

## 디지털 콘텐츠 유통 인프라 개발을 위한 로드맵

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### A Roadmap for Developing Digital Content Distribution Infrastructure

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#### ■ Abstract ■

Unlike physical products, the distribution of digital content has involved many participants in all distribution phases from providers to consumers. The longer the distribution channel for services is, or the more participants that take part in it, the more the added value of the content increases. Consequently, the customer usefulness has been maximized. In order to enhance the values of digital content, it is utterly urgent to implement a service infrastructure that could be shared by all participants along the distribution path. Digital content is distributed from a creator to a final user through complex value chain stages. All the participants along the value chain exchange information about copyrights, marketing, and contents themselves, through the distribution channel. Recently, the more the distributed Information Technology environment has been widely used, the more the necessity of an identifier for digital content has been increased. In this paper, we examine the current status of the Korean distribution market of digital content, identify necessary distribution services of digital content, and establish a systematic roadmap to implement these services.

Keyword : Digital Content, Distribution, Infrastructure, Digital Content Identifiers

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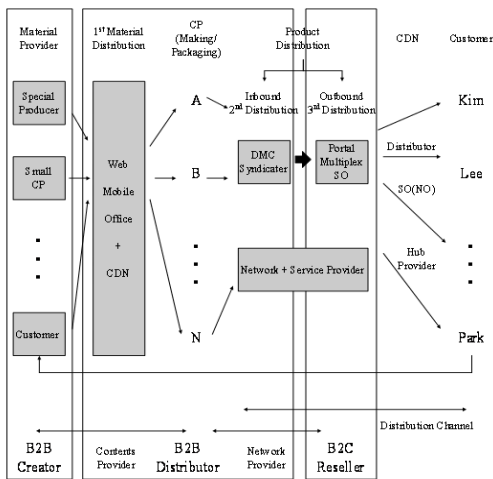
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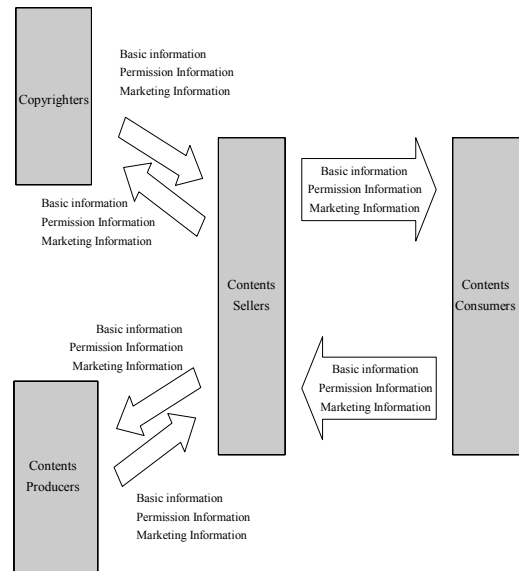
# 1. Introduction

In the distribution of physical products, the shorter the distribution channel is or the fewer the participants there are, the more usability customers perceive. The case of digital content distribution follows Metcalfe's law that the network value is relative to square the number of participants. That is to say, the longer the distribution channel for services is (or the more participants take part in), the more values of content are added. Consequently, the usefulness which customers perceive is maximized[1]. Another difference of the distribution of digital content from that of physical products is that there is clear difference between primary use and secondary use. Digital content could be used for various purposes in many fields by using information technology (IT for short). It is urgent to establish an infrastructure where each participant along the path of digital content distribution, shares information about digital content. Digital content is delivered from a creator to a final content user through a complex value chain [Figure 1].



[Figure 1] Value Chain of Digital Content

Major participants related to the distribution channel of digital content include copyrighter, content producers, content sellers, and content consumers. They exchange information about copyrights of content and content itself through the distribution channel [Figure 2]. If there are no identifiers for digital content and its meta data which includes all information about the digital content, there are many duplicated or redundant digital content along the value chain. That causes inefficiency of digital content distribution[2].



