japan) from 2004 to 2008" : The Application Server Software Platform, ASSP market would grow with a GAGR of 14% in the next 5 years. This substantial growth was due to economic recovery includes the factors as the development of digital media creation, the requirement of B2B on-demand strategies, the Enterprise Application Integration (EAI), the digital video image file on network services system and the increasingly complex IT system. These factors would encourage the users of the requirements of the integration on video media. That would upgrade the demand of digital audio and video software. The creation of the digital audio and video software provider would require the features of easy management and cost. Therefore, to open the digital media creation platform on digital video technology would achieve the development of the software applications by the digital right management.

3.3.3 The Trends and Market Size of Mainland China

3.3.3.1 Game Market

In recent years, the population of the broadband in China is continually increasing. It would make the huge business opportunities on broadband-based service market. The revenue of on-line game in Asia Pacific region reached the total revenue of NTD 26 billion: NTD 13.7 billion in South Korea; NTD 68 billion in Taiwan; NTD 5.45 billion

inMain China. Many international consultants estimated that Chinese would be the network language after 2007. The digital content industry in Taiwan would play an important role because the location of Taiwan is in the intersection between East and West and with a pluralistic society; the rich lifestyle and creative environment wick integrate with IT industry. The on-line game industry began to flourish in China since 2002; the output value is lag than Taiwan since the limitation to the hardware, bandwidth, R&D capabilities as well as the factors of national income. The main reson is its considerable market. At present, the computer market in China is total 3500 million as the population on internet is 8700 million. The average spends of online game in China reached 19.6per month in 2003. The game users reached 13.8 million. The online game market inMainland China is reached to NTD 52.8 billion which is contribution to the IT industry in 2003. The revenue in Mainland China is significantly more than Taiwan in 2004, and it is expected to exceed NTD 34 billion in 2005. One new start company in Mainland China would become the largest network game stock in just 5 years. The 32-year-old chairman would become the richest man with 9 billion yuan in China. The company would be listed on the NASDAQ in U.S. Another company named “the ninth city” also entered the NASDAQ market. The online game users would grow up to 4,500 million which is more than the total population in many countries. These figures would rise constantly as MIC estimated the average annual rate in China market rise up to 62%. IDC(International Data Corporation) predicted that the online game revenue and members in China would surpass South Korea in 2007. Although the game fee in China and Korea might be more inexpensive than that in Taiwan. Due to the game industry is a huge market in China, therefore, the world would focus on China.

Table 3-4 Mainland China online game market

Unit: 100 million yuan, * the estimated value

Source: 2003 China Game Industry Annual Survey, CGPA, IDC

Year	2001	2002	2003	* 2007
Online market	3.1	9.7	13.2	* 67

According to the latest CNNIC report, the online population of China in 2004 would grow up than the number in 2003. In which the number of broadband would be over 4.28 million peoplemore than 2003. There would be more than 1,500 million gamers in China.This would be the greatest support for industrial development. The master would go abroad for the game.

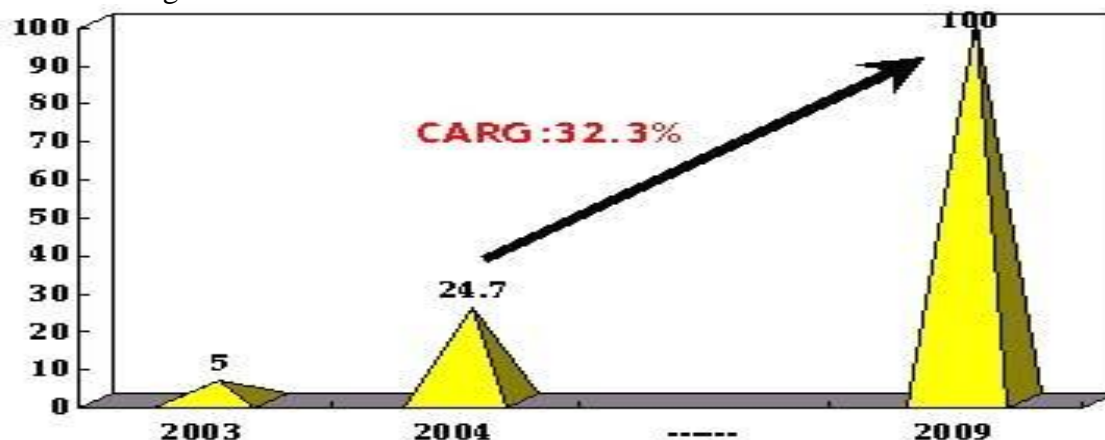


Figure 3-11 Trend of China's online game market value (Unit: billion yuan)

Source: China General Administration of Publication, 2005

3.3.2.2 Video Application Market

1. Animation Industry

Over the past few years, the film group developed by the variety of transformation in China. There would be 13 digital cinemas in different cities. There would be over 10 reforms at the end of 2002. This trend would be a positive impact on the digital video post-production film market. The Government intends to support the animation industry in China. In addition to foreign capital, the policies of the Government would protect the business benchmark. Including the animation playback ratio, and the limit of foreign coproduction factory by following promotional measure until 2001. The animation films in China would be about 560 million. It would be approximately equivalent to 2.34 billion.

2. e-Learning

The digital learning market in China would be increase as 41% speed as the average annual. However, as the vast and the populous recently, it makes China would be easy to access the universal education. So far, there would still be 1.3 billion illiterate people in China. The junior high school diploma would be 82% and the lack of the teachers. The demand for convenient distance learning would be applied in the real case. Due to more complex multimedia applications and for a variety individual learning styles, it is a benefit in communicate learning. By the 1998 year, the Tsinghua University, Zhejiang University, Hunan University started to apply the network education. The visible network is a continuous development education. According to IDC (Internet Data Center) forecast, the learning market in China would be about NTD 2.073 and would have the domination on the market. Consider the effects of the economy scale, the users of the cable broadband would not reach to the sufficient economy scale in Taiwan. The wireless communication should support by 3G, WLAN technologies. The Mainland China market is the most popular areas of mobile phone users. Digital content creation platform integrate the multimedia creation from all resources and technology. The digital content products are developed to the Chinese market. Through the cooperation with two developments sides for different consumer markets, it is expected to reach the economic scale and a considerable degree of the profitability.

3.3.4 Market Trend in Taiwan

According to the estimate form MIC, the online games in Taiwan are generally estimated to about 2.5 million players. The number is more than one-tenth of the population in Taiwan. The majority is the 20-year-old young man who has the influential power in the society. MIC estimated that the overall size in computer game market of Taiwan would be up to NTD 9.9 billion in 2004. The compared growth rate is 12%. The online game market reached to 8.314 billion and become the mainstream on the market. The Chunghwa Telecom has launched Multimedia on demand (MOD) services which are based on the ADSL and provide “TV channels” and “Video on demand (VOD)” services. In addition to the payment TV programs, there are more operators joined the market; therefore, the digital media industry would continue to expand the market in Taiwan. It is growing up 3 times to 1,500 billion yuan.

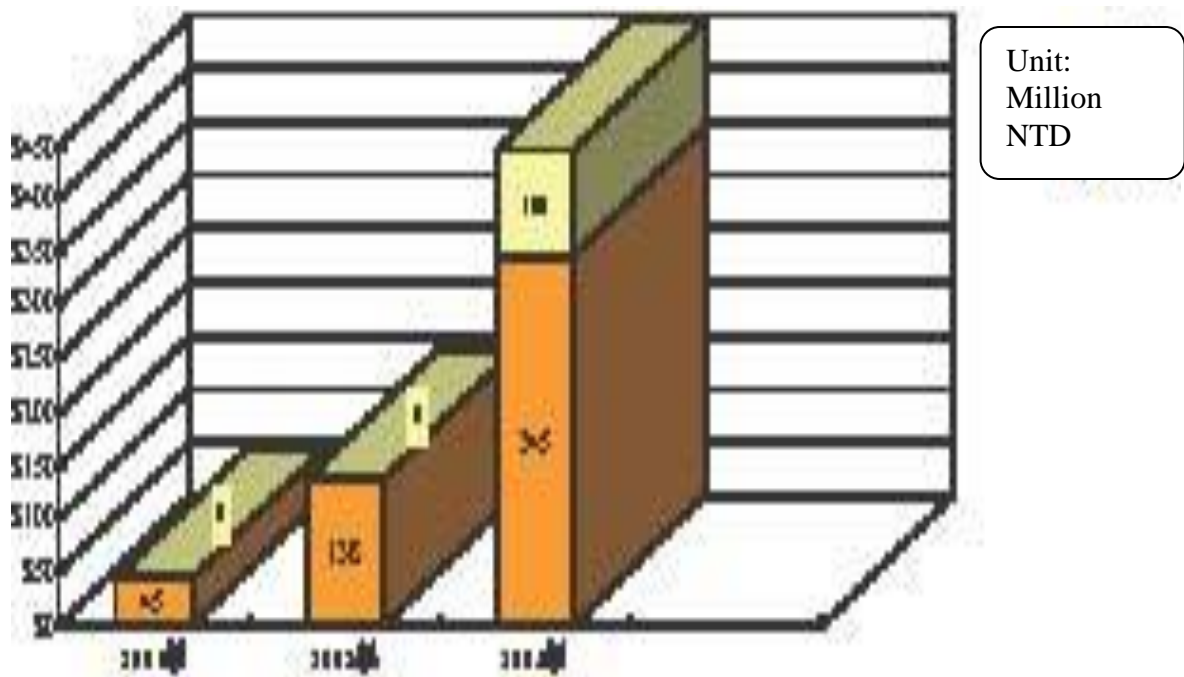


Figure 3-12 Online video market forecast in Taiwan
Source: Institute for Information Industry



4. Introduction of Digital Multimedia Technology and Amana Company

4.1 Image Processing Technology

4.1.1 Introduction of Digital Imaging Technology

Digital Video takes a lot of space, because it must store track and each grid and requires pixels with full-speed movement which can reach 30 frames per second. Video compression is an art and a science. The professional experts can compress digital video to make room for both savings and appealing to people visually also. The digital bit is the basic calculation unit. More and more information can be digitalized. The signal digitization and data compression are very convenient for the data collection. The broadband network environment of digital media is wide-ranging. It includes: the digital technology, broadband internet access technology, streaming media-related technology, video player, software technologies and the allied technique of 5 major technical development directions. Video production and distribution industry can attract many funds, therefore, the consumers could get high-quality media content.

1. Digital Technology

Broadband audio-visual media technology network can be attributed to the invention of digital technology. The emergence of digital technology makes the film evolve from analog to digital video. Therefore, the content could across multiple platforms and be more convenience to lower the costs of production and the advantages of closed path.

2. Broadband Technology

The broadband internet access methods including the followings ways: Integrated Services Digital Network (ISDN) 、 Cable TV modem broadband internet 、 Wireless Internet access (wireless solutions) and satellite Internet (DBS). Generally, ISDN is a traditional way of broadband internet access. In the xDSL family, the ADSL (Asymmetric Digital loop system users) is the highest degree on the broadband market. ADSL speed would be different from the cable modem transmission. Wireless internet refers to the wireless connected to two or more exchange with high mobility and no trouble setting wiring. Satellite internet mode means the client must install a 40 to 60 cm diameter of the dish antenna receiver. It aimed to provide the direct satellite internet access service connecting line which is installed in the satellite industry. It is an associated with the installed equipment.

3. Streaming Media-related Technology

The internet video media is going by the approach of download and play method. This approach is the downloaded image file from the internet and preview through the download process. But it should be downloaded and stored in the hard drive, then the video content could be reviewed. While the users hope to store the video content in the computer, but the download time is too time-consuming. In addition, if you want to save the file, then you must prepare the great capacity and there still be the issues of copyright turnover. In order to have the easy function, immediate and interactive features; the protection of copyright and streaming video technology becomes important. The streaming media technology means that the process of streaming video combined order normalization and compression technology. Not all of the files are downloaded with immediate and efficient advantages. The normalization and compression technology that can reduce the file size thus it could reducing the time. The users do not have to use the download the file to your computer. Therefore you can save the disk space and there is still benefiting the copyright content.

4. Video Player Software Technology

Network broadband video palyer software is a demonstration of streaming media technology product. Media Player 9 (Microsoft), Real Audio Player 8(Real Networks) and

Quick Time Player 6 (Apple Computer) would be three main products. Since various software does not support to each other, therefore, the majority of network broadband video web site usually provide free charge for users to download these three player software.

5. Allied Video Technology

Audio data now is classified for the wide range applications. The current audio research in U.S. can be divided into the classification, audio , data acquisition and audio ancillary. The audio classified information could divid the external environment, voice and music classification. The audio auxiliary indexing is used in movie clips. It can also make the audio information network and data indexing. Audio data management (sound effect database management); audio data indexing (sound indexing) can be introduced to use the sound data claims. Audio auxiliary image analysis (audio-assisted video analysis) is popular at the Hollywood in United States. The last image analysis must be changed through the screen and to find the desired video. Now through the auxiliary audio search is more convenience. The audio encodingis to identify the computer voice and music, then it caould be different between the compression engine and increased the automation level. The five kinds of technologies are basic digital and broadband technology. It has been to establish the comprehensive, major transmission applications.The streaming media technology is the main impact on the specifiction and video compression. The multimedia application technology would develop with digital content creation and it is closed to the commercial applications.

4.1.2 Image Compression Technology

As the digital signal processing is developed with cost-effective. The digital signal processor would be under the image resolution, the image rate (frame rate) and other issues related to image quality. It is gradually by the advancement of video crompression technology. The continued spread of digital home trend would led the consumers record the digital audio and video equipment, the mobile entertainment devices, the media gatwatys, automated monitoring system and digital high-defination TV as the increasing demand for audio-visul appliance products. To present the perfect picture quality, the entertainment products would achieve the full use of digital technology environment. A keycomponent of the implementation would be a key component which is responsible for image compression as MPEG IC. MPEG is defined by the animation experts group (Motion Picture Experts Group). It also means that the standard format by the expert group. MPEG is defined by the ISO (International Standards Organization) as the image compression format in thedigital content production. Since 1988 year, the MPEG has already published the important criteria. The computer image processing capabilities can be viewed as the data processing and the display format. MPEG IC applications, commercialization and its successful function in DVD player, digital STB and other digital industry would make it becomes a more world-class IC design product.

4.1.2.1 MPEG video compression Technology

The full name of MPEG is movingpicture experts group and it is mainly used for video compression. Since 1992 to 1995, many expert meeting defined the standards of MPEG 1 aand H. 261. They have many similar structures which are more suitable for video conferencing. In the ISO/IEC 11172 documents, MPEG 1 includes 5 parts:

- (1) MPEG system layer
- (2) MPEG video layer
- (3) MPEG audio layer
- (4) MPEG test layer
- (5) Software reference layer. From 1994 to 1995, the expert group also defined the MPEG2. Besides the five-story structure, there are more four-story structures.
- (6) Digital storage media command and instruction control;
- (7) Non-backwards compatible audio type;

- (8) 10 video expansions;
- (9) Real-time interface. MPEG system layers are mainly in the combined video and audio compression bit string in order to achieve insertion (Interleaving) and synchronous (Synchronization) function.

In MPEG, the basic unit of macro block (Macroblock) is a block from 16 x 16 sub-image brightness, the 8 x 8 Cb is the degree of sub-image and a color 8 x 8 Cr is the composed of sub-degree images. MPEG 2 video compression standard is for post-MPEG4. Its main feature is the introduction of objects (Objects) of the concept. It is to provide the framework in VRML(Virtual Reality Modeling Language) on the language to allow the users to enter the key description and called BIFS (Binary Format for Scenes). In 1998 year, MPEG 7 is planned to offer multi-media content (Content) which could describe the interfaces. To reduce the storage space requirement of the video file, MPEG compression algorithm is first selected a number of key cells. And the rest of each cell is the key under the grid before it's done to change the situation description in the future. For example, in the conversation screen, only to produce the changes is in facial expression. So it is necessary large amount compression. Because the background is just described in each cell and can be critical. MPEG compression is adopted by the mathematical techniques to reduce the required data amount.

