

Developing Digital Content Industry in Taiwan

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Abstract—According to predictions by PriceWaterHouseCoopers in 2004, the average global annual growth rate of digital video & audio products (VOD, MOD., etc) will reach 235%, wireless contents will reach 91%, and digital archives will reach 84%. This is due to the advancement, cost reduction and availability of the enabling technologies e.g. digital processing, digital storage and digital telecommunications. The development of Digital Content Industry (DCI) requires fine culture, initiative ideas, respect of intellectual property (IP) rights, and telecommunications infrastructure, which are all very dependent on government supportive policies. This study summarized the government policies, progresses, and obstacles in the development of Taiwan's DCI. Comparisons with those in other countries, including the U.S., EU, Japan, and Korea will be provided. Taiwan DCI's opportunities and challenges will be discussed; strategies and recommendations will be provided based on Taiwan's unique resources and competitive advantages.

I. INTRODUCTION

The era of knowledge-based economy is different from other ICT industries and past ones. These industries emphasize knowledge innovation and rely on the different agents of production: technology, knowledge, innovation capacity, and high-intense capital. In this period of time, the speed of innovative technology and initiative ideas are the key success factors because the period of validity of knowledge is not fixed (ever changing), and the mass production of commercial products are needed. A fast development of new knowledge and innovative technology can accelerate the rotation of existing goods and the speed of production can become faster as new knowledge brings in new technology. As a result, technology and products that are rapidly rotated will be led to fierce competition among enterprises.

The characteristics of knowledge-based economy that enterprises should adapt to are broken down into three categories. First is the acceleration of innovation. In knowledge-based economy, the speed of innovation in enterprises have to be faster than their competitors in order to dominate in the market and to gain enough returns before competitors can promote a new knowledge product. Acceleration can save the cost of working and increase the cash flow. Second is the difference with ICT industry. The main stream of industry in knowledge-based economy is the focus on IIS (Innovation intensive service, Chen, H.C., Shyu, J.Z. [1]), i.e. the enterprise leverages the market domination through innovative technology and uses new service models to develop diversified products, services, and market expandability. Last but not least, this posture of industry in knowledge-based economy is considered a pioneer and a

radical innovation process [2][3], and the industrial environment is highly dynamic, hostility, and low heterogeneous.¹ Hence, the enterprises in this environment are profited by continuous innovation and diversified products.

In digital content industry, these industries digitalize pictures, texts, videos, audios, and data compiled as one, which differs from other ICT industries. These pictures, texts, videos, audios, and data are integrated by being digitalized to become new products or services. Compared with other ICT's value-chains, digital content is a creative industry that is undergoing rapid changes. Many creative companies and organizations are already engaged in the production and distribution of Digital Content because of the general usefulness of new technologies. These companies are increasingly being used in traditional industries, thus blurring the definition of some sectors. [4]

The development of digital content industry relies on creative ideas and innovation, including content and technology. Therefore, the driver of profit from digital content has to be done through ongoing content innovation; i.e. the creative companies that provide fresh contents are playing the more important roles. Taiwan's government has declared that digital content will be the highest value-added and competitive industry in the future and will identify digital content as the "star" core and potential industry for Taiwan's economic developments in knowledge-based economy. There are numerous fields in digital content and the niche for Taiwan's creative industry shall be discussed in this study. The following topics are divided into 6 sections: section II is the model of innovation and profit chain, section III will analyze the digital content industry, section IV is the Taiwan's digital content posture in global market, and section V will conclude these discussions.

II. INNOVATION IN KNOWLEDGE-BASED ECONOMY

The characteristics of knowledge-based economy are progressive technology, intensive knowledge capital input, and innovation. These factors are known to be the crux of industry. Comparing with ICT sector, the emphasis of industry in knowledge economy is not cost reduction or the scale of economy. In contrast, the content is also the existing factor which includes the determinant and the acceleration of content innovation.

¹ *Dynamism* indicates the rate of change in the industry, the unpredictability of the behavior of customers and competitors and the shifts in the industry's technological conditions. [5]. *Hostility* creates an unfavorable climate, featuring intense competition for limited resources or market opportunities. [3]. *Heterogeneity* indicates the diversity of the market segments in which the company operates. [6]

A. The transition of industry

Technology innovation that dominates market advantages is the goal for ICT sectors for either hardware or software. For ICT sector in developing countries, the capacity of manufacturing is the index for evaluation, but in industrial countries, such as the United States, Scandinavian nations, and Japan, the focus is on R&D expenditure. However, in recent years, OECD has declared the forthcoming of the era of knowledge-based economy. The ICT sector will aim for knowledge capital instead of traditional production factors, [7] therefore innovative intensive service providing will be the mainstream of ICT sector instead of manufacturing with creative industries. The creative industries aim at content providing and continuous innovation, but aim differently with R&D expenditure because of the rating of innovation [8][9][10][11], including the EU Innovation Scoreboard.

According to the British government’s Department of Culture, Media and Sport defines creative industries as activities that have their origin in individual creativity, skill, and talent, which gives a potential for wealth and job creation throughout the generations and exploitations of intellectual property. These include the following key sectors: advertising, architecture, art and antiques market, crafts, designs, designer fashion, films, interactive leisure software, music, performing arts, publishing, software, television, and radios [12][13].

The status of creative industries developments reflects the score of knowledge economy and digitalization. The production of creative industries is knowledge and innovation, which are intensive and have aesthetic activity [13]. Hence it is not like other ICT sector’s productions that can be mass produced and pursued for cost leadership and also aim at market orientation and customers’ needs, which is the way toward customization. There are a lot of fields in creative industries, and each one has the ability to become the dominant proportion in this industry. The diversity and uniqueness are also characteristics of this industry, so it is an advantage for small-medium sized countries that need

development like Taiwan, Korea, and South East Asian countries. Since creative industries provide services and products made by ideas innovation, the profit model is different with other ICT manufacturing value-chain and will be discussed in the next paragraph.