[Figure 2] Information Exchanges Along Digital Contents Distribution Channel

In order to manipulate and manage many digital content which staggers under the distributed environment efficiently, the necessity of identifiers for digital content is increased. Since digital content is manipulated and modified along the distribution channel, for effective content management, it is very important to have their identifiers and meta data. By using the identifiers and the meta data, searching behaviors of participants of the digital

content value chain can be enhanced.

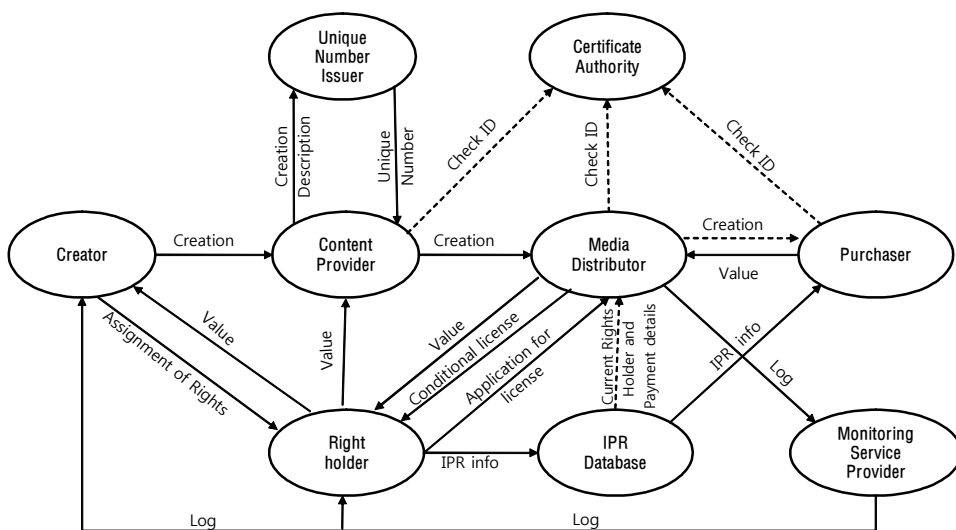
Therefore, in order to deliver or use digital content and its meta data that go beyond boundaries among distribution domains managed by mutually different subjects, a standard identification system should be built. The system must generate a unique identifier for digital content in the world as well as be accurate and machine-readable, through all the stages of the life cycle of digital content from creation to consumption of digital content.

The goal of this research is to identify a road map for developing digital content distribution channels by analyzing Korean and international distribution markets of digital content. Various distribution services would be needed to implement efficient distribution markets of digital content. First of all, the basis of these various distribution services is to introduce an identifier which could identify unique digital content. This paper examines the current status of Korean markets for digital content distribution and their structures. Finally, it identifies necessary distribution services and

suggests a roadmap to implement these services.

## 2. Business Models in Digital Content Industry

Along the digital content distribution channel, many participants are involved, having different roles and business models. A well known business model in the digital content industry is Imprimatur Model[3]. This model consists of Content Provider, Syndicator, Aggregator, Retailer, and Service or Infrastructure. Imprimatur is a project to develop digital content distribution model in Europe, and its goal is to make a blueprint of multi-media content businesses for future digital content transactions. The Imprimatur Business Model was designed to provide an infrastructure in which participants such as Creator, Content Provider (CP for short), Media Distributor, Purchaser, Rights Holder, IPR Database, Monitoring Service Provider, Unique Number Issue, and Certification Authority, can freely share content information together [Figure 3].



[Figure 3] Imprimatur Business Model

Since digital contents are delivered to consumers by communication network, they would have fewer bottlenecks on the value chain than physical ones. However, it is true that there is no co-operation or information sharing among subjects who participate in the value chain. Because of many above-mentioned features of digital capital, subjects in the value chain provide consumers with their own versions of digital contents. This could create inefficiency of digital content distribution.

- The Imprimatur Business Model suggests four major players.

1) Content Provider : The Content Provider (CP for short) that manufactures, commercializes, and provides digital contents is the core of digital contents business model. This takes charge of primary or secondary manufacturing digital content. However, a large majority of CPs have weak finance foundation and qualitative limitations of contents. They are caused by lack of understanding about copyrights, online distribution as well as irrational treatment of earnings or contracts from large companies.