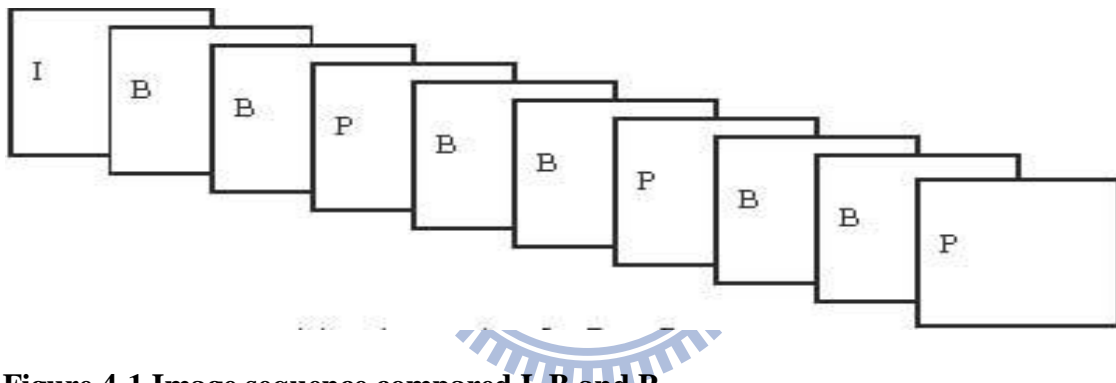


Figure 4-1 Image sequence compared I, B and P
Source: Data compression principles and applications

In general, the process are obtaining video images. The cameras should need the photograph in 30 seconds. The image volume would not only be addressed by the fluency. Hence, if the two consecutive files would be similar to the higher level of video compression, it would be more helpful in the block matching (Block Matching) area. In MPEG video layer, the first of all is the iamage should be divided into three categories: I image (Intra-code Picture), B image (Bidirectionally Predictive-code Picture), and P image (Predictive-code Picture). Suppose that there are 10 images, the first video image is set to I; the second and third video image are set to B; the fourth image is set by P image. The number would be formatted as BBPBBP.

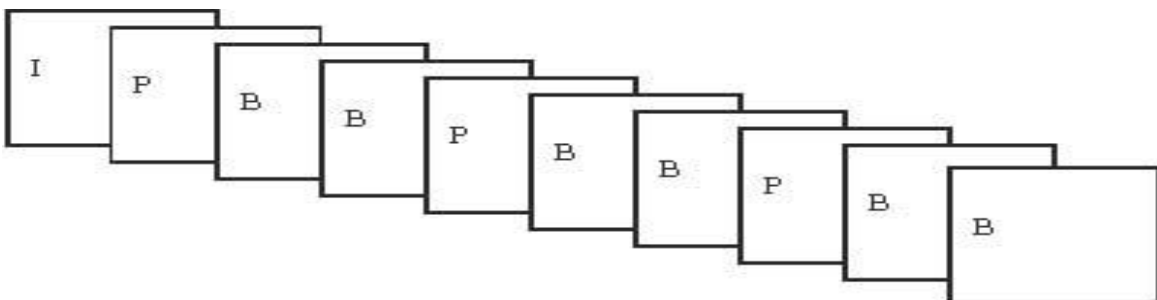


Figure 4-2 Imaging sort sequence
Source: Data compression principles and applications

Block matching could lead to good compression results. It is mainly due to the following characteristics: I and P images are with high similarity degrees. As for B image compression, it could be based on I image and P image as the conduct of the interpolated B image. I image could be compressed by the JPEG method. P images are available to be carried on the compressed image I as the I image is treated by the reference image (Reference Image), and P image are regarded as the current image (Current Image). P image blocks could be matched with each other.

4.1.2.2 Related Standard and Application of MPEG

(A) MPEG-2

In the signal transformation, only the efficiency codes of video and sound signal could be analysed in high quality content. MPEG-2 is the most successful image compression technology so far. Since it is simple and high quality and the data rate is closed to 4 ~ 6 Mbps, therefore, it is attracted to the vendors of DVD Player and STB. The market scope is large and matured enough to lead the related products with the integrated support in the main compression technology. MPEG2 and MPEG1 compression could be divided into three layers. When the layer is high, the compression degree and the CPU capability are increased as the transportation broadband is reducing. Therefore, the compression rate is less; the capability of CPU is less; the delay time is less in the first layer. According to the compression rate is the lowest with less quality of sound, therefore it needs the highest transport broadband. The third layer has the best quality of sound; the compression rate could be 1: 10. The process time is also three times of layer first.

Table 4-1 MPEG2 compression standard

MPEG2	Compression	Goal/Bps	Transmission rate/Bps	Idea time	Delay time
1	1/4	192Kbps	32~448 Kbps	< 50ms	19ms
2	1/6	128Kbps	32~384 Kbps	100ms	35ms
3	1/10	64Kbps	32~120 Kbps	150ms	58ms

The concept of the compression layers are developed by time. The standard of the third layer are late than the first and the second layer. As the specification of the third layer is pandemic, the consumers are very familiar with the orders. Therefore, the freedom of consumers makes their own applications with right specification layer. This condition is very similar with the color television. The color television convenience can decode the signals from the black and white television. However, the high-definition DVD and DTV set would have not enough compression rates and it causes to the result of MPEG-4 and H.264 which are the emergence of new technical specifications. The completed MPEG-2 standards could meet the STB and the DVD or broadcast applications such as D-VHS and other multimedia applications. MPEG-2 is not conducted on the standardization of MPEG-2 encoder, but for MPEG-2 encoded bit would provide the standardized format. On the other hand, it could also provide for the MPEG-2 decoder as a standard model. The Filter is set by the Fast Fourier Transform (FFT) to convert the time domain as the same number with the frequency domain sampling. The output is a set of equal bandwidth sub-band. The Psychological process of calculating the acoustic mode of sub-band signal mask ratio (SMR) would facilitate the decision of each sub-band signal and it's used for encoding. In the signal allocation process, the affordable noise could be decided by the filter bank output and the SMR. The higher the amount of the noise, the lower of the sub-band assigned signal bits. In the digital format module, the sub-band frequency of sampling and the signal would be combined to form an audio frame includes a signal section.

(B) MPEG-4

MPEG (Motion Picture Experts Group) develop the MPEG-4 standard with the main idea of the virtual world of multimedia data for presentation. The main object of MPEG-4 is to object the video / audio files. However, the description, storage, transmission and the integration of these objects in ways are the additional features but these features of MPEG-1 and MPEG-2 are not available. MPEG-4 is considered as the ideal standard multimedia applications. The international standard organization has formulated the specifications of Simple Profile, Advanced Real Time Simple Profile in 2002. The different profile and level could be applied differently such as the mobile phone, PDA and other portable devices suitable for the Simple Profile standard. The video phone, video conference, and remote monitoring applications such as real-time encoding is suitable for Advanced Real Time Simple Profile specification. MPEG-4 technology is to deliver the original purpose of execution on the image transfer by the narrow band, so that it could make the video maintain at 176x144 pixels as the low pixel level and the transmission rate of 48~64Kbits per second. In addition, MPEG-4 could also provide a distance objective at the lower transmission rate under the control of instance object manipulation. According to the different rules, MPEG-4 could work by the conditions such as the direct handling background, moving image and other video components. More important, MPEG-4 could be set with the standard of scalability which refer to an image compression process and could meet many goals of the bit flow for the receiver processing power. MPEG-4 is consisted of a set of applications including the shape coding, motion estimation, compensation, image texture coding, error resilience, spate coding and scalability. If the supplier has no intention to implement the standard, MPEG-4 also could offer a number of well defined subset of conformance points which could help the manufactures optimize the system cost without any impact. Combing these capabilities, the designers could bring the good flexibility and interoperability as that they can produce the high-quality digital video graphics and support the variety multimedia applications.

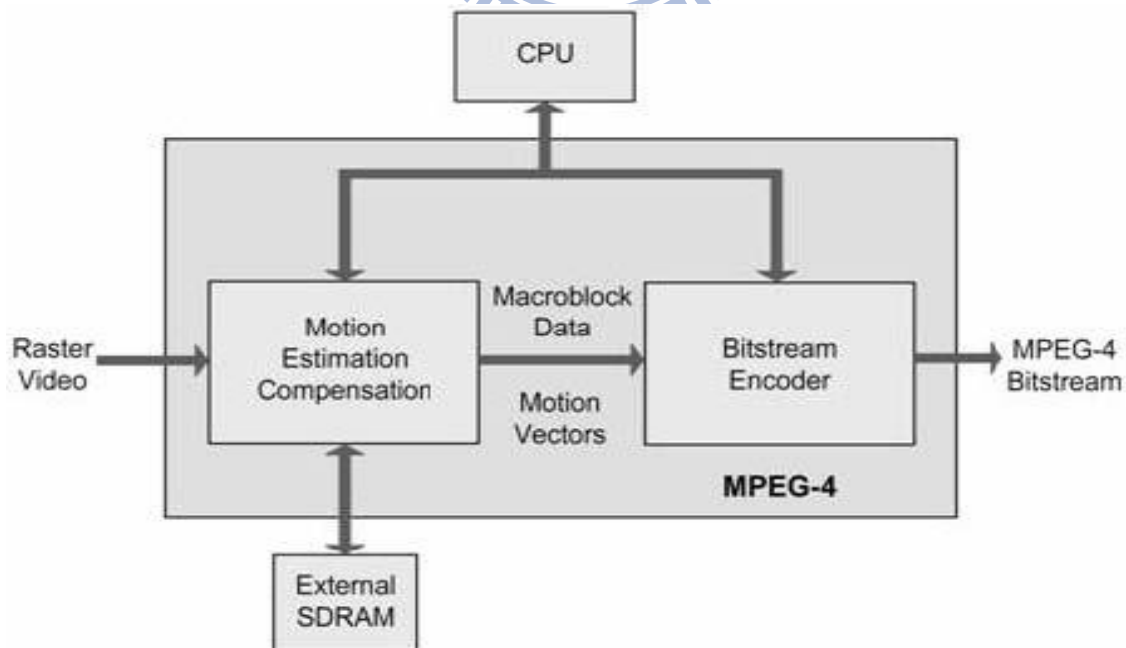


Figure 4-3 MPEG4 image processing techniques

Source: <http://www.cast-inc.com/cores/mpeg4-mce/index.shtml>

MPEG-4 standard is composed by a set of tools which could support the different types. The overall main function could be divided to several features as the following categories:

- Compression efficiency: MPEG-4 is based on the previous criteria but could provide high coding efficiency and increase the acceptance level on the market.
- Content-based interactivity: The video as objects rather than video frame, you can make the content-based applications to translate the concrete implementation. Just have to provide more highly efficient object representation, the object manipulation, bit streaming editor and object-oriented extension. They are able to bring the interactive content to higher levels.
- It is suitable for all transmission media: even if an error occurs in the environment easily, MPEG-4 is also very robust and reliable. It could be used for a variety transmission media including the mobile networks and the cable connection circuit entities.
- MPEG-4 visual scene may contain one or more video object, each video object would move through time and space data including their shape, movement and texture. Some applications may not be able to use all MPEG-4 tools, there would be due to the additional processing burden associated to video objects on the rectangular frame (Rectangular Frame) into the parallel coding. It is also a variety objects in the shape of the simplest (degenerate cases). MPEG-4 visual bit streaming provides a hierarchical description of the visual scene. Start code is a special coded value; they can access the bit streaming of each layer hierarchy.
- Visual object sequence (Visual Object Sequence, VS): it is a complete MPEG-4 scene, may contain any 2D or 3D objects of natural or synthetic enhancement layer.
- Video Object: Video Object would link to the scene of a 2D element, rectangular frame is the simplest cases; it could be any shape of the object corresponding to the scene of an object.
- Video Object Layer: Video Object Layer could be divided to extended and non-scalable code mode, the actual encoding mode represented by the video object layer of the application would support the scalable coding.
- Group of Video Object Planes: GOV is the optional feature which would provide the independent video object plane to be encoded points, so that the bit streaming would join the number of random access points.
- Video Object Planes: VOP is a sampled object which could be an independent sample with motion compensation value conduct sampling. Rectangle could represent the traditional video frame.

There are many ways to use the video object plane. The most common approach is to let the video objects containing the encoding video data. Each video object plane would include multiple macro blocks (macroblock) and there would be four 8x8 luminance block and two 8x8 color level blocks (chrominance block).

(C) H.264

H. 264 has the diverse application markets including the broadcasting service providers, cable, satellite, telecom operators on the H.264 compression ability. In the audio-visual applications, the DVD recorders/PVRs industry also intends to use the H.264 technology with more compressed image bits on the disc. The DVD forum includes H.264 which is conducted in the high resolution media with high-performance compression feasibility by Red-Ray. In the DTV application, the industry is actively discussing with H.264 with the transfer digital terrestrial TV signals on mobile devices, especially the high quality digital content industry. In Japan, Korea, the vendors look forward the boosted on the market in 2005. In Europe, the industry is generally optimistic about H.264 for DVB-X technology to conduct the possible compression as the expectation of H.264. Since May in 2003, after the ITU approved the formal technology, H.264 is another new image compression standard follows the MPEG-4. The reason would receive much attention,

mainly in its degree of compression and performance, under the existing MPEG-4 IC with different MPEG-4, H.264. The H.264 contains a built-in internet agreement adaptation layer. So, H.264 protocol could be mapped to any fixed IP, wireless IP, storage or broadcast network with some cable or satellite (radio/TV). The effectively MPEG-4 compared to MPEG-2 would be more insufficient bandwidth. More important is that H.264 could reside in the compatibility of MPEG-2 mainstream format. In addition, it has the function of the multiple reference frames and it would also contribute to the intermittent movement compression on the picture. The unique function of the “Intra-estimation” could also be looking for temporary access through the adjoining blocks of approaches pixels for evaluating the data block. Furthermore, it’s only for the actual block and prediction block among the different department conduct code. The remaining space for a flat background of the image processing also has a great benefit. As H.264 may be a system applicable to all types of public technology and allowing the consumers on mobile phone, portable camera, recordable DVD, home servers and PC multimedia files between the exchanges. But the H.264 IPlicensing issues are not solved.

(D) MPEG-7

MPEG-7 is mainly an interface tool of the multimedia content. The purpose of multimedia information for the different descriptors to establish the order on the MPEG standard is to make more specific designation and description of extraction image. Therefore, as the consideration of the MPEG-7 position, it is mainly as a database for video but not as the compression tools. It is not at the competitive position with MPEG-2, MPEG-4 and H.264 but just as a tool without the specific chip. Unlike the standard of MPEG-1 and MPEG-4 compression and decompression, the main objective of MPEG-7 is to provide a set of core information technology as the audiovisual data content standards. The standard of MPEG-7 does not include the data for the content description data or for searching and processing. Motion Picture Experts Group decided to focus on the description of the data format while the production of the suitable software system is reserved for those who use this technology. Thus MPEG-7 does not rely on other standards of MPEG, even though the digital files. MPEG-7 provided the comprehensive description tools. Whether it would be the catalogue level such as the title, semantic level as who, what, when, where or the structural level as spatio-temporal region, color histogram, timbre, texture; they would develop the new multimedia applications. MPEG-7 could be applied to the digital libraries, multimedia guide services, broadcast media selection, multimedia editing etc. The specification has been formed in July 2001 and attracted the domestic and foreign companies to enter the scope. The advantage of MPEG-7 is that it allows the intent of the audio-visual content with the common associates from the future. MPEG-7 would play a role of accessories of the films and TV programs because it can be computerized the logic processing. For example, when the media producer is looking for the specified level of public video resolution samples, he can adopt the MPEG-7 to execute the online database. Thus it could quickly be found out what he wants. MPEG-7 might also be the base of the accessibility technology such as the sub-theme. The visual effects the scene description might be useful under the circumstances although the mass of the detailed description has not optimized yet.

(E) MPEG-21

MPEG-21 agencies were organized in 2000. The main objective is to develop a common media framework in order to let the PC, mobile phone, PDA, TV and other 3C products could communicate with each other. There are many companies would enhance the standard features in the coming years. MPEG-21 would become the commercial applications from the forward-looking specifications. Theoretically, the multimedia framework would address the following issues:

1. Transmission network
2. Service quality and flexibility
3. Described on the content quality
4. Artistic content quality
5. Easy to use the services and equipment
6. The interoperability of the physical media format
7. The pay/subscription
8. Decoding and rendering on the multi-platform
9. Search, selection, position, content retrieval and storage
10. Consumer content publish
11. The consumers right
12. Consumer privacy

Unlike the other standards of MPEG, MPEG-21 experts group view the consumer demand side of the comprehensive set, not only described from the technical details of the compression. A new generation of the compression technology of MPEG-4/H.264 with the technical specifications developed into the commercialization stage in 2004. MPEG-4 was the all DVD/DVR solution for all chip vendors. In response to the consumer demand of DSC/Camcorder and other mobile entertainment devices, the recoding time is expanded to the capacity of the multimedia memory storage. Therefore, MPEG-4 replaces the JPEG compression technology and creates another application markets. However, due to the better video quality, the transmission rate must be at the expense of some cost. How the video quality and transmission rate would obtain an acceptable balance and slao be a creator of digital imaging technology would be the current problem. Overall, MPEG-4 is on going by the rapid commercialization and actively devoted to the improvement of the compression rate, performance and stability by the smart phone and the DVR/DSC/Camcorder. We can see the potential force would couple with continued spread of digital home boom. The future might be focus on the wireless multimedia home gateway market through the WLAN and MPEG-4 compressed content. H.264 application might bein the key position of HD DVD/DTV in the next few years, and video conferencing, network phone through the network transmission of multimedia content via mobile devices.