B. Profit chain of Innovation

Innovation can be regarded as the providing of new services and products through the use of new knowledge, which includes invention and commercialization in creative industries.[14] The crux of innovation lies in the accelerating speed of knowledge that is being created and accumulated.[7] A related characteristic of knowledge economy growth that has become increasingly evident from the early 20th century and onwards is the growing importance of intangible capital (also called intellectual capital). In total productive wealth and at macroeconomic levels, the rising relative share of GDP attributes to intangible capital.[15] Intangible capital basically falls into two main categories: services for digitalized contents (in movie, mobile, radio, etc), and added-valued application products, such as digital archives, publications, e-book, etc.

The profit of creative industries mainly comes from intangible capital, which is different from ICT goods that can be priced by the market. The value of ideas is subjective and differs greatly with the production orientation strategy. Corporations should offer more innovative products, services, or diversified goods for earning higher profits. According to the profit-chain offered by Afuah [14], knowledge (idea initiative) is the main key success factor corporations rely on, and this represents the “distinctive competence” and “capability”, which can satisfy market needs and can separate itself between other competitors. The environment of creative industries is highly dynamic, hostile, and low heterogeneous, so the profit-chain of this industry can be shown below.

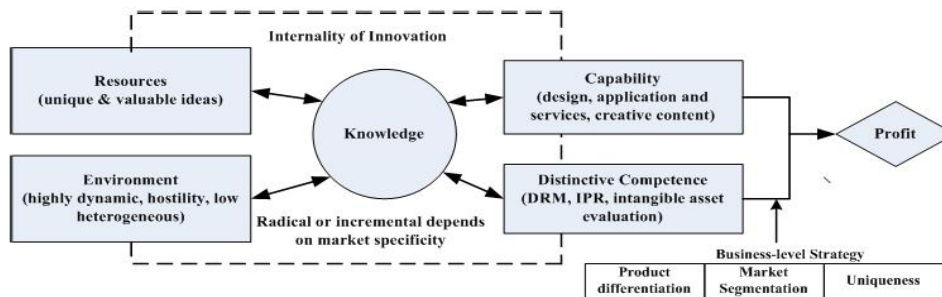


Fig. 1. Profit-Chain of Innovation in Creative Industries

III. OVERVIEW OF CREATIVE INDUSTRIES

Uniqueness and initiative capability are stressed in creative industries, and scale of production is not the main goal for corporations; i.e. the success in this industry is determined by the acceptance of production from the market,

hence, small-medium sized countries can establish the competitive advantages in this area like Taiwan, Singapore, Hong Kong, New Zealand, Korea, etc. As Scott and Storper [16] observe “there is mounting evidence that creativity and learning have a distinctive geography, with regions playing active roles as sites of continuous and informal but

cumulatively significant improvement in industrial products and processes”. The creative industries have all the characteristics of high-tech industries. They require a well-developed ICT infrastructure to serve their clientele and interaction with an IT manufacturing base to create and target

their products. Creative sub-sectors, such as the process of movie making and electronic games, depend on local and international networking in order to develop commercially successful products that enhance their market prospects. The nature of such local networking is presented below.

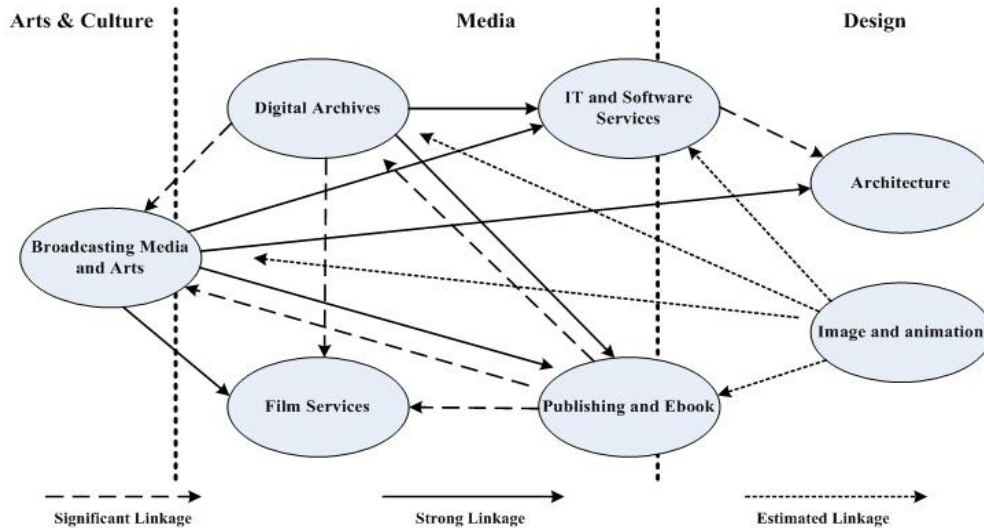


Fig. 2. Networking among creative industries
 Source: Yusuf, Shahid, and Nabeshima, Kaoru, [17]; modified by author

A. Definition and market scale of Digital Content Industries

Being highly export-oriented and dependent on personal contacts with buyers, reliance of creative industries on networking is greater than manufacturing firms.[17] Cultural-products industrial agglomerations around the world are becoming increasingly caught up with one another in global webs of co-productions, joint ventures, creative partnerships, and so on. In this manner, productive combinations can be established and can draw on the specific competitive advantages of diverse clusters without compromising the underlying force of agglomeration itself. [18]