2) Content Syndicator : The Content Syndicator collects contents from various content providers on the wire or wireless internet, digitalizes offline contents, and then provides them to sites or service companies that need related contents. Although they take charge of collecting or processing digital contents, and providing additional services, they experience difficulty in collecting digital contents. This limitation is caused by complexity of securing copyrights and difficulty of identifying original sources of digital contents.

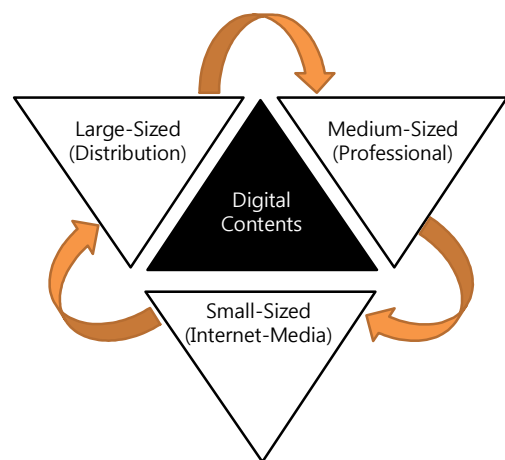
3) Content Aggregator : Content Aggregator means an intermediary media-enterprise or knowledge portal site, which serves collaborating enter-

prises or other providers with its own media-platforms (mobile instruments, internet servers, streaming media, portal/hub sites).

4) Content Retailer : Content Retailer is an enterprise model to provide digital content and services to final consumers. Because of providing free services for securing early consumers, it will be difficult to charging on digital content in the near future.

### 3. Current Status of Korean Digital Content Industry

The Korean digital content industry occupies a small scale of total domestic industries from the viewpoints of the number of businesses or employees. Although the digital content industry has a far smaller number of enterprises than that of other industries, its employment or gross-product is 4 times or 9 times, respectively, as that of other industries[4]. This means that the digital content industry, even with a small scale, is economically superior to other industries. The market of the digital content industry consists of distribution-ori-



[Figure 4] Markets in Digital Content Industry

ented large-sized enterprises, medium-sized professional enterprises, and internet-media-oriented small-sized enterprises [Figure 4]. There are 3,338 domestic enterprises that are related to digital content at the end of 2004, with 2,145 enterprises related to creation or services of digital content, 391 enterprises related to distribution, and 802 enterprises related to solutions.

### 3.1 Market Size

The Korea Software Promotion Agency said that the world market size of digital content industry was 253 billion dollars in 2006, that the digital content industry in Korea was growing at 26 growth-rates per year from 2001, and the Korea market would become 9 trillion won market in 2006. But, the yearly growth is decreasing (46.7% in 2001~2002, 39.7% in 2002~2003, 18.6% in 2004~2005). The downward growth would be caused not by saturation of digital content market, but by mixed disheartening factors such as continuous minus-growth of content consumption and customer psychological resistance of paying fees for online content. Even in this environment, the fact that the digital content industry keeps a record of approximate 20% growth proves that the industry has potential growth energy more than other industries.

The Korean industry of digital content has already marched into the serious growing stage and is expected to expand its market scale continuously in the future. The industry has mostly recorded rapid growth since 2001 and most of its growth was focused on creation or services. Because the digital content market is now at the early stage, it has many customer requirements about creating digital content or serving them to end-customers. However, as the market reaches the growing stage,

the market of distribution and solutions is expected to grow dramatically from now on.

### 3.2 Current Problems

Although the demand of good-quality content is increasing as the information infrastructure such as information telecommunication networks or satellite broadcasting services implements, the basic infrastructure for creating and distributing digital content is still weak. From the viewpoint of industrial development of domestic digital content, the biggest problems are that the competitive power of content is very weak. Currently, there are no fields that have world-class competitive power among Korean domestic digital contents and only parts of content such as online games or broadcasting programs are popular in East Asia. The problems of digital content industries are listed concretely as follows. 1) Any safe infrastructure of digital content is not implemented. 2) Means for securing investment of contents manufacturers are weak. 3) Related fields of digital content run short of industrial manpower because systems that they provide digital content enterprises with industrial manpower leave something to be desired. 4) Governmental departments related to digital content lack mutual cooperation of their systems.