(F) Other Software Compression Standard

In addition to the hardware compression standard, the launch of Windows Media Video 9 Series Platform (referred to WMV9, as 1920x1080 pixelworks quality on HDTV). It could reduce the noise and delay of the characteristics, functional properties. Because of Microsoft's dominance, there would be more market share of this scope. Therefore, the MPEG-2/MPEG-4/H.264 standard would be a competitive standard. Second, RealNetworks launched RealPlayer, Nancy compression software technology would become the compete situation of WMV9. RealNetworks and Apple have been into the online music shop and the vendors would help them to expand the strategic alliance.

4.2 Other Related Digital Multimedia

There are 5 channels of entertainment and information transfer: broadband internet, satellite transmission, packaged media and multimedia features. As the rapid development of communication technology in recent years, in the extensive application scope, there would be more digital image creation applications under the broadband network environment and there would be more areas of moile video applications. The content interactive multimedia could be combined with images, sound and data. Software development could be used for video animation by the programming language. It could be loaded on the different hardware devices and presenting the interactive multimedia content. As the mobile phone basedband data would be processed by more and more digital multimedia applications with the required specification to achieve the best results and

performance. As the below shown, the mobile phone function would be changed in the multimedia trend. If the consumer electronics industry would form an alliance with the audio-visual entertainment industry, they can integrate the technology and humanities, science and art. Especially in multimedia applications would show the effectiveness on consumer electronic products.

The trend of multimedia on mobile phone goes from the 4096 color gradation to the current 262k color gradation. The camera module made by 110k pixel CMOS/CCD camera module and now it become 1 million pixel CMOS/CCD camera module. The music form support MP3. In addition to the development of hardware technology, the digital compression and audio files could be converted into various digital content files for the mobile communication. Especially in the increasingly audio and video content, the capable of compressing and streaming using optimum transmission technology could achieve good quality. The audio-visual development on mobile phones could increase the audio and video capability. These are developed to Java and Javascript. The structure of the image is very similar with C++, but compared to C++, it is no longer supporting the overloading, the multi-level inheritance, the extensive automatic coercion and the basic interpretation. Multi-level inheritance and extensive automatic coercion would support some interesting basic interpretation. Since it is compiled by the middle code, then it is loaded by audio and video capabilities for audio-visual services related to the introduction. Video phone application is programming language and its related technologies are JAVA, MMS, Video clips, real-time transmission.

4.2.1 JAVA

Java is the hardware/software interactive programming language which is created by Sun Microsystems on the internet. In 1991, James Gosling and Bill Joy in Sun tried to develop an interactive software system on television and other household applications. This application is a small but reliable system. It could transfer and it is good for real-time network distribution environment. The process encountered many difficult problems and they aware the need to solve the problem. Ultimately, the successful development of the software called Oak which herein Java prototype and did not cause attention. In 1994, as the development of internet, Java became a popular language on internet. To create the dynamic images page, the program size is too large and it is not suitable for the animated web production. JAVA is used originally by IT and it is an open application software platform. In order to develop another portable version, it is developed to J2ME (Java 2 Micro Edition). JAVA application now includes games, stock software, maps and notebook. The most optimistic is the games and JAVA game is divided into built-in games, download games and multi-platform-based games. It integrates other features and advantages of the language but also avoid the inadequacies. Its main features are as follows:

1. **Simplicity:**

Java is created with the lesser features and has increased the memory function of automatic garbage collection, complex features could be omitted and the practical function makes the reliable program. Another aspect of the simplicity is very small Java systems; the 40KB could add the basic standard libraries and thread support only 175KB.

2. **Independent Platform**

This is Java's validation and it is different machine code execution. It is "Java Virtual Machine". Mask the platform environment feature requests, as long as it could support the Java virtual machine, you can conduct a variety of Java programming operation.

3. **The legal system could be executed and Java has a sophisticated synchronization primitives to ensure the order and make it suitable environment for the development.**

4. In the type of library is free to add new methods and establish the basis of public technology recognition technology. Indicator would change the application semantics, power, explanation, portability technology and it would be the series of JAVA software.
5. Multithreading
The multi-threaded machine data is through the use of multiple threads,. Programmers could use the different threads and complete the particular behavior rather than the global event loop mechanism and achieve the network interactive behavior.
6. Security
Java is not able to go the previous data or private data structure. Thus, it could be constructed out of virus-free, secure system. In addition to these main features of Java language, there is high-performance of Java. Java technology also provides a mean to establish the Web services, XML messaging, a large number of network agreement, toolbox and Java Web application.

4.2.2 J2ME

J2ME (Java 2 Platform, Standard Edition) and Java 2 Platform, Enterprise Edition. Java 2 Platform, Micro Edition includes the main components device configuration. The device configuration limits the connecting line, mobile information device profile and enables the Java solution to meet the consumer embedded device market. J2ME is divided into personal mobile devices as CLDC (Connected, Limited Device Configuration) , it is continuous improvement in human-machine interface with little memory mobile phone, PDA. The sharing of fixed device CDC (Connected Device Configuration) application platform is like the digital television, car navigation with entertainment equipment and video phone. The two inherited configuration features of the J2SE and language features are defined. The virtual machine and support design patterns of J2ME have provided a HTTP, TCP server connected line with information exchange and access. In addition, J2ME application developed through GPRS or wireless network directly to the phone side and the execution time, it is no need to execute by the network. J2ME also has many features such as: It could be execute the Java virtual machine on the phone and would automatically carry the memory management, facilitate application type library could not be the convenience as that we could develop application quickly.

4.2.3 MMS

Multimedia Messaging Service is an open, standard wireless application software agreement on mobile phone and portable devices. The traditional SMS service is the synchronized multimedia integration language equipment from the digital media content production. It is the reason why many mobile phone manufacturers like Nokia, Sony Ericsson and Motorola like the application.

MMS would combine the text, pictures, sound and video services. MMS could send the multimedia content including a variety of color pictures, animation and sound. If the transmission speed of the network is high enough, it could also send the video clips. MMS could send the content between different mobile phones by different systems. Many MMS users could send MMS freely. When the text messages with text and picture format are sent, it could allow you to set the editing and integrated photos. Transmission in GPRS and 3G environment as MMS presentation files on personal computers is improving. The 3GPP and WAP forum could set the open standards and provide the cross-platform messaging service. In addition to the mobile communication or digital image, it could also apply to the MMS. It is able to combine the e-commerce mechanism to facilitate the mobile entertainment and communications.

4.2.4 WAP

WAP is primarily for digital data and mobile phones with the wireless terminal devices and provide the communication business services. A WAP system has two of the most important component language used WML which is similar to the HTML programming language in the personal computer browser. Another one is the WAP Gateway/Proxy, responsible for the web page source code. WAP language is used WML. Wireless Mark on the internet is used WAP. Through the WML pages by the content, it could deliver the enterprise content to the WAP mobile phone devices. Namely, you could use WAP phone to read the web content to write WML.

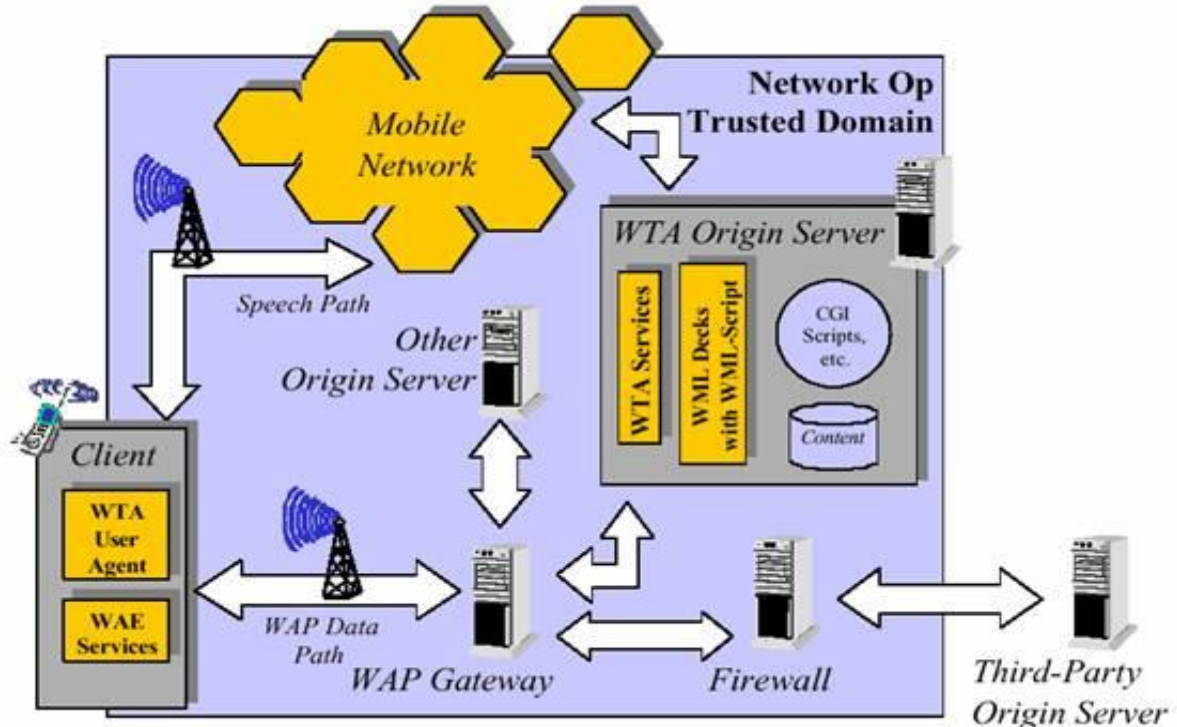


Figure 4-4 WAP transmission Chart

Source: <http://playstation2.idv.tw/iacolumns/j10000.4.html>

The phone built-in web browser is the source code generated by a compiled binary bit file as Binary WML which is not written according to WML format. So we need intermediary software to help us to do the conversion work which is what we call the WAP Gateway / Proxy. Mobile internet could only use the phone built-in browser. If the user does not select the pre-set gateway, the mobile phone could not access the internet. The current network computing is not good enough as the computing. It could be built-in the instant text of WML and compiled into a small screen on the cell phone. Therefore, it needs the WAP forum web site and the gateway. The gateway via mobile phone could be linked to the phone web site. It would help the phone users to browse the website and update the gateway WML pages. The gateway received WML page and it would be able to compile the content into a rapid execution level binary file. As the WAP standard is established, the world mobile phone manufacturers and the system providers could have certain rules to follow. Therefore, it attracted many of the companies to join. The WAP specification provides the following advantages as follows:

- 1. The standard of WAP could be compatible with Internet and WWW**

This makes the information on the internet could also be captured and used on the WAP mobile phone. When the users could not stay at a fixed location, this feature could be convenient to the wireless WWW information.

2. WAP is an open standard specification

Before 1997, Sony Ericsson and Motorola have their own wireless application protocol. Since it is not compatible with each other, thus the speed of the application development would be slow down. Nowaday, the WAP standard could be adopted by any manufacturers. This property would be a natural incentive to lead to the new services quickly and be imprted the mobile communication market.

3. WAP specification has nothing to do with the air agreement

No matter the WAP mobile phone is used by the mobile communication system for the D-AMPA 、GSM 、CDMA 、FLEX or CDPD, it could capture the service and information they need. WAP specification has nothing to do with the mobile phone. Irrespective of the PDA users or the GSM users, the data could be gotten by pull or push from the database.

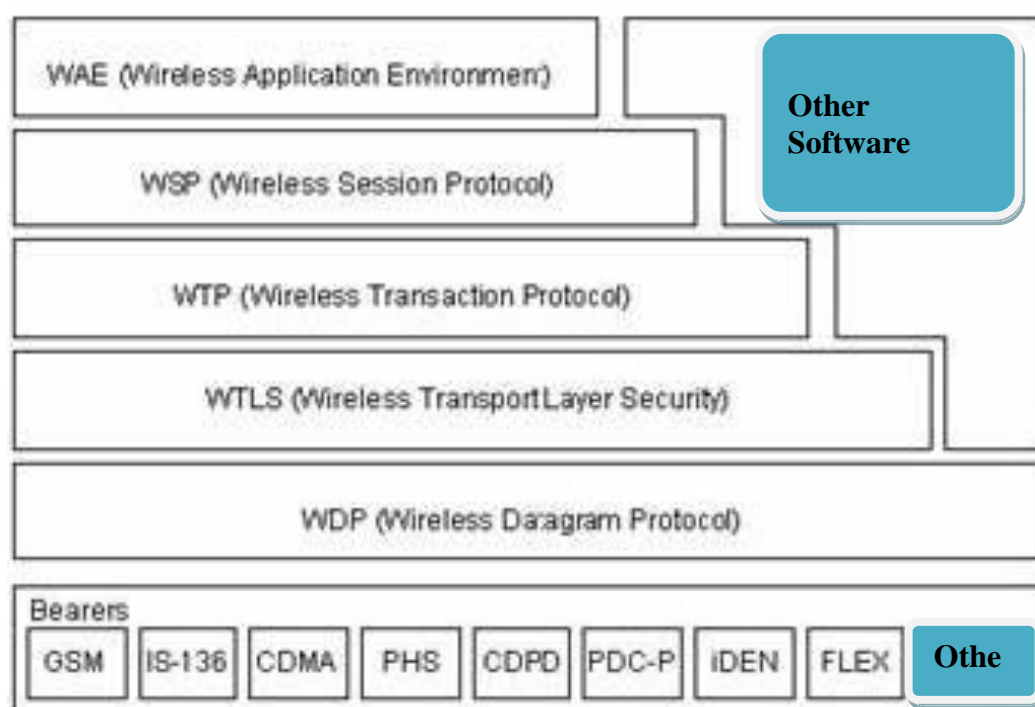


Figure 4-5 WAP architecture components

Source: <http://playstation2.idv.tw/iacolumns/jl000004.html>

According to the network architecture of WAP Forum, WAP agreement levels are divided into WAE 、WSP 、WTP 、WTLS 、WDP and the bottom data services (bearers). From the hierarchical case, we can find the GSM or GPRS systems could only exist in the data service. The top five levels are application environment, the conference agreement, transaction agreements, security and data transmission. This architecture in general frequently in various types of network agreements includes the most notably TCP/IP network architecture. These architecture follow the ISO organization in 1984 and proposed the ISO/OSI seven layer protocol standard. Because the WAP application is only a protocol, the communication through the system is not directly related on the WAP services. We caould use WAP services on GSM system and make the progress in the GPRS system or PHS WAP service. Even the development of general wireless communication system such as the CDMA or WCDMA, the user could use WAP services. Even we could usually use the TCP/IP network by the WAP service in the future.

4.2.5 Video and Real-time Audio

Video transmission requires a large amount of bandwidth, the 2.5G mobile phone system with limited bandwidth. But at the 3G age, the expansion of the bandwidth could open the real-time video transmission. Real-time transmission could be considered as the 30 pictures per second transmission which could select the good video compression format and would achieve the same audio and video features. Trend in the early stage is the development of multimedia. The video and audio transmission and the data processing would fall on the digital signal processor as the video is continuously improving the specification. In order to process the relevant chord bell sound, the multi-order melody IC is adopted in the design. In order to handle the camera module the image processor is applied on the design also. Based on the retail components, it becomes the higher application processor in recent years. For the basic cell phone signal processor, it is responsible for the audio visual aspects of data processing by the application. The Video have different levels of recording quality and specifications.