1) Definition of Digital Content Industries

Creative industries can also be called Digital Content Industries since products from them are made through digitalization and involve the form of creativity. A recent European study defines the Digital Content Industries as “including net-business which delivers digitized information (text, data, image, audio, and video).” The core of the Digital Content Industries can be identified as the converged traditional media sector, e-publishing, and digital audio visual industries. While the former Digital Content Industries produced digitized text, data and images, the latter Digital Content Industries focuses on digitized television, voice and video sequences. [4]

2) The scale of digital content market

The creative economy and Digital Content are closely connected. As noted above, identifying those that make an industry successful is defining the industry. Another way of looking at Digital Content is to identify those parts of the creative economy that are digitized, or becoming digitized. Most of the activities are identified as being in the creative economy that uses digital inputs or produces digital goods and services to a greater or lesser extent. The least digital activity in the list is most likely craft. Activities, such as software and video games, are now almost universally digital, while the transacted part of activities, such as music, are becoming heavily digitized (where CDs and DVDs now dominate, although there are still significant sales of vinyl records, which are considered analogue forms). The challenge is in determining what proportions of these activities have been digitized.

According to the statistics forecasting for global entertainment and media market, the scale of market of Digital Content Industries has reached 1.13 trillion US dollars and will continue to grow to 1.18 trillion US dollars in 2004. The semiconductor industries are only at 0.215 trillion US dollars, 1/19 compared to Digital Content Industries. Figure 3 and 4 are predictions of Digital Content Industries in global market, and one noticeable point is that Digital Content Industries in Asian countries are growing rapidly, and the figure shows that these small-medium countries build their own advantages for competing in globalization.

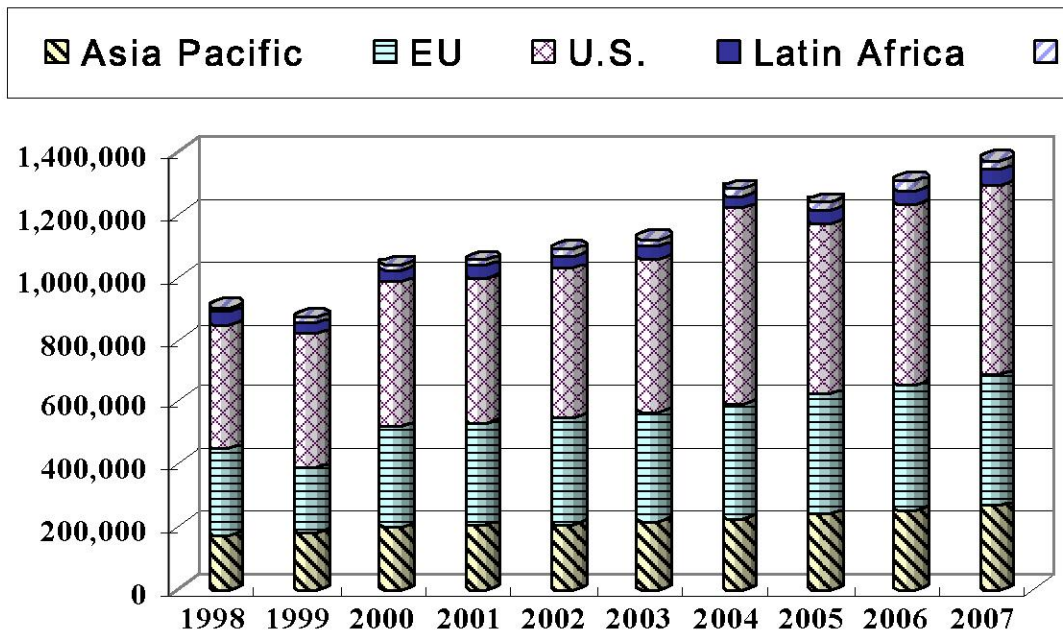


Fig. 3. Forecasting the scale of Digital Content Industries in global market
 Source: PricewaterhouseCoopers, 2004

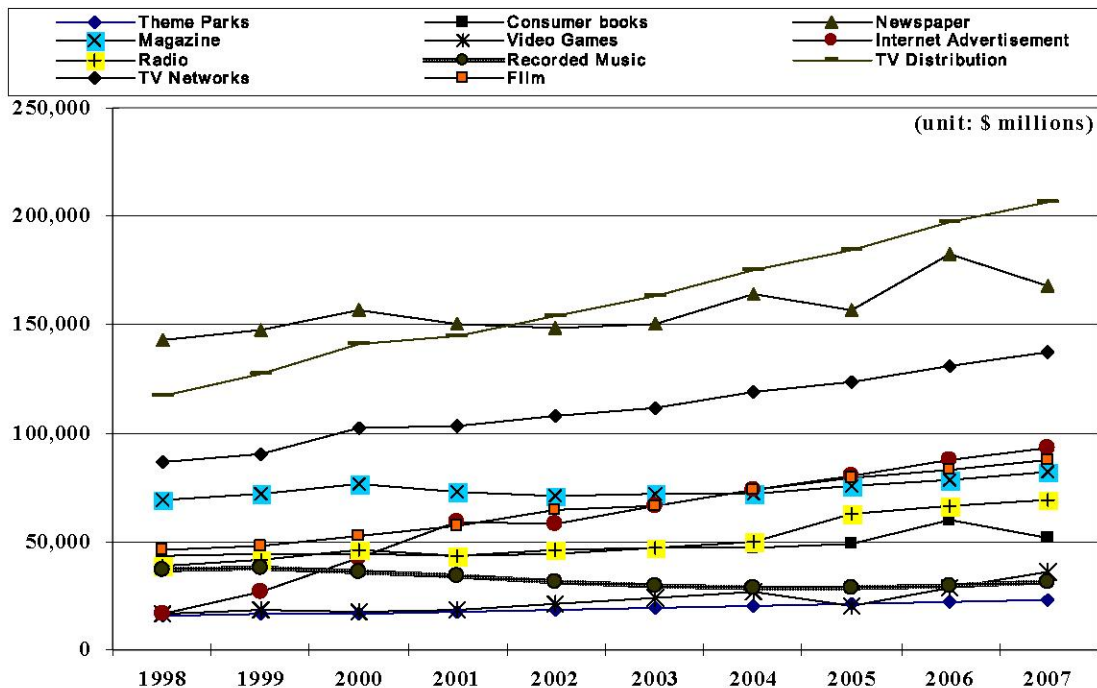


Fig. 4. Forecasting the scale of Digital Content Industries in each category
 Source: PricewaterhouseCoopers, 2004