### 3.3 Law and Regulation for Digital Content

Rapid development of digital technologies such as computer graphics and virtual reality are changing the industry profoundly from existing entertainment-oriented content industry to complex content industry that expands its application domain to service or manufacture fields such as educational or medical services. To cope with the changeable

environment of this content industry, the Korea Ministry of Culture, Sports, and Tourism announced a vision, Next-Generation Complex Content Promotion Strategy. The vision says that the Ministry will promote complex digital content of various forms combined with new next-generation technologies to strengthen the competitive power of content industries in the world, create new markets, and finally become a global content leader in the world. As a new growth ideology as well as a practical strategy of Low Carbon, Green Growth in the practical government age, the Ministry decided to intensively foster next-generation digital content industries of 5 major areas (computer graphics, u-learning contents, virtual reality contents, and so forth). In order to realize the decision, the Ministry plans to invest 650 billion won in technology development and industry reconstruction till 2010. To make a new 7 trillion won market and to create 130,000 employees is expected until 2012, which would certainly be a leaping to make Korea one of the top 5 content powers in 2012. In February 2009, the affairs related digital content promotion transferred from the old Korea Ministry of Information and Telecommunication to the Korea Ministry of Culture, Sports, and Tourism, in order to expand or develop the affairs. The Ministry is now intensifying work in high-tech digital technologies and industry-promotion functions on the basis of existing cultural creativity, and then is expected to move forward with policies to foster more systematic and total content industries[5].

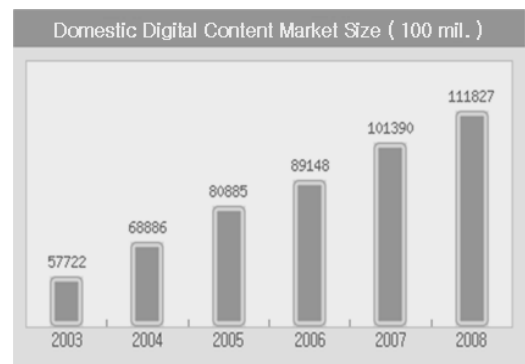
#### 4. Analysis on Digital Content Distribution Markets

Digital content distribution is defined as total process to deliver digitalized content from creators

to consumers [6]. In digital content distribution, digital content creators serve various types of content through distribution infrastructure of syndicators. Digital content distribution markets have two major markets, one for end-users (Business to Customer, B2C) and one for business companies (Business to Business, B2B).

##### 4.1 International Digital Content Distribution Markets

In 2008, industries related to digital contents grew meaningfully in general and showed a possibility that they would play a leading role in developing IT industries in the near future. Since the market size of Korean digital content was recorded as 5,772.1 billion won in the year 2003, the market had recorded a high growth rate, 14.1%, per year. In 2008, the market reached 11,182.7 billion won [Figure 5] [7].



[Figure 5] Size of Korean Digital Content Market

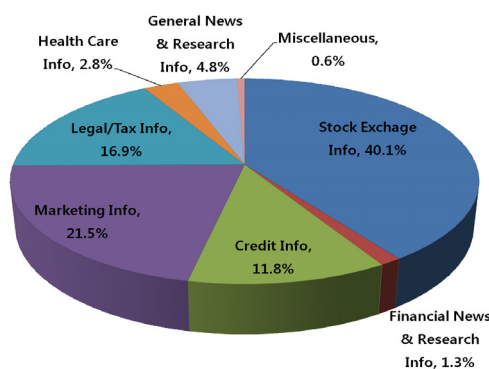
Now, the center of information telecommunication industries is moving toward digital content. The growth rate of hardware has been decreased due to the fall of the cost to connect to the internet, the increase of broadband connection rate, and the penetration of the maturity age of mobile phones

in Europe and Japan. Owing to the increase of the amount of information by geometric progression, the digital content that has been recognized for being offered free becomes difficult to be purchased by consumers. As the rich-media (such as music and video) market is expanding, the number of consumers who intend to purchase for trusted quality and rapid transmission is growing. Therefore, these situations show that digital content would be a principal force in leading the development of IT industries in the near future.