Table 4-2 Dynamic images

Analog	Digital	Compress	Web Streaming Media
Betacam D1 D2 S-VHS Hi-8 VHS V8 Others	DVCam DV Others	Cinepak DV Animation MPG1 MPG2 Others	Realmedia streaming QuickTime streaming Others

Source: National Science Council Information Service Office (MIC)

The ultimate video performance is high quality image and it is more attractive to the users. On the other hand, it must reduce the file capacity to keep the same quality; therefore there is the emergence of DVD. In addition, the reduced capacity of the file would be more convenient to the spread of the network. The quality of betacam is the best and the quality of DVCAM is the best in digital video. Because of the advances in computer technology, the development of all kind storage medias such as DVD, VCD would be more on the market.

4.3 New Image Processing Technology of FrameFree

Pixel is the basic unit of digital graphics which is compsed by the image and elements. In handlingthe dynamic screen, the time sampling and the picture would come from the cumulative and rapid continuous play, the action produce the visual flow smoothly. Amana Company is developed by the Science council of Japan for 18 years. The original digital image display would be changed from the horizontal plane to vertical eye momement as the dynamic changed. Then it would depend on the visual characteristics of temporary services so that the perfect image would be made. The pixel requires a large memory capacity with more pixels bits. The agreement also requires the image-based software or hardware decompression engine. It would consume the image processing chip. In addition, the continuous improvement is based on the simple image-based terminal software. It must compromise the image decompression processing speed and the processor clock speed rate. Based on the original language of the agreement, the high density computing would need the execution ordered by the image. The graphic engine is the most optimal execution of the agreement based on the key elements of the original language. Compared to the block form of MPEG-4, FrameFree is moved by the pisel form. Therefore, it could be present by the smooth state. Usually, only the one pixel appears in

the screen graphics. The graphic screen may appear the spatial aliasing. If the display designed for the “anti-aliasing phenomenon”, the processing capability would take too much. Especially MPEG-4 occurs the edge dentate would fuzzy the block difftortion. FrameFree could be maintained in a dynamic image integrity level. The number of bits would affect the degree of the realistic image. It could be applied with different types and show the high quality digital image.

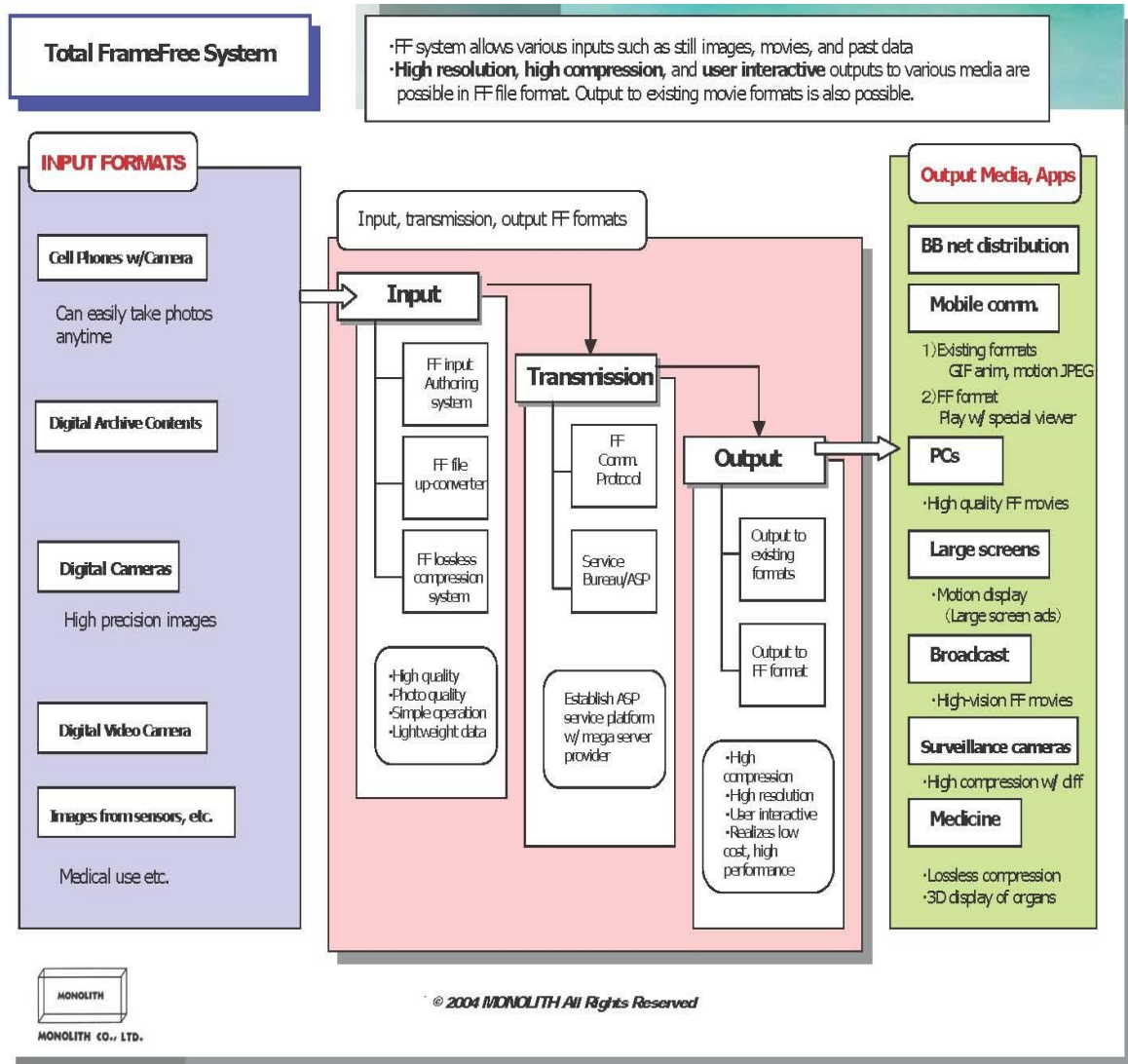


Figure 4-6 The flow chart of FrameFree technical operation
Source: Amana

Customers can provide a few images; FrameFree would combine the elements into a dynamic form. For example, customers could provide three video pictures. FrameFree could apply the computing mechanism and made the non-consecutive images into a continuous dynamic video. There would be Zoom in/out, pre-forward, rewind functions. The file size of FrameFree production could be smaller than sound file as 1/30 of MPEG-4 compressed files. The compression format is like the capacity of VCD and the quality of DVD. Irrespective of the transmission, storage, they all have the advantage of low cost, high-level differentiation and high-quality analysis. In addition to the general image compression, FrameFree technology could integrate both voice and image file compression. It would save more digital storage space with video and voice processing functions. The input form could be from cell phone’s camera, digital camera and others. It

could produce by FrameFree file conversion feature by a variety of media tools such as mobile, personal computers, large screen, billboards, etc. Communication, advertising, media, mobile business and even medical related industries are the main applications of FrameFree.



5. Import Digital Media Creation Platform

5.1 The Introduction of Digital Video Production Company: Amana

Amana is a Japanese company which is focus on the high-quality video material creation and image processing. Amana signed the contracts with well-known photographers. They specialize in the digital image creation works from the artists and maintain the digital copyright with good visual content database. In addition to the general application of multimedia technology, Amana got the technology license from the Japan Branch and acquire the new image processing technology FrameFree. They develop the new image processing technology. They also use new processing technology and create all kinds of digital image. Amana set up an open mode of work station by Web Album + Blog: fotologue.jp is different from other general portal. They use the high-interactive Flash multimedia technology architecture, and deal with the data by XML. They display the image on the website. The digital image shows fluency quality. In addition to the browsing interface, the digital art show would be set into the data bank which combines the business operations and digital culture marketing.

Amana has the technology of 2D/3DCG+ FrameFree (Photo Motion) and a large amount of digital content database. They allow the customers to create the convenient, rapid creation with high-quality under lower cost. Based on the budgetary and the plans, the studio in China could achieve better intellectual property with good process control services. The service would be accepted as the standards of services. In the coming 5 years, the protection of digital property rights on the value chain is the most important task as asset management. If it is able to join the digital media creation platform as the member, the member could get the digital rights management protection from the current digital copy right piracy. Through the complete digital intellectual property management and quality planning, it is possible to maximize the economic benefits.

5.2 Amana: The Advanced Digital Service Platform

5.2.1 Advanced Digital Service Platform

The Digital Media Company needs to expand and use the relevant knowledge and technical resources. To establish the database as the access to creative and technical exchange on digital content creation platform would improve the efficiency. The digital library service platform would provide the digital media as basic photographic images and the image which is made by the members. The photography and creative image files by the members could converse to the digital images and be stored in the database. They could contract the creative artists and provide the stable pictures in the database. Finally, they could present the digital image by 2D, animation, web browsing and other media forms based on the customer needs. Then they could set up the digital media database to conduct the digital asset management and virtual management to provide the media services. Due to the progress of the digital image technology is improved. Digital content creators could use Java 、 J2ME 、 H.264 、 MPEG and FrameFree compression technology. Each function could be applied for different services by different communication channels in order to optimize the quality of the image processing and dynamic effects. The investors might think that the digital asset management would increase the production cost. But in fact, if there is no set of the work flow management, the digital media workers create their own interest and lack of the precise data of the management capability. It would make the result in the loss of industrial production efficiency. SOHO studio or art group could also work efficiency by the digital platform. Amana set up the digital production platform to provide the environment more comfortably and allow the media workers to face the emergency pain. The concept of the digital service platform is as shown:

Cost + Speed + Quality + Digital Asset Management Unique & Effective Visual Creative Work Flow



Figure 5-1 Digital Services Platform
Source: Amana

5.2.2 The Development of The Advanced Digital Service Platform

Because the digital technology is not compatible with the integrated software on the digital platform; to be compatible with the data in the database to conduct the operations may make more quality and low cost services. It also could break the geographical constraints and cooperate with the national creators. By controlling the national dynamic digital content creation trend, it could make the international digital content better. The chairman of Sony mentioned the importance of the “quality”, this development trend and application are the same as the industry pulse. The operation of the cross-media platform is a model of the Paradise shift of the knowledge. The existing multimedia services and human capital has reached a certain level. However, the professionals are involved in their professional work. They have no interests on the integration of the operation and concepts. To develop the integrated industry platform and combine the digital media creation, capital, digital interactive assets are the demand of the trend. The long-term purpose of digital content creation platform is to choose the best place and establish the digital media center. If it is possible, to combine with the digital media company in China would be good in the Chinese market. It would make more international business partners and achieve more large market share. According to the agenda of WTO, China would open the retail market in 2004 and open the service industry in 2005. Under the trend of the digital TV broadcast and Olympic competition, The foreign enterprises would increase the advertising budget and increase the sales. Due to the increase of the digital media demand, it is necessary to establish and maintain the good relationship of the cooperation. The study of digital service studio service platform (Digital Studio Service Site) would adopt the correct post-digital media flow structure, discussion forums, lists and budget mechanism of the exchange platform. They would train the human resources and recruitment the digital industry to support the rapidly growing market in Asia in the next 10 years.

5.2.3 Visual Solution Experts & Know-How

Amanda Company has 80 professional digital art producers and the professional knowledge, the virtual creation program and digital media asset management capability. The platform could produce the image by the virtual network and achieve the quality, cost control and make the customers to get the full services. The photographers and creative

teams of Amana Company could work together and accumulated the image database with other digital video production company. The material is stored in digital content creation platform and for the derived production. In addition to show the content of the service, creative images and video ads, the skilled digital content creation artists could make more digital image and the color management. The standard color is the primary barrier of the corporate identity. The corporate brand is conveyed by words or symbols over the past years. Until recent years, the industrial design and color application become popular. BenQ adopted the “purple” as the interpretation of “enjoy happiness and technology” for their corporate image colors. Apple i-Mac adopted the “white metal” for female consumers and is popular on Japan market. The corporate image adopted by the communication channels become as a trend. Therefore, in addition to the digital image creation like games and computer animation; the digital video, digital asset management and digital color management could be commissioned for the customers implementing the project cost control, the quality control and the intellectual property protection. They could develop the digital multimedia application by the customer demand. The virtual project delivery system is as shown:

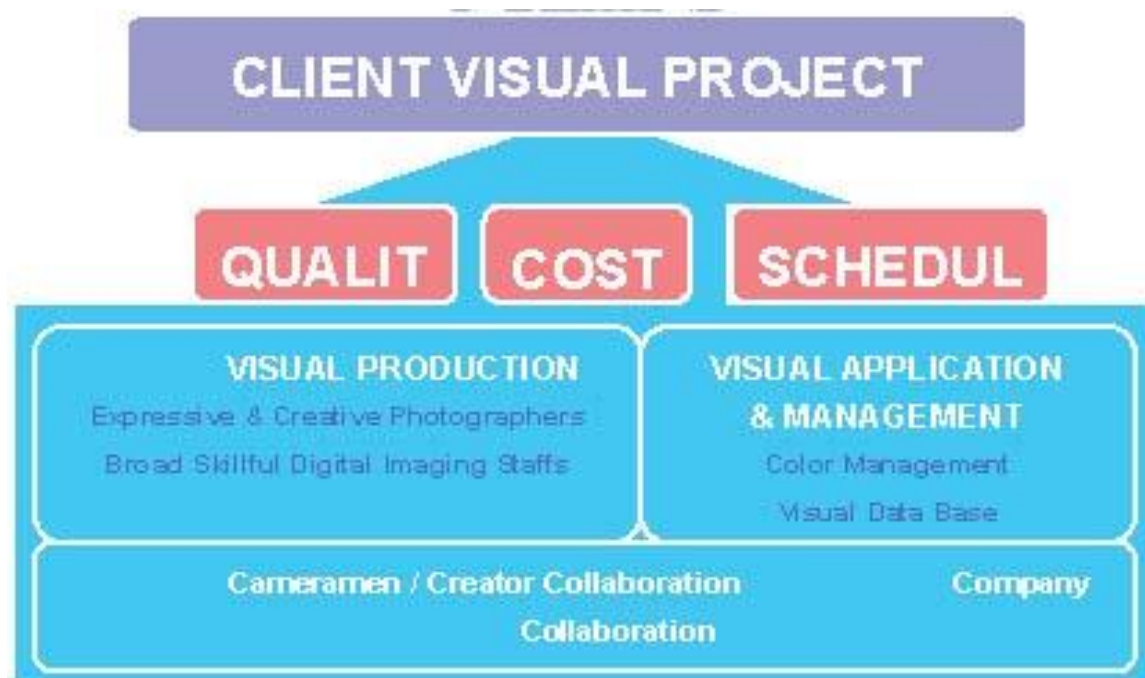


Figure 5-2 Visual Project Service
Source: Amana

After building up the multimedia digital content creation platform for system level images, the functions could also help the well-known brands to do the image package. The images for the corporate branding management are selected from the huge image database and made by the digital design artist. Through the digital art to express the corporate culture, it could maintain the unified corporate image and demonstrate its consumers. Therefore, it includes the digital video production and application management with all digital content creation services. In the entire production process, Amana Company conduct the completed digital video with high-quality, low cost in accordance with the most advanced 3D technology. The whole value chain of the digital content creation platform is integrated through the digital media applications. It could also help the beneficial relations with the whole industry.

5.3 The Features and Services of Digital Media Creation Platform

Not only the image display quality is related to the visual vision, but also involved with other visual experience. The whole part is more important than the overall combination. Therefore, the high resolution of the digital image would be only one part of the all quality levels. It is more important to consider the human factors and the behavior factors. Then the image could be designed by digital technology. Coase theory mentioned that the causes of the market inefficient are complex. The companies of different geographical locations appear constantly. In the digital life, the “information on demand” increases a lot. The consumers could operate in accordance with the time to conduct the digital audio and video information. There would be 6 types of basic transaction costs: Search costs, Information costs, Agreement costs, Decision costs, Monitoring costs and Enforcement costs. When the market becomes more efficient, the large scale and complex enterprise organization is not economic. Because the transaction costs could not eliminate, the market becomes more complex. The enterprises are responsible for manufacturing and trafficking. To reduce the transaction costs, many goods and services are made by duplicate activities and complex composition. The emergence of internet makes the market efficiency. It rewrites the rules and affect the industrial competition mode. The digital content and technical development of multimedia applications could be applied in e-commerce. Art has become a new competitive. The related design industries increased as the application ranges. Amana Company completed the construction of digital media service platform. It could be used in print ads, dynamic CF, MV, computer animation synthesis and film media production. The production time could reduce 1/12 of the current industry time and reduce 1/8 cost of the current production. The major technology and equipment of Amana Company are as the list:

- (1) Digital Creative Studio Service
- (2) Digital 3D+CG/PP Process Service
- (3) ECU, E-Charging Mechanism

Whether it would be hardware or software, the color, the overall beauty and style are very important. Digital content creation could be designed for various products and corporate image. The flash content could be modified and beautified by the digital technology. The flash content could be modified and beautified by the digital technology. It could apply the internet to provide the platform as the quick access for the content and the user interface system. Depending on the number of digital compression technology, the digital content creation platform could manage the creative product patent and take the internet security, the voice switching and video compression. Through the internet protocol transmission, the enterprise could trade the scheme and establish the mechanism. The reduction level and the digital content creation value chain could integrate the electronic information industry in China market and make it more effective.