B. Profit-chain of Digital Content Industries

Digital Content is about creativity. Digital Content is about assisting creative processes throughout the economy because it accelerates the spread of ideas. It makes ideas, knowledge, and information easier to store, distribute, and

access. As mentioned above, the investment of Digital Content Industries are almost intangible capital and substantial financial support. Venture Capital in ICT sector has been developing for many years, but the VC for Digital Content Industries is still in an initial stage. ICT sectors

pursue the cost leadership and market demands, therefore, the investment in ICT manufacturing profits quickly from the market. However, Digital Content Industries are different from ICT sectors since the products of this industry are unique, diverse, and not mass produced. The most important point about Digital Content Industries is that idea initiatives emphasize quality and market acceptance, hence the time horizon will be longer than manufacturing and return

of investments.

The profit chain of Digital Content Industries contrasts with ICT manufacturing in that the profit-chain of digital content is a kind of “value innovation” that focuses on content, which is not like an assembly line that occurs in manufacturing. In the following graph, the profit-chain of Digital Content Industries is shown.

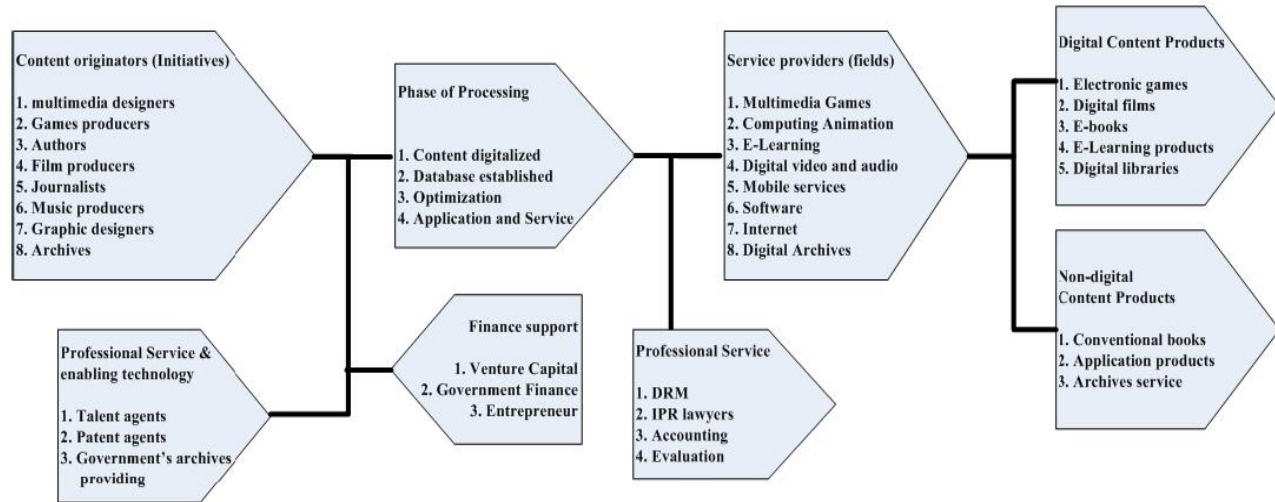


Fig. 5. Value-chain of Digital Content Industries
Source: MIC, 2005; modified by author

IV. TAIWAN DIGITAL CONTENT'S STATUS

Digital Content Industries (DCIs) in Taiwan include categories, such as videos, games, publishers, and learning by applying sides, which also discriminates core and staff industries. Core industries use applications, such as video and audio, computing animation, multimedia games, e-learning, mobile services and digital archives. Another application is staff industry that includes content software and internet services. The production value of Taiwan DCI in 2003 has reached 1983 billion NT dollars and is expected to exceed over 2300 billion NT dollars in 2004. [19] and the average annual growth rates have been 22%. [17]

According to the statistics from MOEA, the companies in DCI are in the range of around 1600s and are expected to grow to over 3000. There are about 33 thousand employers and will most likely expand to about 40 thousands thereby offering more working opportunities. In application and services, the export ratio of DCI in production value is 12% now, yet the DCI companies predict that this number will continue to grow to 30%.

A. Government's policy for development

Digital content index can measure the level of a nation's knowledge economy and digitalization. It can not only improve traditional ICT sectors and the intensity for

knowledge, which resolves in higher added-value, but also enhance Taiwan's DCI's competition advantages in the global market. For this reason, Taiwan's government has declared that DCIs are one of “Two trillion and Twin star industries” and has started to push related policies and bills that include the environment, human capital, financial support, R&D, global marketing, and applications. First of all, “Digital Content Industries Promotion and Development Office” has been programming the policies and strengthening cooperation between industries and academic institutes. Second of all, the government has created “Digital Content Institute” for developing human resources for industries and cooperating with universities. Third of all, it promotes the “Center for evaluation of Digital Content and investment services.” The value of digital content has yet to become the standard price in the market, so the evaluation center will offer objective pricing services for all intangible assets. Fourth of all is the offering of service for loan or financial support. Last but not least is the offering of national archives (including pictures, arts, historian source material, metadata, etc.) to companies for add-valued applications, like the worthy Chinese drawings that are applied on the decorations, handkerchiefs, tableware or dishware. These drawings are very popular and are highly accepted in international market.[19]

In a globalizing world, government policy has to compete by taking measures that create value for firms; the DCIs will

need to capitalize on existing opportunities that are likely to emerge, but also contribute to the future dynamism of these companies. The question facing major cities that seek to strengthen innovative capacity is what kind of models they can use as points of reference, what kind of measures they can take to enhance attraction for firms, and, particularly, how to create clusters of industries and services that can accelerate an industries growth.

Governments play an important role in DCIs because they are highly uncertain and intensive capital investments, like film producing or music, database establishing, etc. These are not possible for just a few companies to handle. Therefore, in the early stage of industry development, governments should have established the mechanism for assisting DCIs, like policy guidance, financial support, enabling technology imports or transferring, or community formation. DCIs need amount of capital investment, and, most definitely, the time horizon of returning investment. According to the locus of industry leadership, these ways can define the DCIs' strategies, which are broken down into three levels: nation, firm, industry, and comparison between Taiwan and others countries' policies for understanding the differences in strategy. The locus of industry leadership is explained in the following tables.

Taiwan government's DCI policy is divided into six main parts and 27 issues, and the policy framework is constructed on the specific technology it is setting rules for. Taiwan DCI policy tries to be well-rounded and invests a large amount of money for improving the industry development. However, from the locus of industry leadership, the DCIs are in an indefinite situation and is still immature; hence, the DCIs are not like other ICT products and should therefore follow a standard, which fulfills applications of technology. Therefore, it needs intensive capital to be the pioneer that ventures into the market. DCIs market has both "clear market segmentation" and "distinctive competence," which is becoming the two most important factors for producing unique content. Becoming the first country to move into the

market, Taiwan's policy strategies are to invest in technology exploitation, creative human resources, and global market promotion. Not only do related policies subsidy for new start-up companies in DCIs, but also convenes the relationship between industries and academy, like "Technology Development Program in Academia," and "Industry-academia Corporation Platform."

In financial support, the venture capital in Taiwan differs from that of the U.S. and other European countries. These countries positively encourage new start-up companies; even the companies aren't as strong as the other more stable companies. The companies in DCIs or cultural creative are mostly small and medium sized and are short on funds for R&D and innovation. At that time, the DCIs were to be regarded as the national's level industry, and the government had to raise the financial support for these creative companies. The strategies of MOEA in Taiwan are to raise the funds by government, which includes tax incentive, loan support, introducing foreign investment, and different industries alliance. They also wish to improve the constantly growing industries.

Nowadays there are a lot of countries, like the U.S., U.K., Japan, East Asia, Australia, India, etc. that are actively developing and promoting the DCIs because it can help push and pull on growing industries, especially the more traditional ones and ICT sectors because digitalization needs innovative technology to work efficiently. However, there are many fields that are included in DCIs and depend on limited resources. Governments should seek for a proper strategy to develop the most competitive industry. A good example of this technique is the U.S.. The country owns the film's production technology, market, channel, and ideas, and this is the one advantage that other countries have a hard time competing with, especially small and medium sized countries, like Taiwan, Singapore, Korea, etc.. In Innovative Intense Services (IIS), dominating a section is very difficult for small countries, but Taiwan's semiconductors industries are leaders in their fields.

TABLE 1. LOCUS OF INDUSTRY LEADERSHIP IN DCIS

	Nation Level	Industry Level	Firm Level
DCIs	<ol style="list-style-type: none"> DCIs belong to long creation industry, but have short life cycles. DCIs need intensive capital investment and the nation's resources are the most important factors. Small and medium sized countries could incise the market by the use of unique products. IP law's protection. 	<ol style="list-style-type: none"> The link between industry and academic institution should be established as soon as possible. The formation of DCIs VC will be another KSF. 	<ol style="list-style-type: none"> DCIs are in low heterogeneous environment and choose one segment for entering. Intangible assets don't have necessarily have product life cycle, so the diversified product is the important strategy.