5.3.1 Digital Creative Studio Service

The 24 professional interior photographers of Amana Company could create the digital video for customer demand. They could use the equipment to conduct the digital images by Kitchen Studio、Bird View Pit、Photo Vector Expansion & White Horizontal Wall Studio、Visual Direct System. Another 3000 contracted artists from US, Europe and Japan as the world-class creative elements in the data library. They could conduct the online news, magazines and other media. Compared with Apple's iPDS, the digital content platform could only share and download music by the online service. However, the MP3 piracy is serious in Taiwan and China. Therefore, the main operation of the trend would be the software, music, and service delivery. The digital content platform is established by Amana Company. The studio with the internal production team could conduct the innovative media products and the external authorization media products. Also, there would be the powerful digital media production hardware to create the lowest

cost and highest efficiency digital content creation platform. This is the biggest advantage of the digital media platform.



Figure 5-3 Digital Creative Studio Service
Source: Amana

5.3.2 Digital 3D+CG/PP Process Service

The 3D+CG/PP of Amana and other 3D technology could help the customers to achieve the required digital stereo audio artistic products with large-scale digital printing process. This sector could make 73 million digital video content products. The global management of the digital intellectual property rights could operate by the e-commerce functions of digital media creation platform. The customers could download the required digital video content from the membership site. In addition, the association of the professional artists could provide the global management of intellectual property rights. Protecting the digital content susceptible could be helpful for the copyright piracy and infringement issues. That would help the digital content creators to help their due rewards and the integrity of the digital creations.

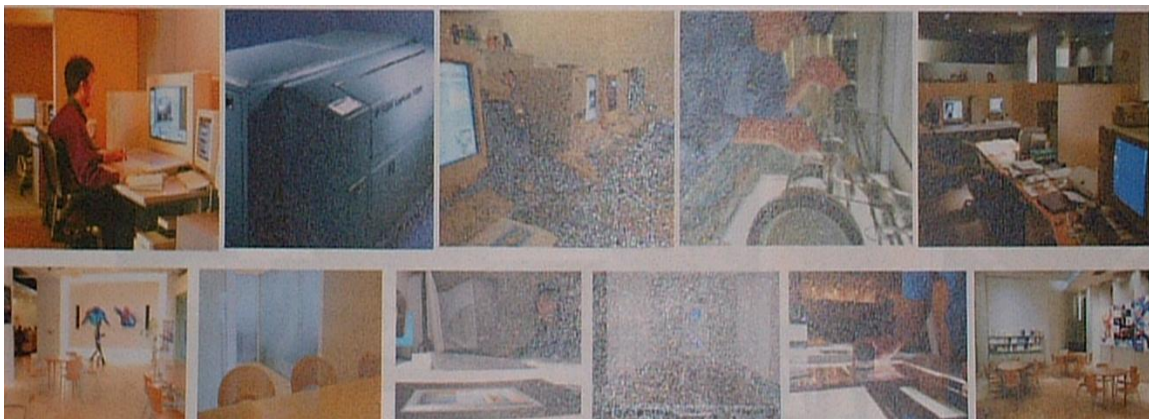


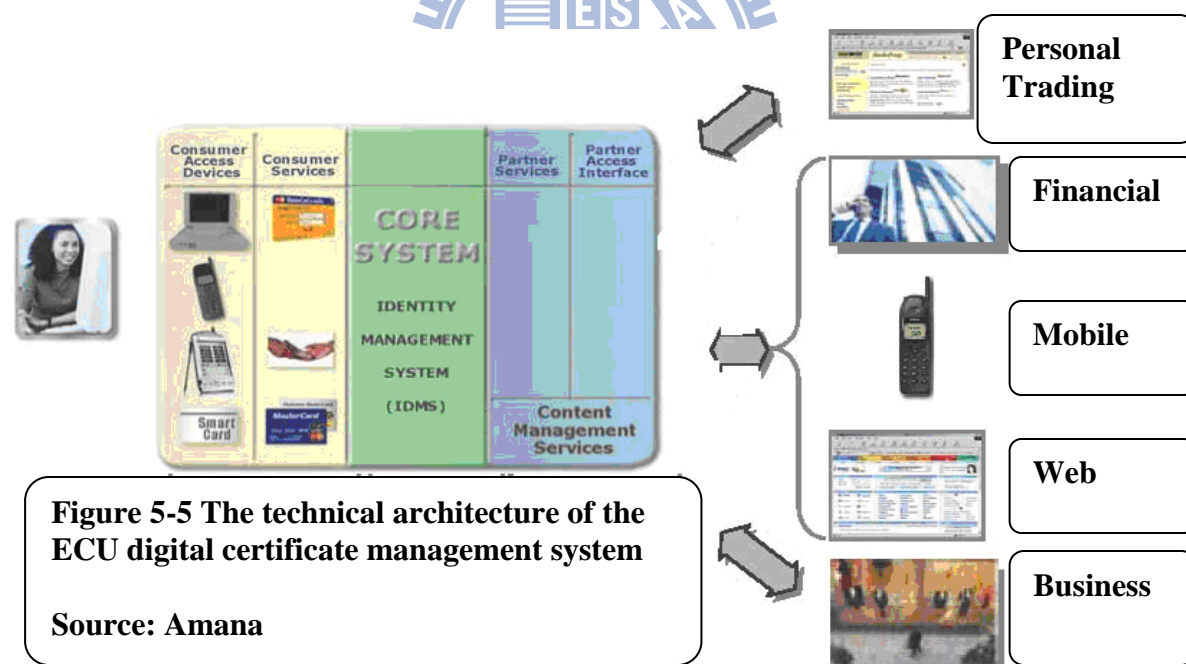
Figure 5-4 Digital 3D+CG/PP Process Service
Source: Amana

After the shadow of the digital media bubble, the digital content creation platform could control the media properly. The market condition is matured. In the past, the biggest problem could be the charges of the internet content services. The quantity of the content and the economic scale are not good enough. Therefore, the digital content providers would be very difficult to survive. The digital content provider would like to find the opportunities and make more market consumption. The cost of the content production is

fixed. Therefore, the content could achieve the same marginal effect. By large amount of communication channels, the receipts could achieve the effective results. By the Digital Creative Studio and Digital 3D+CG/PP Process Service, Amana Company could take over the China market with the digital content production system. As long as the customers could provide the material of the content, the story plot or the digital media creation, then they would be designed in the studio creation. Amana Company could use their own equipment, technology and all the creative talent to complete the flat, static or dynamic images. Whether the dynamic TV advertisements, LCD flat billboard advertisements, mobile digital video transmission, TV & PC Game animation, Internet audio and video content, effects production or computer animation, they belongs to the scope of the digital content creation platforms.

5.3.3 ECU: E-Charging Mechanism

In the digital communication transmission, the internet content providers and wireless communication could complete the structure of the payment mechanism in order to achieve the effective digital content value chain flow. According to the digital compression technology of digital media creation platform and the database system, the digital video content, exchange flow and transmission business should be completed with the payment system. Then the actions and the internet transmission cycle could be completed. The application of Amana's digital media technology is set up with the Electronic Commerce Unit for E-Commerce payment. And it would be linked via any network device, anywhere in the world. The operational objective is set for the creation of the electronic money circulation.



As the advances in the digital electronics and the digital storage database, FrameFree digital compression technology could achieve the effectiveness of security. ECU platform is to use the digital technology as the financial transaction service by mobile communication, games, automotive navigation, PDA and other personal communication system. The user message, P2P payment, virtual cards, smart cards, 3G mobile content by IDMS could be expanded in bank, business and government entry scope. Also the system could help the users to store the personal digital information by payment management mechanism, e-mail communication, and the transaction records and to provide the new services and information for consumers. ECU server is easy to apply by electronic money. In addition to the automatic password management, the consumers could select the

appropriate form of electronic media. It could record the current customer demand and the order content by the wireless communications. For the banking industry, through the technical architecture of digital media as the e-commerce intermediary mechanism ECU, the users could account the data by the user management system. There is no requirement of the complex paperwork and the monthly bills. The system could save the costs of the processing; increase the customer satisfaction; reduce the error degree and reject from the customers and balance the account for the users. For the consumers, the system could save the time. Since the users are not familiar with the Chinese electronic sites. There is no payment system or web site does not accept the U.S. dollars or other currency. So that the consumers could not perform the necessary internet and the digital content from wireless communication environment. The digital content platform is focus on the market-oriented development in Chinese regions. Besides Taiwan consumers, the Chinese area is not suitable for e-commerce trading practices. ECU, e-commerce platform could be fully compatible by the systems in the conduct currency conversion. The platform could integrate the Chinese market with European and American countries by the global flow of e-business. The digital compression technology for Chinese e-commerce site could make the substantial growth on the market.

The digital media creation platform is the base of the ECU payment framework as the digital information authentication system with the digital databases. The consumers or the joint ventures could enter the service by the computer, mobile phone, PDA, internet or other communication equipment. After the approval of the personal data, the user could enter the platform. For example, after download the digital image products, the user could get the personal account and access the digital platforms and the bank co-liaison directly. The transaction records and the account information could be accessed by the user, and the user could also download the software and complete the transfer transaction. Therefore, ECU trading services could be personal, corporate as B2B transactions between banks. The integrated communication transmission equipment could carry the digital audio and video products as the electronic commerce business activities. In the perfect arrangement and mechanism for trading under the constitution, the platform for digital media creation content would also be convenient to the consumers. The platform could expand the visual application and make the active business opportunities in digital audio and video transmission. The service is integrated as the personal financial transaction with variable import business customer service. The user could connect with the identification system through any network device and the cooperation could be made between the interface and the systems.

5.4 The Digital Media Business Model Platform

Amana provide the service includes the entire value chain of digital media production. The digital image capture (conducted by the Studio Production), the digital content processing, synthesis and compression by the FrameFree transmit images, and the digital media processing system are all the scope of the business areas. As the digital information technology is cultural globalization, the digital content could flow without borders. However, the China region is full of potential on digital application market. The digital content production in Taiwan would still maintain a certain level. As the integration of creative digital technology, human resources and capital, the digital creation service and the production could be based on the direction of the market. Beasuse the cultural industries by the digital media could not be restricted by the time and the space communication. Therefore, the most important is the dreative development of content. The digital content should be made with culture and entertainment. It would promote the digital image equipment and hardware technology and the thrust if electronic information industry. As the market trend and the good digital tehcnology of Amanda Company, the estimation of digital media creation platform would be as follows.

5.4.1 Establish the Digital Media Exchange Platform

Amana Company would set up the exchange of digital media platform. Since Amana Company has a certain digital image library for customers to choose the data. The digital video production creators could also expand the database of digital content. This platform would be opned for all digital media artists by the way of membership and allow the personal digital images to besaved in the database. The professional digital rights management would let the users be willing to adopt the customer database and create the digital content with different charges. The platform would provide the matching of the digital creation and thebusines. Digital language is the programming language and it is the 0 or 1 symbols with the representation series. It is quite different from the traditional language on arts. The emergence of new artistic language is derived from the changes by technology and media. Therefore, it could be regarded as the forms of change on the culture style. The impact also changes the way of appreciate on art. The digital image is the new types of innovative ways for the advanced digital technology. It would be the digital display of the video art and the image file compression. The digital technology dissemination by the internet could save the cost and be able to serve by multi-element digital media performance types. Amana Company regularly updates and expands new image elements. The paltfrom could enrich the digital media platform and the content for the customers to draw more diverse and convenient products.

5.4.2 Digital Creative Studio and Digital 3D+CG/PP Process Service by Order

The orders could be complted by the Amana's creative studio, Digital 3D+CG/PP Process and FrameFree image synthesis. For digital animation, video ads, special synthetic production could be conducted on the external single production. The current cost of production requirements, human resources, scenery and other costs could be made by the Amana Company and from the discussion with the customer and the presented results. To select the appropriate picture element could conduct the post-production of synthetic video. Less than the cost on the current market, the platform could provide better quality and more space for small compression. Amana Company would cooperate with Warner Brothers and Rolling Stone Animation Company. Waner Brothers produced the computer game by the technology and the lower costs form Amana Company. Warner

Brothers has an initial willingness to discuss the cooperation in Shanghai. For various types of digital video advertising, Amana Company has connected with the Ogilvy & Mather, Dentsu, Leo Burnett Company Ltd., Wealthmarch, J. Walter Thompson, J. Walter Thompson, Dentsu-kuohua. Amana Company also discussed the cooperation with the Government about the “Just Taiwan” project. “Just Taiwan” project is a feature of the scenic spots in Taiwan and it is for the international marketing of national impression. To show the beautiful scenery and the description of Taiwan-related video at the transfer station and various air traffic hubs. For example, the passengers from various countries at CKS airport could see the LCD flat billboard advertising around. Therefore, the foreign visitors could increase the good impression of Taiwan at a short time.

In addition, the huge market of video game industry also promotes the application of multimedia technology. NASA spent more than 20 million on the virtual reality technology when the game company is introduced the virtual reality video games quickly. The president and chief executive of Texas Instruments, Richard Templeton said: There is rarely companies could have been such a long time and fresh the qualifications still. Looking to the future, he believes that the communication and the entertainment would drive the continued growth of the electronic industry. The information technology would still play a key role in the industry, multi-party applications for the development of digital multimedia technology advances. He believes that the communication and entertainment-driven variety of personal electronic products would be able to make market size of 1 trillion dollars. DSP (digital signal processing) and analog core technology would play an important role. The introduction of computer and graphic technology in game industry would make the software become the digital media creative image. It could create high interactive software content. And it would promote the development of software and hardware technology. Xbox2 would be the highly anticipated video game. The concept of digital home entertainment would be attracted to the gradual online game. The game production company with the Chinese culture products is changing the existing computer games to be compatible with the version of video game operation in order to obtain the cash income and the expansion of the copyright. Digital media creation platform for games could be produced as digital image. It could also develop the conduct technology on computer games and screen combined with XBOX or PSP specifications and computing. Then the platform could create the cross-platform version of the games. That would be helpful to the video game and computer PC, so that the consumers could share the platform and interconnected into the online game server.

5.4.3 The Conversion of the digital Video

By the FrameFree compression technology, the video file conversion would become the available digital content. The quality is not only clear and there would be more storage space. The platform could provide the library digital archive, the classic movie file conversion and the services of digital archives to conduct the various types. The Telecine equipment (the hardware would converse the old-fashioned video file to the new digital contentvideo) of Amana could take the old movie of computer operations into the digital video format file. The equipment could also be expected to be conducted on co-operation services. Or the platform could have the cooperation with domestic and international film production companies with the compression of the classic movie album. The digital video content is easy to save. After authorized, the digital media could be transmitted in the broadcast interface. Such as: digital TV; mobile phone; broadcast

video systems in cars. It could be re-priced based on download moves prices. Through the mechanism of transaction records on ECU e-commerce, the image could be the important digital assets in the video database.

5.4.4 Online TV Video and Audio Production

The most affect public file in terms of television media, digital technology would not only make the video quality of television programs. More importantly, after the digital TV signal, the image would be easier to combine with the computers, internet and other electronic goods. Based on the estimation, there would be more than 400 million cable TV operators in Taiwan. After digitizing, the development of domestic digital television including the development of digital TV which is driven by the hardware and peripherals industry would be able to create more than 10 trillion on the market. Chunghwa Telecom's online TV market could not grow quickly due to the technical issues. Amana Company expects to have the consultation with the investment angles. The program production or the new file transfer could help the video clips to be compressible. To enhance the quality and the file size could help to solve the problem easily. The online TV transmission in the convenience of broadband transmission could be achieved without the delay of the video effects. It could help to increase the liquidity of the digital video and the program content; easy to watch digital TV; surf the internet and read the e-mail.