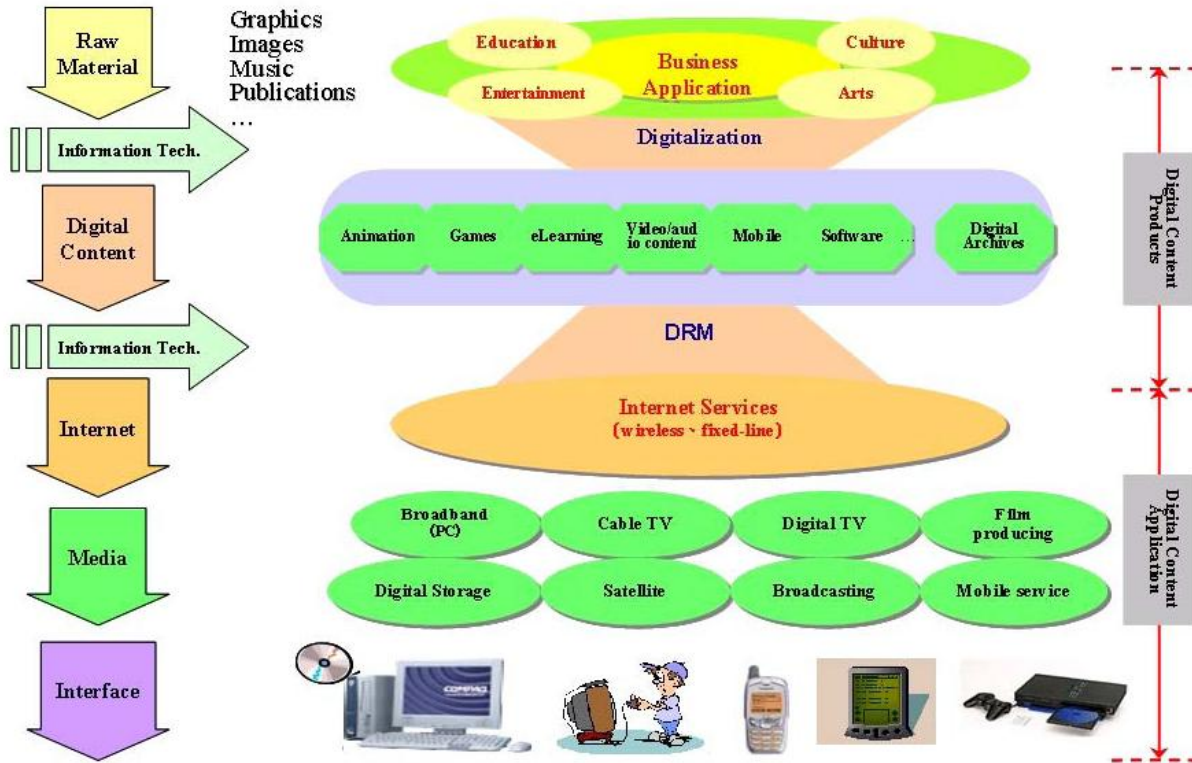


Fig. 6. The Promotion Strategy of Taiwan's policy for DCIs
 Source: MIC, 2005, modified by author

TABLE 2. INTERNATIONAL DIGITAL CONTENT POLICIES

	Canada	Korea	Japan	U.K.	Taiwan
Public Office	CH	MCT & MIC	MITI	DTI	MOEA
Promotion Institution	Telefilm Canada NFB	KCIPC KIPA KGDI	DCAJ	DCF	DCPDO
Emphasis	TV, Film and New media	Games, Cultural Content, Digital content	Games, Software, Film, Music, Publications, Services.	TV, Film, Publications.	Games, Animation, Video/Audio, Internet service, Digital Archives, Software

Source: MOEA, 2004

B. Focus on Taiwan's niche

In Table 2, it is clearly shown that countries emphasize the development of DCIs the most on their own vantage points because of the limitation of the nation's resource. It is hard to cover all fields, but the enabling technology is the key factor for industry developments. The enabling technology can be divided into two parts: one is industry used in technology, like applied software or video/audio tech, and digitalized tech; two is interface technology, like hardware, telecommunications, and internet infrastructure. As the Korean policy states, the government plans to invest about 6100 Korean dollars on the multimedia technology-support center for developing Virtual Reality and Computer Graphics technology to improve on-line game's quality thereby attracting more players. That is also why the U.K. focus on publications and media since they have a large amount of archives and a flourishing media industry, and these are good

foundations for developing DC. These policy decisions show that in DCIs, even leaders in technology like the U.S., it is hard to achieve a goal such as "winner takes all." Each country has to put their limited resources on the most efficient item to bring in a substantial amount of profit.

The theory of locus in industry leadership clearly defines the DCI's position and situation, and like the developing tech and bio-chips, this kind of industry is still in the process of growing and contains many risks, therefore, can the development of technology accompany with the industry growing? DCPDO(Digital Content Promotion and Development Office)[20] has investigated and analyzed Taiwan's environment and policy for developing DCIs, and through the expert's and companies' opinions, they presented a report about the KSFs of Taiwan's DCIs. In this study, the report is used to compare with the status quo of the global market, and the expert's opinions and analysis of the risks of

these factors are shown in the following. In this study, it assumes that there are numerous variables for analyzing these KSFs. High risks indicate that it is not the right time to develop this issue in Taiwan, and it is known that high risks also mean that this issue is in high dynamic and hostility.

Low risks are more adequate for Taiwan's status quo and can gradually be developed. The vantage point means that it is the critical factors that have the ability to easily influence the developments of industry.

TABLE 3. THE ANALYSIS OF DCIS' KEY SUCCESS FACTORS(KSFS) IN TAIWAN

Issues	KSFs	High risk	Low risk	Vantage Point
Digital Video/Audio Application	1. established fixed users	✓		
	2. killer application software	✓		✓
	3. human resource incubating		✓	
Games	1. encourage new start-ups	✓		
	2. has to be creative content	✓		✓
Animation	1. technology development		✓	
	2. creative ideas and topic	✓		✓
eLearning	1. useful content and easy use		✓	
	2. should expand the target of application		✓	
Mobile service	1. broadband infrastructure		✓	✓
	2. content and service renewal	✓		✓
Software	1. incubating human resource	✓		✓
	2. Corporation with foreign software producers	✓		
	3. key and most users software exploit	✓		✓
Internet service	1. well-done infrastructure (high speed and capacity)		✓	✓
	2. mature users community	✓		
Digital Archives	1. rich raw archives or materials		✓	✓
	2. application and services promotion		✓	
	3. global marketing strategy	✓		
	4. continuous content innovation	✓		✓
Financial Support	1. government policy support		✓	✓
	2. loan incentives		✓	✓
	3. VC	✓		✓

Source: DCPDO, 2005; modified by author

From the analysis in Table 3, the whole DCIs environment has existed as a high risk in Taiwan, and the government should choose the profitable fields to invest, like Korea's emphasis is simply on internet services and on-line gaming enhancement. Immoderate divergent resources allocations are the cause for inadequate industries development, and can also postpone the time for the products' to enter the market. In fact, DCIs need the demand side market orientation and the acceptance of ideas to decide the viability of digital content companies. Some fields like Digital Video/Audio, Digital Games, Software, and Internet Services, are almost all in high risk, and these fields need fresh ideas; otherwise, it will be difficult to get a high added-value. Moreover, the broad market size will be able to ensure the survival of DCIs, and Taiwan's domestic markets are constrained and export orientation can help solve these problems; hence, the human resources incubating and management will also be a large investment. Therefore, Taiwan's government should ponder pm these issues in policy decision making. In this study, the SWOT analysis of DCIs from the research of KSFs is shown below.

From the SWOT analysis, it can be concluded that Taiwan DCIs obvious advantages are the opening of the China market and the linguistic familiarity. The China market has a high acceptance for new innovative commodities, and the Olympics Game 2008 is coming soon, so the national pride has been rising and it doesn't matter if the person is Chinese

or a foreigner, both are enthusiastic about Eastern Culture. It will be a very good opportunity to promote Taiwan's DCIs through different fields. Moreover, DCIs need creative human resources or talent agents, and the most important factor is the aesthetics incubating for innovation. DCIs are like "artifacts imbued with imaginative aesthetic and semiotic content." [21] Although there are some universities or institutions doing arts, the relationship between arts and industries are seldom built on, causing a shortage of innovative talent supply and a source of innovation. Another point is that the limitation of domestic market size and lack of emphasis on the demand-side of the market are problems DCIs have encountered. DCIs products are high-value added when compared to ICTs', but the demand side is limited by the market scale and can not be expanded. Thus, the global marketing strategy and government support. Lastly, the government should have a focus strategy on the most profitable field because each issue of DCIs needs enormous capital investments

After analyzing the information, it clearly shows the advantages and disadvantages of Taiwan's DCIs, and also indicates which issues will be more proper for Taiwan to develop. Digital Archives and eLearnings are more advantageous than other issues because of its low risk and popular materials for doing applications and services. SWOT matrix for analyzing the issues' position in DCIs is discussing followings.

TABLE 4. SWOT ANALYSIS OF TAIWAN DCIS

Issues	Strength	Weakness	Opportunity	Threat
Digital Video/Audio Application	<ol style="list-style-type: none"> 1. Creative film producer 2. Linguistic familiarity in film 	<ol style="list-style-type: none"> 1. Small domestic market 2. Enabling tech. hard to develop 3. Lack of sufficient capital 	<ol style="list-style-type: none"> 1. China would be the target market 2. VOD's usage is growing 	<ol style="list-style-type: none"> 1. Channels are owned in U.S. or others. 2. bad film producing environment
Games	<ol style="list-style-type: none"> 1. PC penetrations are high 2. Low cost for producing 	<ol style="list-style-type: none"> 1. Lack of enabling tech. for quality. 2. Insufficient ideas for creating 3. Lack of capital 4. Lack of TV games experience 	<ol style="list-style-type: none"> 1. The ratio of PC has been growing in China. 2. On-line game will become the main-stream 	<ol style="list-style-type: none"> 1. Korea has developed on-line game well. 2. DRM will be a serious problem in China.
Animation	<ol style="list-style-type: none"> 1. OEM from international film company. 2. Skill has advantages 	<ol style="list-style-type: none"> 1. Lack of creative ideas. 2. Small companies lack talent and capital. 3. Lack of long-term incubation 	<ol style="list-style-type: none"> 1. Internal demand has been growing in China. 2. 2008 Olympics is coming. 3. Corporation with international companies for entering China. 	<ol style="list-style-type: none"> 1. Lack of aesthetic education 2. Government support is insufficient. 3. Korea's has been mature.
eLearning	<ol style="list-style-type: none"> 1. Large amount of producers. 2. Government policy support 3. Leading posture in Chinese linguistics. 	<ol style="list-style-type: none"> 1. On-line authorization has not passed the legislation. 2. The usage habits didn't build. 3. Small domestic market 	<ol style="list-style-type: none"> 1. Global CAGR is growing rapidly. 2. China market has opened. 3. Integration of content in many fields. 	<ol style="list-style-type: none"> 1. China has cooperated with companies (Smart Force) for expansion of domestic market. 2. "On-Line School" has opened in China
Mobile service	<ol style="list-style-type: none"> 1. The holder of ratio of cellular phone has been over 107%. 2. 3G has opened. 	<ol style="list-style-type: none"> 1. Where is the platform? 2. Standard is owned by enterprises. 3. Content resources are seriously insufficient. 4. Lack of database. 	<ol style="list-style-type: none"> 1. Chinese content could be popular in China. 	<ol style="list-style-type: none"> 1. I-mode has penetrated into the world market. 2. Integration of software and hardware.
Software	<ol style="list-style-type: none"> 1. Full experience of producing Traditional Chinese version software. 2. Agent of software 	<ol style="list-style-type: none"> 1. Lack of R&D ability 2. Lack of management of software 3. Lack of marketing strategy and experience 	<ol style="list-style-type: none"> 1. Broad Chinese linguistic market 2. Government bridges the local and international companies. 	<ol style="list-style-type: none"> 1. India & China positively developed software industry. 2. Full talent pool of other countries.
Internet service	<ol style="list-style-type: none"> 1. Infrastructure well-done. 2. Usage ratio has been growing rapidly. 	<ol style="list-style-type: none"> 1. Mechanism of E-commerce not yet established. 2. Internet security willingness for on-line payment 3. lack of platform 	<ol style="list-style-type: none"> 1. Wireless has been popular. 2. China internet infrastructure has been rapidly established. 	<ol style="list-style-type: none"> 1. Strong competitiveness with intl. main enterprise. 2. Where is profit model?
Digital Archives	<ol style="list-style-type: none"> 1. Linguistic familiarity 2. Popular materials 3. many Publishers 4. Government policy support 	<ol style="list-style-type: none"> 1. small scale economy 2. DRM protects the IP. 3. lack of platform 	<ol style="list-style-type: none"> 1. Application and services can rapidly penetrate the market. 2. The new market of China has opened. 	<ol style="list-style-type: none"> 1. Usage interface integration 2. marketing strategy