In the future, the digital television, no matter it is through a wired or wireless transmission (ADSL, Cable, terrestrial wireless, telephone lines, microwave, satellite), the image could get into the user's home. Through the "digital video converter", the user could watch the information sources integrated in one platform. That is so-called "home media platform" or named "Multimedia Home Platform, MHP. The integration of digital content creation, images, characters, images, voice, data and other diversity products could help the creation of the products such as the video, interactive TV, online games, personal digital recording function. Or the platform could help to conduct the online e-commerce; broadband video conferencing, electronic banking activities; integrated applications and telecommunications in order to create the more value-added services for the multimedia industry. The internet access could attract more consumers to watch the growth rate and reach a win-win situation.

5.4.5 Multimedia E-commerce Application

E-Commerce is by electronic data interchange and value-added network with the extension. It also includes the transactions between enterprise, transmission product and marketing advertising. The availability of digital video content delivery would be in software, hardware and infrastructure. The application platform could help to establish the mechanism and contribute to the operation of e-commerce. The communication network services could be achieved the information flow, the cash flow and digital video transmission technology. The operate in the internet business could work through the ECU and use the e-commerce to make the intermediary transactions, queries, procurement and management the trainer in good supply in order to reach the best efficiency and the results of customer relationship management. The digital video content creation platform could be the image database. It could also keep the e-commerce transaction data repository. The platform could be the exchange mechanism and used as e-commerce products. As shown in Figure 5-7, the consumer could use the digital download platform and the digital video art application. The mechanism could be e-

registering as a trading intermediary. It could save many provinces and the transaction costs. Also it could accelerate the commercial application of digital transmission.

5.4.6 The Development of Mobile Digital Content Business

The digital data wireless communication technology would help the users to retrieve the information on the internet. There is no need of the general desktop machine with the network cable. As the mobile communications system would move from analog to digital, from voice to data; the mobile communication network and the internet exchange flow grow gradually. The mobile internet industry rises up. The internet access with a simple speaking would be general in the future. In fact, the desktop computers connected with network equipment are very expensive investment. The mobile phones would be more facilitate. However, the mobile phone browser could not be as convenient as the WWW browser. It is limited by the size of mobile phone memory, CPU computing ability of the factors such as physical devices.

Richard Templeton, the president and chief executive of Texas Instruments mentioned 4 main trends of the digital application technology: The mobile phone market segmentation; The rise of emerging market demand; Wi-Fi and Bluetooth applications with wide range; Mobile digital TV. The application including digital audio and video could be branched out into the mobile communication and mobile digital television fields. According to the market survey from Point Topic: there would be 5 million telephone subscribers on global broadband network in 2004. It does not include the personal computer for communication with each other network software and the majority of phone users. For example, P2P technology for transferring the voice packets could apply on the free, clear sound with ECU as the bank register web site and create the virtual payment mechanism. All kinds of bills could be paid through the variety of ECU with virtual card, credit cards; debit cards; smart cards; check books and saving books. Via the computer, PDA, cell phone, automobile or any internet-connected computer devices which are made systematic interface. The users could use the computer, PDA, cell phone, automotive computer, TV or any internet-connected device with the virtual card for purchasing goods on ECU. Skype would be easy to go through the firewall. It is easy to understand that there are more than 3,000 million registered users currently. After 5 years, there would be about 125 million consumers to use the mobile phone for watching TV. The research group, Informa, said: there would be 130,000 TV phones on sale. In 2010, the number would reach to 8,350 million. The difference between the TV and streaming video services is as follows: TV signals are transmitted simultaneously to all users; the streaming video on demand by mobile phone operators. In addition, the mobile phone television image could be clearer than the streaming video. Therefore, digital audio and video content in the mobile phone would be more divers and continuous improvement on color. The multimedia production is expected to become the digital multimedia applications on the main market. Mobile communication services are not only the traditional voice services, it could be resued including the text, pictures, video and other different types of data applications. The multiple mobile communication services could be defined as the used of mobile terminal products. Mobile communication network via voice access, mobile content and application service, the creation of digital media platform could cooperate with the brand advertisers or vendors. The platform could product the digital video clips for cell phone transmission. FrameFree compressed files could be stored as small space. Mobile phones could be exempted from the current

contents with the file transferring problems. The advertising content digitization and multimedia could be more efficient in the management of advertising appeals. At present, the broadband network and multimedia technology are matured. By the clever application of environment space, the real-time advertising could be maximized. For example, Amana Company could cooperate with the vehicle companies, and produce the brand advertising clipe. To transfer technology by the central control management system on the regular or irregular intervals through the wired or wireless network or mobile networks could convey the specified location. It allows the consumers to receive the latest advertising information instantly and the cell phone holders could enjoy the broad and send each other. It could expand the brand awareness and reduce the advertising costs.

5.4.6.1 Mobile Value-added Telecom Services on Demand

In the past, there is only voice service. Telecom is a oligopoly telecommunication service with all links in the value chain. But there would be many different industries and competitors. The services bring more types and operating modes. It makes the whole telecom industry value chain more comparison and complicated. To separate the various types of services required to construct all links, it would be the challenge on the telecommunication companies. The development of wireless communication in the United States today is far different on the rapid growth in Europe and Asia. According to IDC synthesize the 4 indicators as computer applications; information flow; internet applications and social structure. Three Northern Europe (Sweden, Norway and Finland) are developed to high degree of information society. Sweden is leading in the digital world in consecutive 3 years. For most telecom, mobile data charges would be the main income source. Therefore, mobile communication and rapid integration of internet is the trend. In addition to telecommunication services and media, entertainment industry of cross-industry exchange flow is gradually emerged. For example, cable operators are actively go into the telecom services market. Carriers have begun branched out into the media entertainment business. Fixed and mobile communication industry is another business involved in both fields. As the digital presentation of images, it breaks the industry barriers. Many telecommunication service companies would enhance the mobile value-added services to telecommunication services for the value. To become the winner of the new telecom, Telecommunication service providers must master the core competencies by their own. Based on the customer demand, the platform could use the advantages of external partner strategies such as the providing the open platform. The introduction of diverse and high-quality digital content providers would integrate the internal and external business flow. It could respond to the market changes and customer needs and provide cross-industry exchange of the flow-type telecommunication, media and entertainment service. IBM survey the telecommunication service industry across a large exchange and attributed to several market trends as follows:

1. The voice profitability ratio suddenly decreases
2. Broadband services grow continuously
3. Entertainment content grow continuously
4. IP network application and proliferation of handheld devices grow continuously
5. Rapid amplification of high-speed internet access locations

The bank work in the field could also access the company internet network and database. Although there would be laptops with wireless data machine for the users access the ordinary existence data. However, digital content creation platform have

provided the good channel. Even, there would be the wireless data coupled with the laptop. It could help the users to access the digital content platform and database files. Province with the general shape database would not be very important to take in data transmission.

By this application, all behaviors could be expected to start on getting the information directly and quickly. Telecom service providers could take advantage of this application and expand the range of the content services. Telecommunication service company could provide innovative services for existing customers. The users could access to the telephone and broadband internet for the video on demand and online games as value-added services. Also, the platform could enter the consumer market by the customer service. In this domain, digital media creation platform occupies a very important role in promoting. Digital media creation platform could help the production of many telecommunication service caused by the continuous improvement in quality, animation, games and transfer images. Even more, it could cooperate with the marketing companies and transfer the enterprise product advertising by mobile video screen. The mobile phone could be the advertising platform for the sales and break the original TV advertising-based marketing approach. The platform could expand the consumption. It could transmit different value-added content to different consumer groups. The platform could be an effective communication channel for customer relationship management and compile the consumer behavior data in order to expand the digital application market.

5.4.6.2 Mobile Communication Service Technology

The third-generation mobile communication system IMT-2000 is integrated various types of broadband technology. The quality of Public Switched Telephone Network, PNTN is good on voice communications and would support circuit-switched or packet-switched in order to reach the ideal multimedia mobile communication. The technology could provide more good quality, diversified services and achieve the personal communication service, PCS of anywhere, anytime. It could integrate the voice, data, and video multimedia. Mobile reception of TV signals would be processed by mobile phone chips as the handling telephone, music and streaming video signal are processed by other chips. If the digital content could meet the mobile communication technology, it would improve the speed of mobile content delivery rate and the quality. 3G network would move to the comprehensive IP-based direction. Mobile IPv6 could solve the issue of roaming around. In the framework of this system, popular network games and digital telephone network with multimedia video conference via the wireless transmission as the largest mobile phone applications. Digital content creation voice, multimedia messaging service, mobile enterprise network and personalized information services would be benefited because of the new technology. To rumore a large amount of image data to the remote device requires the high bandwidth. Bandwidth requirement depends on the specific display resolution. The amount of data transmission from the compressed image is very impressive. The current actions and handheld devices supporting the display resolution QVGA size and the degree achieve 16-bit color depth which is about 65,536 colors. There would be high requirements with the development of display technology. Mobile communication network moves from voice to data. Because the data packet transmission and air interface resources are limited. Different levels of QoS services provide the reference for price. 3GPP(The 3rd Generation Partnership Project) would divide 3G mobile communication applications and services to 4 grades according to QoS.

The main distinction between the elements of data transmission service is the accordance with the time delay-sensitive. The background class service is the least sensitive for the data transmission delay.

Table 5-1 Mobile communication technology and services

Service Level	Basic Features	Types of Services	Data Amount	Detention
Voice Dialogue	<ol style="list-style-type: none"> 1. Immediate response to information-oriented and not allowed to delay 2. Reserved a block transmission of information 	<ol style="list-style-type: none"> 1. Voice Dialogue 2. Video Phone 3. Remote Technology 4. Game 	<ol style="list-style-type: none"> 1. 4-25 kbps 2. 32-384 kbps 3. <28.8 kbps 4. <1 kbps 	<ol style="list-style-type: none"> 1. < 150 ms 2. < 150 ms 3. < 250 ms 4. < 250 ms
Interaction Level	<ol style="list-style-type: none"> 1. Request a return type of type of service 2. Transmission data loss rate lower 3. Ensure the transmission time 4. Need to retain the accuracy of information 	<ol style="list-style-type: none"> 1. Voice message 2. Web browsing 3. Mobile Commerce 	<ol style="list-style-type: none"> 1. 4-13 kbps 	<ol style="list-style-type: none"> 1. < 1 sec 2. 4 sec/page 3. 4 sec
Streaming Level	<ol style="list-style-type: none"> 1. Reserved a block transmission of information 2. Transmission quality can be controlled 	<ol style="list-style-type: none"> 1. Streaming Audio 2. Image 3. Remote technology 	<ol style="list-style-type: none"> 1. 32-384 Kbps 2. 32-384 Kbp 3. <28.8 kbps 	<ol style="list-style-type: none"> 1. < 10 sec 2. < 10 sec 3. < 10 sec

Background Transmission Level	<ol style="list-style-type: none"> 1. Lower transmission data loss rate 2. No specific or fixed transmission destination 3. Does not limit the data transmission time and delivery guarantee 	E-mail, SMS	NA	NA
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Source: ITU, IEK-IT IS, 2004

By agreement with the image compression to meet the needs of a large amount of video transmission, and achieve the required real-time remote display screen refresh speed. This agreement requires the client system configuration to achieve rapidly, high compression rate of the engine. In the server-side, the configuration would fasten decompression engine. It needs both the client and server-side configuration with low overhead transmission agreement. For image-based protocol, without a reliable transmission bit error generation will lead to different level of image reproduction. It might be the pixel value with a minor error. It may also be the missing of the serious failure on entire image frame. When using the image compression bit, there might be errors in serious consequences. Although some multimedia processors have a fast image decompression engine, but many processors are made by I/O bandwidth limitations. It can not be captured on the screen frame data for the codec. Then transmitted software would transfer to the codec rapidly. Amana's digital video compression technology, FrameFree video files, could be compressed into smaller files. Continuous improvement of image transmission would cause a certain quality assurance.

5.4.6.3 i-mode Success

The wireless sector of NTT(Nippon Telegraph and Telephone Corporation), NTTDoCoMo launched I-mode to provide consumers with low prices on mobile communication and it could browse internet in 1999. It provides the consumers of bank transactions through the internet; sending and receiving e-mail, trading stocks and order tickets. Even it could send video images and the new games. The revenues of I-mode in the first year reached 100 million USD. In 2002, the number of user is 30 million. It would create profitability of 5 billion USD. It would show a new generation of mobile carriers for digital audio and video telecommunications technology, and would combine with commercial viability. Since the mobile communications system of NTT DoCoMo would be the PDC while the domestic rivals and European countries use the different systems of GSM, CDMA. So you have to use a unique mobile phone then enjoy the services. The I-Mode mobile phone manufacturers in Japanese are NEC 、 Fujitsu 、 Mitsubishi 、 Hitach 、 Matsushita 、 Panasonic and Nokia. Compared to WAP mobile phone, I-Mode mobile phone is functional and smaller. NTTDoCoMo president said: "The success of i-mode mainly due to the use of packet-switched transmission

technology; low limitation of charging. It would provide a mix of large amount and diversity of information services. Packet switching transmission is not the same as GSM circuit switching. Users can maintain the linking status and retrieve information at any time. The bill depends on the amount of data transmission. Users could get the information sources through NTT i-mode transfer center. In Japan, more than 14,000 web sites designed for i-Mode. The completed websites are more than 53,000. This is quite favorable for DoCoMo with mobile internet. On the one hand, it could attract the content providers; on the other hand, it could give users more choices. The applications would encourage the users to progress by the wireless network and have more consumer behavior by mobile internet. I-mode sites are made of HTML language. This is a standard language with internet pages. It is easy to browsw the format by i-mode phone. As long as the people have the basic producing skills, they could create both preclinical and light production of i-mode sites. The market entry barrier is relatively low. It makes i-mode content rich in Japan. The i-mode sites could be divided into 11 categories: Mobile banking, Mobile travel information, Credit card information, Insurance, Flight information, Travel and booking system, News, Information, Database applications, Electronic shopping, Video services, Entertainment. There is multi-site and it could support the consumer demand. The distinctive i-mode is one of the success reasons.

5.4.6.4 Value-added Applications by Mobile Data Services

Internet would develop gradually towards the wireless communication and personal communication. Communication 、 Consumer electronics 、 Computer would be integrated by the internet in the future. And it would expand to a variety of communication equipment. The use rate of mobile phone in Asia is high; especially the mobile phone in Taiwan is more popular. There are many commuters would paly video game by cell phone and to use the messages is a common phenomenon. According to the forecast of UMTS Forum, the mobile communication would reach the revenue of 3,220 million in 2010. 66% of the revenue comes from market information and value-added mobile services. The consultancy firm McKinsey estimates the global mobile commerce market would reach 190 billion USD in 2005. The largest proportion is Asian market. It would be up to 80 billion USD. The mobile commerce market size in Taiwan would be up to 13.8 billion USD. There would be mobile service in Asia-Pacific and Europe market. The digital media production platform would reach the customization needs and interactive multimedia transmission. CHT in Taiwan launch GPRS services. However, few users would use WAP wireless internet. Therefore, many communication service providers would suggest that GPRS service would be the first promotion of 3G multimedia application. After the hardware equipment is completed, the most important thing is the mobile value-added products with digital content which needs the effort of digital creators.

In the mobile data service and the application domain aspects, the market would be divided to consumer and enterprise market by the object. In the consumer market, the mobile message service; mobile entertainment service; mobile information service and mobile trade services are mainly for the consumers according to the purpose. On the other hand, in addition to use the general public access by mobile nwtworks. After the gradual broadband network, enterprises began use the mobile device to improve the efficiency and strengthen the customer relationships. The demand of mobile work increases, mobile commerce application and customer relationship management could be

integrated by digital media creation platform in order to set up the enterprise resource management with data security protection. The real time information is also the advantage of digital content creation platform. It would play a significant effect on financial, logistics and other information technology industry. Enterprise market would become a very potential emerging market.