Source: DCPDO, 2005; modified by author

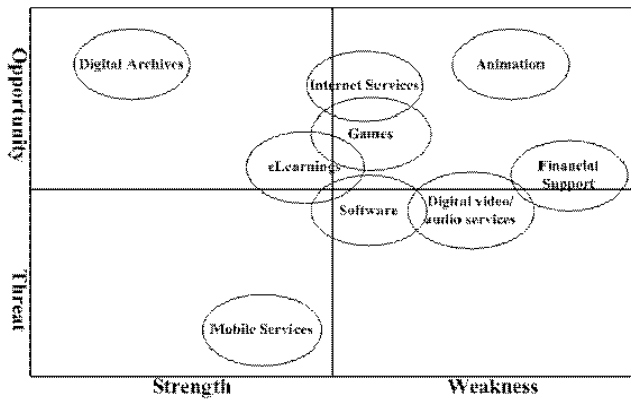


Fig. 7. SWOT matrix of Taiwan DCIs

C. Discussion

With China opening their market to the world, the Chinese will become the largest group of internet users, and the content points out Chinese will help the market grow at double the speed. DCIs have the cultural compatibility and uniqueness, so it is the vantage point for Taiwan's DCIs developing to become the pioneers of China's digital content market. Globalization forces China to enter the information technology era. Meanwhile, the infrastructure and technology are rapidly growing; furthermore, the ratio of users of information technology is becoming much higher. These are the factors and conditions that foreign companies positively invest capital and human resources in. For example, Hong Kong, it is the transition center for globalization of culture, but the small scaled economy can lead to an expansion of DCIs into the market. Yet, Taiwan has the vital position and has more creative ability than others. Therefore, Taiwan has the potential and opportunities to explore China's market and eventually entering the global market.

Taiwan has the crux channel of Chinese digital content, and the cultural similarity can help Taiwan DC companies to do vertical integration more easily: from creation to channel, to inverse the traditional value-chain to capture the dominants of the market in order to defend the Western countries monopoly. During that time, Taiwan's government should help the DCIs to build up the global marketing strategy system and create sufficient financial support.

After analyzing DCIs issues, for more efficient resource utilization, Digital Archives and application and services are to be first priorities in the process of policy making. Digital Archives is one part of DCIs, but it will offer the whole DCIs development an important database. Application and services become high added-value products or services and will expand to other issues by offering new ideas and creation. Traditional archives' application and services are like replicas of famous paintings or arts, but the digitalization will rapidly increase the value of these archives, like printing the symbol or signs of Chinese paintings onto wallpapers, cards, counterpanes, or other decorations. Even the price of those can become higher than that of before, and the most

important factor is that many people will collect these products by paying a higher price.

The goal of Digital Archives is to prevail and diffuse the exquisite cultural applications. The arts have their uniqueness, so the market segmentation will be very obvious and the companies could offer different prices and levels of products to dominate the market. For the overall effect, Digital Archives will have a two dimensional influence: one is on human and social science.[22] It means that through the Digital Archives applications, aesthetics will be combined with the technology for education and mold the palate for spurring the new ideas and innovation; two is on the industry and economy. Digital Archives can transfer cultural heritage into valuable information and commodities, and it would be the accommodation for digital databases like developing animation, software, or film producing.

Nowadays, the composition of Taiwan DCIs is almost made up of SMEs, but lack industry leadership. Though SMEs are flexible and developing their own unique products, they have difficulty facing the challenges of international companies. Consequently, the government should assist Digital Archives companies to establish a transaction platform to refer the archives to products added-value then distribute them to the channels.

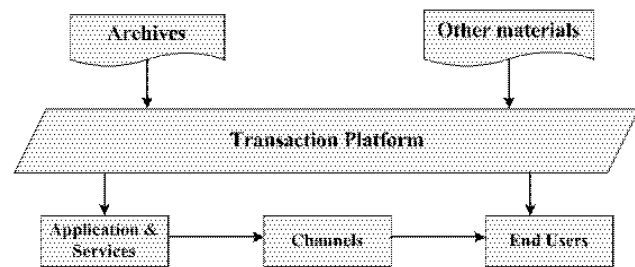


Fig. 8. Transaction Platform of Digital Archives

V. CONCLUSION

The output of Digital Archives has offered the DCIs an amount of materials and database. Taiwan is located at the critical position for the transition of Chinese content. Taiwan has the potential human resource and enough raw materials; however, it is a lack of a well-planned policy to promote the Digital Archives. DCIs in Taiwan have many factors and barriers to break, like resource allocation, financial support, technology innovation, etc., and the most important factor is the exploration of customers' needs. For this reason, there are two considerations for promoting Digital Archives; the first consideration is the inducement for industry and customers' needs, and the other is the improvement of environment. First of all, the government should understand the industries needs and bridge the relationship between industries, talents pool, and market. The output of Digital Content is very subjective and unique, so the mechanism of value-identification should be established

Lastly, the improvement of environment is focused on the policy making. DCIs are the high capital intensive and the government has to assist the development of the industry by policy support, especially the financial support and the government should establish a transaction platform for the capturing of resources and output promotion. DCIs are the main leading and incubating industry in Taiwan's economic plan and invest much of its time on the relationship between the government, industries, and market. The market should be well-done and will have more competitive advantages in the global market.

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