The e-business depends on the support of operators. Digital media creation platform would need the development of telecommunication operators. To form the single carrier's base station, it would produce the digital files and transmit by SMS. Digital media creation platform would provide mobile consumers free digital image content. It would increase consumer groups; download messages and files such as the transmission movie ads; CF firms and multi-style standby screen. The consumers would take images by wireless transmission and the workers could modify the digital files into new digital photo products. In addition to the FrameFree technology with compressible audio files, there are clearer picture for music and video transmission. For the commercial market, the digital media production and application would enable mobile business to the multimedia era. Besides mobile commerce, video games, video advertising clips might include Amana digital media content platform. General cable phone or internet is made with a variety management functions such as the account balance inquiries, transfers and payments. Users could also use the digital media platform to conduct e-commerce electronic payment mechanisms. The convenience is between the telephone and cable internet browsers. However, the transmission through a variety of mobile communication ability is for wired telephone and internet. Many financial institutions currently have the service. In particular, the upsurge of online transactions has driven the rise of such services. Digital media content platform could still be related to financial information or digital video and data transmission. To provide real-time content services, it would allow the users to have more convenient. Consumers could interactive the approach and it requires the digital content platform as well as the information storage mechanism ECU. E-mail or voice could be processing by this platform. It could deal with the direct and instant messages and stored in the specified channel. It would avoid the loss of important and necessary message immediately. Many digital image files produced by Digital Creative Studio and Digital 3D+CG/PP Process Service could transfer to the video content which the mobile phone consumers are interested in. It could help the operators to provide more value-added services of digital video content. It could expand the range of digital image applications to vehicle communication system. Transmission could be as an electronic map and position via satellite navigation system. The digital media could create the real-time dynamic traffic condition map and expand the areas to mobile video.

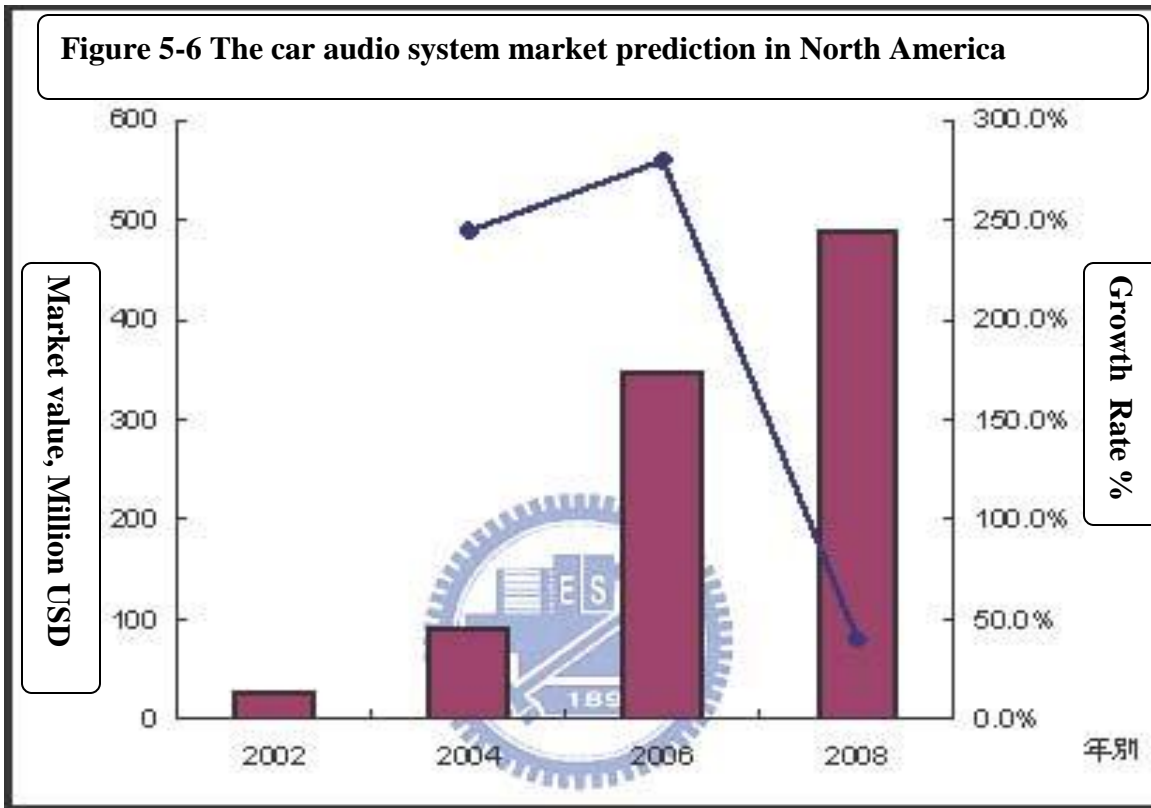
So far, the computer network is the main access tool. All kinds of information application, IA, device is also planned. IA could provide different time and different locations of the information access needs for the users. It could expand the application of digital content creation as the variety of information applications. For the emerging digital home equipment and instruments, the digital media platform could be the digital home entertainment center for the content providers. It could provide the digital information content; audio-visual entertainment; consumer data records; image and other multimedia information services. As the increasing of the bandwidth, based on the wireless broadband environment, the application would be increased and the scope of the services would be more extensive. In addition to the tradition text, it could transfer the

data, images and video transmission. Digital content service platform could create different types such as: multimedia information; personal information management (PIM), and location-based services. Digital media platform would make the mobile communication device into personalized multimedia messaging terminals. Digital media creation platform could produce the real-time video communication and provide mobile digital audio and video content including the life-style information; leisure and entertainment; electronic commerce; think tanks inquiries; e-mail services and several service projects. E-commerce could be reused in the mobile banking; mobile brokerage air ticketing; hotel booking; movie ticket orders and other kinds of services. It could compress MP3 audio files and match the digital video content. It could develop the interactive multi-media production of video instant roadmap.

5.4.6.5 Audio in Car

In the beginning, the audio system in car is the most rudimentary radio. Global Positioning system, GPS, system would be designed in the car audio system. Basically, the audio in car would become the new standard driven by international manufacturers. The car with GPS-equipped would increase to add the intelligent map indexing system. In addition to the drivers would no longer lost their ways, the location of gas station and restaurant would be uniformed. In the audio car system, it should consist of the audio and video players; loudspeakers; controller and play panel. The advanced audio and video tools for intraspecific cars would begin to enter the general consumer market as the sale of RV/SUV cars. In addition, the increasing audio-visual equipment and CD playback functions would enhance the DVD players with digital video and PM3 types. In the future, after the vehicle containing equipment (On-Board Unit, OBU) integrated the car audio system. The audio-visual entertainment would depend on the onboard devices and would be powerful capability while the continuous improvement and changes in the car environment caused by the digital mobile entertainment.

In the car audio system, there would be divided into the original accessories (Original Equipment Manufacturer, OEM) and aftermarket accessories (After-Market, AM) are two types. In 2001, Mazda introduced the first built-in MP3 player. Since then, the sedan car MP3 player has become the mainstream on the market. In 2002, the sales in North America regional of the audio system in car reached to 470,000 units. The market value would be about 26.6million USD and the average unit price would be about 57 USD. In 2008, the sales of North America region would be 19 million sets with the market value of 490 million USD. And the average unit price would be about 26 USD. The car audio system market value of the annual compound growth rate is 62.5 %.



Source: Frost & Sullivan, IEK-IT IS, 2004

The major car audio system suppliers of North America region are Alpine Electronics、Blaupunkt、Delphi、Fujitsu、JVC America、Kenwood USA、Panasonic Auto Electronics、Pioneer Electronics (USA)、Sony Electronics、Visteon Corporation. Blaupunkt and Visteon Corporation are the suppliers of Ford Corporation. Kenwood USA is the supplier of Mazda. Global Position System, GPS signals would use the satellite network and the system linkages determined by the electronic marker location. The sport enthusiasts also use the Global Positioning System like the backpackers, climbers and people who ride bicycles. But the most common application is to be installed in the mobile phone. The car audio system supplier would use the digital content creation platform and cooperate with the global GPS vendors. It could provide the necessary information for the geographical location. The consumer background research information and the map database would be the source of the digital platform. Digital media creation platform would produce the digital maps and digital audio and video consumer information. The platform could provide the different consumer preferences in the database, and provide the service facilities and meal reference image. The platform would optimize the local resource. It could transmit the relevant response to the current environment by digital data. Also, the platform could provide the drivers about the traffic condition in the transport position and the alternative routes map image. The platform could cooperate with the television production and media cooperation for the dissemination of the contents. It could transmit the variety digital content creation; audio-visual products; programs and real-time news by the satellite communication equipment.

5.4.7 The Training of Digital Media Production

According to the survey of digital content industry, the production value of the digital content industry in Taiwan amounted to NT 1,892 million. The potential forecast growth is about 15% ~20% per year. In 2006, the overall output of digital content industry would be raised to 3,700 million. In addition, the domestic development of digital content industry would need the manpower of 36,754 people in 2003 to 2007. But in the education system, there would be 17,651 people within 5 years. The lack of professional talent would reach to 51.9%. There would be 3,820 per year and then meet the rapid development for the core industry. In the future, the personal computers would be able to apply the digital technology in teaching and artistic creation. As the development of digital technology, work and play would be expanded by the intermediate zone. Creative leisure activities, life creation, manufacturing and performance would be affected by the digital signal processing for synthetic music production. The digital content creation platform would establish the cultivation and the opening of a variety digital multimedia production with the technical exchange space. In addition to the digital media production technology and new machinery equipment, the most important resource is the digital media creative talent. Digital content creation platform would cooperate with the industry and the education sectors. The courses would include multimedia technology and FrameFree commercement training, new digital creative talent. There would be digital imaging technology and synthetic techniques. Amana established the platform for digital content creation with Chiao Tung University in Taiwan. It create the digital content industry promotion office, Nankang Software Park College and other digital collaboration. It would train the digital content creation with the quality of human resources.

5.5 Target Customer and Marketing Methods

5.5.1 Target Customer

Because of the decreasing price on hardware and it becomes more popular recently. Therefore, digital content would increase the needs of customers and the market trend would be expanded. Amana Corporation established the digital content creation platform. The working day of production MMS movie ads (video image ads) would be just one working day and only takes 1 USD. Therefore, the target customer of Amana Company would be the management of digital brand name business. 15-30 seconds of TV advertisement films; MTV Production; internet video transmission; interactive digital services; online game & video digital imaging and animation which would be produce the animation based on the customers: Warner Brothers; Ogilvy & Dentsu Japan and other advertising; Coca Cola, Toyota, GM, Ford, Channel that require digital brand marketing company are all the customers of digital content creation platform.

Amana has approached target cooperation as follows: Ogilvy & Mather, Dentsu, Leo Burnett Company Ltd, Varie Model & Talent Agency, J. Walter Thompson, JWT, J. Walter Thompson, Elite PR, Warner Brothers, Digimax, inc, Leader Asia Pacific Creativity Center, Wang Film Productions Co., Ltd., Pixelframe, SONY, Docomo, Apple. Warner Brothers has numerous peripherals. Amana would provide the hardware platform and provide the creative digital video production with advanced technology such as the virtual studio, broadband, email servers, digital video services, digital intellectual property and legal advice, e-commerce system. It could speed up the product production and video animation effects. If the online game could adopt the technology of FramFree,

they could reduce their costs. And it could increase the quality of the animation fluency. Therefore, they would have high willingness and cooperate with Amana Company. The animation technology would enhance the quality of the product by FrameFree technology.

Digital content creation platform would not only based by the creation of digital content in Taiwan. The platform would integrate the local manpower in Taiwan, capital and technology resource to develop the Chinese digital content products. In addition to provide the digital content online video, mobile communication video in Taiwan, the platform would provide the completed product development for the China market; the game market; digital audio and video consumer market; digital music market; and various types of digital multimedia content.

5.5.2 Marketing Plan

Historian J.Burckhard mentioned in his book “Renaissance in Italy” mentioned: “ In the middle generation, human beings could aware the existence of individuals by his own race, family or work group. The layer would veil away during the literature and art restoration. The social mechanisms as nation, ethnic and family are objectified. Human individuals would become interested in knowledge and find the existence by the subjective consciousness.” In 21 century, digital image technology could help the digital content industry application fields. Digital technology would transfer the different culture scene and art images. That convenience is arising from the digital media and social impacts. Therefore, the revolution of art changed the way of culture. Amana Company specialized in the digital production team and the Studio Arts Department with overall resources and the quality of the products. The professional media maker of Amana would continue the cooperation with long-standing partner. There would be the commissioner for the promotion of FrameFree new technology, digital multimedia production studio, integrated platform and digital right management. When the new technology and production methods are accepted by the market, digital content creation platform would integrate the entire digital media value chain services.

Table 5-2 Amana marketing plan

Goal	Short term	Medium-term	Long-term
Marketing Objectives	Promote FrameFree technology and digital creative studio service	Contact customers and extend the China market	Integration on digital content value chain and value-added services
Product	Digital media production services (depending on the case and the ad hoc pricing)	Animation, film post-production services and new applications of digital content	Professional production and creative human resources, information and image gallery with digital rights management
Marketing Methods	Introduce the technical advantages to target customers	Conducte ad hoc cooperation with world-renowned film production company	Digital media production and cooperation with international marketing

Digital content creation platform would major the technological innovation on the digital multimedia. It could produce the digital video files according to the customized needs. Amana Company would also make the digital product images for the enterprise marketing management. It could cooperate with the media production companies and convert the digital video files. It would be applied on the mobile audio, video, computer games, digital TV, car audio markets. The expansion of digital media creative talent and database would focus on the domestic and foreign animation and game software markets and develop new content products or Chinese culture products. For example: Chinese animated films and related games, digital audio and video programs. It would serie with the digital content creation industry by the creative and technical personnel and operation of technology pplatforms in order to reduce the cost of international cooperation.

5.6 Competitive Analysis of Digital Content Creation Platform

5.6.1 The SWOT Analysis of Digital Content Creation Platform

The most important elemnt in the service is the professional qualities of digital content creation. The professional digital media production professioners could play the advantage of the technology and control the quality, progress and cost. Amana Company contacted the media specialist, Mr. Lau to host the original digital production service platform. Mr. Lau has the detaled understanding of the practical experience and knows the long-term flow of the service. In addition to the technology platform for digital media creation inTaiwan, Amana Company would set the marketing office of digital media creation platform in Shanghai since the region is considerable as a good location in Mainland China. The following SWOT analysis is for digital content creation platform and the local environment competitive analysis in Shanghai:

- **Local environmental analysis of Shnghai:**

Shanghai is located in the front of the Yangtze River, the east is the vast expanse of the Pacific Ocean; cross the sea is the US west coast. The location faces the sounth temporary of Hangzhou Bay; adjacent to the west and the affluent Jiangsu Province, Zhejiang Province; closes to the northern of Yangtze waterway sector. The traffic is convenience amd wrapped in the hinterland of Canton which is the advantageous geographic location. The location is the third largest prot in the world and there are top 500 enterprises concentrated in the commercial city which is the largest commercial and financial center in China. Also it would be the important international port city in Western Pacific Region. The wide range of internal and external liaison, transportation, communication is developed well. Oriental Pearl TV Tower; Mao Fun Building; Shanghai International Convention Center; Pudong International Airport; Shanghai Museum; Shanghai is a modern, international, fashion-oriented specimens. In October 2001, APEC conference held in Shanghai. Shanghai is an international economic, financial and trade centers. Financial securities, futures trading, foreign exchange and technology are established a national market in Shanghai. The location would affirm the allocation of resource throught Shanghai hub and also speed up the economy and the pace of international integration. Amana Company would develop the digital content creation platform in Shanghai Center. There would be 3 highways around the current east, west and north of the city. It would take 30 minutes to the city center. The existing MRT station is about 3 street distances far from the location. There would be the 24-hour campus bus. The

nearest subway would be constructed during the 2008-2010 year. It would take 25 minutes for car trip to HongCiao and PuDong Airport. It would be conducted for domestic and international travel easily. Mall Front Puxi from Pudong to Huangpu River would be the main road tunnel for linking the world. It would be adjacent to 4 new university campuses. There would be rich human resources and the latest education, technical information.

Table 5-3 SWOT on Amana Company

Strength	Weakness
<p>1. The most advanced technology — Full 3D + CG / PP and image processing FrameFree technology for the digital media services. Digital media, flow control, as the next era of digital media services, the advances prospective joint venture partners: Amana International— Japan, the United States and Europe.</p> <p>2. Location Advantage: Shanghai high-tech software park, the surrounding abundant resources, huge business opportunities</p>	<p>Must have adequate resources and local business partners to ensure that our technology leading position, in particular, the whole 3D + CG / PP production workflow, digital asset management and members of the ad hoc bulletin system right</p>
Opportunity	Threats
<p>1. There is no any global platform for digital media integration</p> <p>2. Global digital media industry market is constantly growing</p> <p>3. The digital media technology and the talents, creativity are at high standard in Taiwan</p>	<p>Homogeneity of digital media studio, but the technology is less intimidating</p>

5.6.2 Forces Analysis of Digital Content Creation Platform

According to five forces analysis framework of Michael Porter, it could be more clearly about the digital media competitive position of Amana Company.

5.6.2.1 Existing Industry Competitors

There are no more comparable foreign competitors in the local major media in Mainland China – Shanghai Media Group and other media would support the full service of digital media studio. However, due to the technology which spends 18 years on the development belongs to Amana Science Council in Japan. Whether the texture and the cost are better than the existing technology. Therefore, there is no firm which has the same competition on the technical standard in current digital content industry. However, there are many studios existing in the digital content industry. Many creative creators would establish variety digital studio. Digital content platform would be opened to all the members and the collaboration with all creators. And it would open the network and digital asset management services for all digital creators. The digital content platform would

promote the digital arts in consumer and enterprise sides and achieve mutually beneficial symbiosis works.

5.6.2.2 The Bargaining Power of Upstream Firms

Digital media production would provide the image element from upstream firms. The digital content creation platform would operate the areas include the value of digital media production on main stream wheel. The studio of Amana would provide the video production, shooting and derived functions. It could be produced by lower cost. Customers could specify the provision of basic image processing content or taken by the members themselves. Since the digital content creation platform could manage the process and encryption the copyright protection, therefore the membership threshold is low in order to increase the exchange opportunity. The members could get the good quality of services whether the members would face what kind of bargaining power with the upstream firms. Current advertising; public relation company; multimedia animation; computer animation games and the consumer electronic manufacturers have contacted with Amana Company.

5.6.2.3 The Bargaining Power of Downstream Firms

The downstream production of digital media include color printing, TV advertising, outdoor panel advertising, mobile commercial content, games and animation companies. FrameFree technology could produce the synthesis images and video beyond the current quality and reduce the costs on the market. The variety of downstream firms would assess the platform for digital content creation because the low cost and high quality. Most firms would choose the FrameFree image production. Therefore, the bargaining power of downstream firms is lower. The output digital media companies are not only in the downstream value chain but also become the collaborative manufacturers of Amana Company. Therefore, the digital content creation platform would be the integration of upstream and downstream platform. The relationship is the cooperation members with upstream and downstream firms. This is the edge of Amana digital media creation platform.

5.6.2.4 Threat of Substitutes

Current digital content mainstream specification is MPEG. Because the basic display device unit of MPEG 7 is 30 cells/ 1 sec as the Block Object. When it moves, there would show the corrugated fuzzy area. Compared with FrameFree image pixel would make the components as a point. The pixel could be cutting as any combination. The digital display could present the high-definition video when the screen moves as the pixel unit. Therefore, it would not produce blurred images. The screen would conduct the digital image and zoom in/out without distortion. Since the capacity of the compressed files could be compressed into video and audio together. It could increase the time of hard drive storage and include more features as MPEG7. The digital content creation would still use other image techniques such as MPEG or H.264 video compression standard techniques and Java programming language multimedia software. But the multimedia technology would completely replace the original digital content technology. The production of digital media creation technology would integrate various image techniques by Amana Company. In accordance with all digital content artists would use the familiarity of the technical information. The expansion of digital media content creation platform would improve the performance of variety digital image and the quality of the screen. But it would not replace the existing technology.

5.6.2.5 Potential Entrants

FrameFree technology would be a full patent protection technology for digital image creation terms. MPEG7, 9 do not reach the same level of image display. Therefore, there is still no threat of the potential entrants in the short term since the training units of digital image are established. Digital content creation platform would cooperate with the education information system and teach the common culture on digital art workers with digital media hardware facilities.



6. Conclusions and Recommendations

6.1 Conclusion

As the development of digital mobile communication technology and the communication technology, the global culture exchange would be promoting with the change of lifestyle and the increase of digital multimedia technology in recent years. Digital content creation art would be shown by variety equipment. For example: mobile phone, digital television, flat panel digital advertising, internet sites, automotive audio and video equipment, all kinds of video games, emerging digital home appliance devices. Variety consumer electronic products are digital content products for the consumers and expand the demand. Creative industries, digital media and the talent of professional standards are the success keys of digital products. In United States and Europe, the progress in telecommunication is matured. Leisure and entertainment activities are important to life. Therefore, the mobile communication devices for connect internet, wireless internet access, multimedia messaging, mobile video, MP3 players and gaming applications are increasing constantly. After the mobile communication and digital technology development becomes high standard, many devices require rich digital content for the application. It would meet the consumers demand for value-added services. Digital media creation platform would make the multi-digital video production. That would be the direction of digital audio and video applications.

6.1.1 The Environment Factors and The Interaction of Digital Content Platform

By the factors of technical level, market level, information and electronic products, digital content industry level, the impact of digital media creation platform would be as shown:

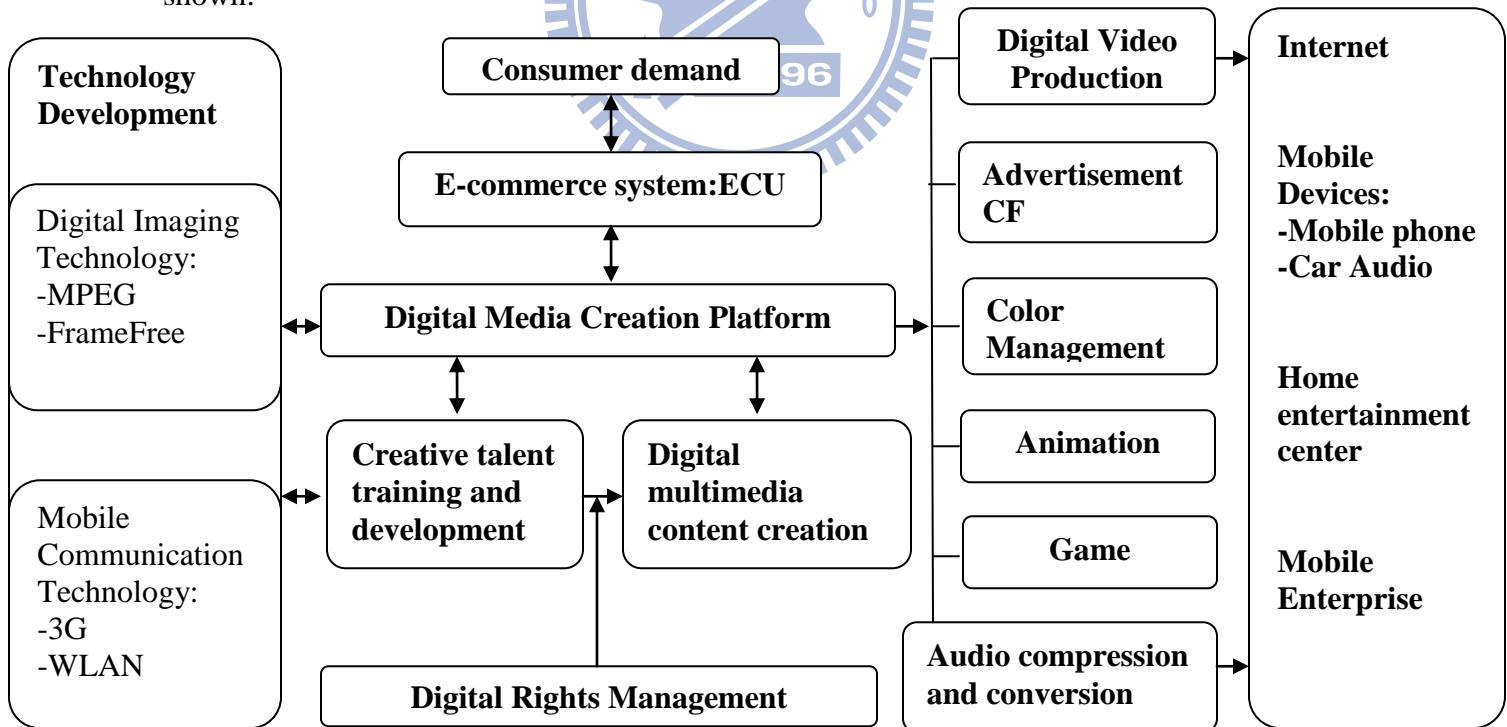


Figure 6-1 Influence factors and the operation direction of digital media creation platform

Source: This study

6.1.2 Mobile Digital Video Service and Digital Home Multimedia Application

As more users join the same network circuit, the value would be higher and utility users would be more. Internet inventor, Robert Metcalfe pointed out that “ If there are n-number of users, the value of the network is equal to $n \times (n-1)$. When the n value reaches a great time, the total value would be closed to n^2 . The number of times could be linked to the interactive computing. Mobile data services would have the characteristics of network externalities. The telecom service providers would launch more mobile commerce applications. There would be more users of the complementary or peripheral products. There would be greater indirect network externalities. The user of video data services would increase and promote the consumer mobile business.

There would be more diverse phone functions and move toward the multimedia applications in the future. A large amount of video data processing and internet functions such as the development of network roaming would affect the evolution of mobile communication technology. The mobile communication market is huge and video applications become more. Mobile communications would promote the development of data services. Mobile phone image applications are variety. Currently, Japan would develop the most sophisticated remote monitor. As long as there would be ADSL plus camera equipment at home, user could see the situation in home via real-time video phone. If the users adopt the latest digital compression technology with streaming technology, the user could send larger amount of digital audio and video files. Digital content creation platform would be used for creative production. In addition to the production of digital music and images, it could be made as dynamic images in order to reach the beautiful effectiveness image acquisition with wireless communication technology. In addition to mobile video and digital content value-added services market. The car audio and video applications would become potential. Telematics systems would increase popular in Europe and United States. According to the published data of Telematics website, currently the United States would be the largest application market for the Telematics. TRG research shows that there would be 25 brands in U.S. market and more than 100 vehicle types equipped with Telematics devices. The operation of electronic information devices would strengthen the ability. Telematics devices would provide multiple services such as the satellite TV reception, active transport path calculation. Digital content creation could be used for car navigation, traffic information, online information, arterial for the digital media. In the mobile data services would provide multimedia transaction services, database services, information services, entertainment audio and video digital content value-added applications. The consumer electronic manufacturer tailor would product the digital home-asix.

The executive of Intel, Paul S. Otellini, declared to develop “Digital Home” platform for consumers and would be available in 2006. The platform could support Wi-Fi wireless device for digital network and the data storage server for the various needs of digital home including the system center hub, network phone, video conference equipment. The platform could provide the audio and video information, data inventory and other related digital content creation. Digital home would become the next generation of digital content provider in the family.

6.1.3 Multimedia Digital Content Products Would Promote the Electronic Industry

The vice president of Toshiba semiconductor points out that “Digital audio and video products would play a lead role of semiconductor. The personal computer would continue to grow 5 to 10% on semiconductor market in the next few years. The current mobile phone penetration rate in Taiwan would be above 100%. The replacement rate of cell phone is speedy. The wireless communication equipment output value would reach to 2.4 billion USD in 2004. It would be expected to grow 30% and reach to 3.2 billion markets in 2005. The trend would increase the development of new mobile phones by the mobile communication equipment companies. Mobile content services would be taken off as the growth of mobile data value-added services. It would help the output value of wireless communication. The communication output value in Taiwan is expected to reach 5 billion in 2007. Therefore, digital content industry would not only enhance the output but also expand the diversity of digital content services and help the relevant hardware sales growth. It would also promote the needs of the consumer electronic industry. The amount of hard drive shipment would grow from desktop capabilities. Notebook computers and servers would focus on the consumer electronic market game, digital music players, mobile phones and digital video recording video players, etc. It would drive the upstream output of consumer electronic chips.

6.1.4 Integration of Multimedia Digital Content Creation Industry

The digital content creators would establish the personal studio or independent operation in the past but they did not build up the consumer payment mechanism well. They also lack the coordination and cooperation with downstream communication and the internet marketing skills. Digital rights management is important while the artists do not know the intellectual property of the digital rights well. The condition would make the digital content creation industry lose the value. If the digital content industry could integrate the resources and conduct the cooperational development; the creators could cooperate with the domestic and foreign market for digital media and audio-visual applications. Then, digital content creation platform could enhance the value of the product and market breadth. Apple Computer would face the consumer demand directly and make the digital music hardware products just like the walkman with digital music downloads. It could link the upper and downstream companies by the insufficient convergence and provide the innovative service model. Also it could provide the various digital music services. The overall value is greater than the individual innovation units. Therefore, if the digital content creation industry could set up the perfect platform for the digital content creation; It could achieve the integration of resources and optimization of the resource allocation results. If the relevant senior digital content creators could cooperate with the industry by the digital content creation platform, they could integrate the digital content technology, market trends and share the successful industry experience. By the international exchange activities, the development of industry profitability model could increase the domestic competitiveness of digital audio and video content creation products. In this platform, the creators could combine the hardware and software industries. The complementary integration could add the value and increase the product integrity. It could promote the digital content creators to have more channels and identify the innovative business model with more business opportunities. The digital content creation business model would enhance the digital content creation industry in Taiwan.

6.2 Follow-up Study

This study would focus on the multimedia applications and the digital technology currently. This study would establish the multi-media platform and conduct of the benefits. However, digital media content and the development of related industries are in the emerging industry. There would be still much room for the study in the future. Researchers could follow the digital media content for different conduct of levels.

1. Analysis the related levels of digital consumer group and the audio-visual products:

The current digital content creation and animation content are for games usually. The digital media creation platform could be extended to be more advertising, films, all kinds of drawing or image processing. As the different needs and different levels for consumers, there would be differences applications for digital audio and video products on youth market, home market, companies and mass consumer market. The study could focus on the preferences of the consumer groups, the continuous improvement and the custom digital products.

2. The development of digital products sales channels in China:

The development of digital media production technology is growing rapidly in Taiwan. Since it's convenient for using Chinese in Taiwan, the digital content creation platform could access to China market quickly. However, there would be many laws and regulations in China market. There should be more studies on multi-party digital products and the cooperation should be screened. Such as internet portals, computer games and digital production companies are all the core market of digital content products. Due to the market research, the internet users would still use the E-mail and search for key instruments in China. Multi-media, games and software applications have not become the trend yet but very developmental in China. Digital media creation platform would be diversity. Digital applications applications could conduct the operation for this market.

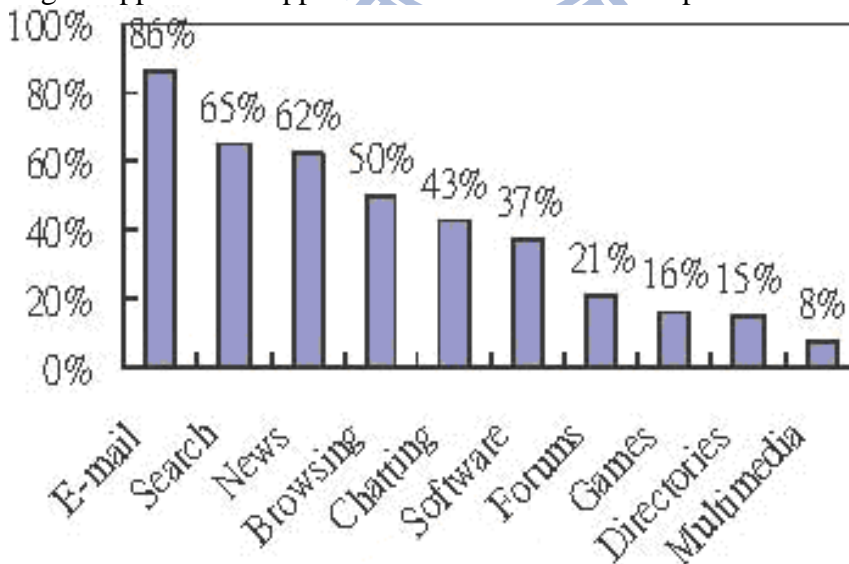


Figure 6-2 Top 10 online activities among Chinese Internet users

Source: Communication of the ACM, 2005

3. Digital video application in the enterprise:

The current digital media creation applications are sold for individual and the mass consumers. In the future, when 3G and 4G technology are accept on the majority market. The internal interactive digital multimedia forms of communication could be expected to increase. Multimedia conferencing technology would be refined. Digital media creation platform on business would be conduct with large-scale digital content plans. Its property development would be in accordance with related digital media applications. The research is worth to be conducted in the future.



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