Since the first survey recording 5,772.1 billion won in 2003, the market of Korean domestic digital content has shown a substantial amount of growth with average annual 14.1%. In the market size by the types of business, game recorded 3,012.7 billion won up by 11% over in 2007 ago. Digital broadcasting recorded 1,664.8 won up by 9.1%, and digital video recorded 338.4 billion won up by 8.4%. The size of digital music market recorded 342.7 won up by 8.1% over in 2007 ago, and that of mobile content recorded 1,063.4 won up by 9.5%. The game market that forms a great part of the digital content industries showed a substantial amount of growth, owing to proactive access to foreign markets by Korean online companies and miraculous growth of video games that were sparked by the introduction of Nintendo DS[7].

The Ministry of Culture, Sports, and Tourism and Korea Software Promotion Agency analyzed foreign data [Figure 6] in 5 regions including the USA, Europe, and Asia, and estimated that the market of digital content in the world will expand from 303.1 billion dollars in 2007 to 353.3 billion dollars in 2008 by 16.6%. They also forecasted that the size of the market will reach 632.2 billion dollars with average 12.3% per year until 2013. The Ministry of Culture, Sports, and Tourism said that Kore-

an domestic digital content industries had continued to increase due to commercialization of IPTV and new complex services according to unification of broadcasting and communication as well as acceleration of HD switching of terrestrial and cable broadcasting, even though their growth rate had slowed due to world-wide economic recession.



[Figure 6] World Digital Content Markets (100 billion dollars)

#### 4.2 Korean Digital Content Distribution Market

The Korean digital content distribution market is capable of expecting to create high value added by use of explosive increases of internet population and development of IT technologies such as implementation of information infrastructure. However, insufficiency of development of distribution management technologies to support distribution channel environment does not secure trusted distribution environment of digital contents. Therefore, offline growth of distribution is increasing rather than online growth.

[Figure 7] shows the sales by the types of Korean digital content markets. In 2008, the total sales of digital content are 11,284.9 billion won where the sales of creation or service are 9,307.7 billion won

and those of solution are 1,977.2 billion won. In 2009, the total sales of digital content has been 12,537.1 billion won where the sales of creation or service are 10,348.4 billion won and those of solution are 2,188.7 billion won. The total growth rate of the sales of digital contents is 11.1%. Meanwhile, the survey revealed that the sales of offline distribution were bigger than those of online distribution, which would result from distribution of illegal online content. That is to say, even though much digital content is distributed online, it is illegal, so the sales of online contents were less than those of offline contents. If the copyrights of digital content is perfectly guaranteed and illegal distribution is not permitted, the sales volume of online contents would be more than those of offline contents.

Category	Yr	Game	Digital Broadcasting	Digital Image	e-Learning	e-Book	Digital Music	Info Contents	Content Trade & Intermediaries	Solution	Total market Size	Growth Rate
Outcome	2003	15,117	2,217	4,414	4,948	306	1,850	5,177	11,790	11,902	57,721	-
	2004	20,797	3,612	4,057	5,819	573	2,112	5,854	14,484	11,578	68,886	19.3%
	2005	24,778	5,297	4,220	6,724	735	2,798	7,117	16,468	12,750	80,885	17.4%
	2006	23,882	11,314	2,445	7,128	552	3,294	8,890	16,226	15,417	89,148	10.2%
	2007	26,589	13,698	2,471	7,930	473	3,559	10,188	17,945	17,214	100,067	12.2%
	2008	28,745	16,867	2,613	8,518	503	3,848	11,442	20,541	19,772	112,849	12.8%
Estimation	2009	30,978	20,567	2,945	8,773	522	3,963	12,592	23,124	21,687	125,371	11.1%
	2010	32,977	24,595	3,404	8,971	536	4,046	13,379	25,012	24,082	137,002	9.3%
	2011	33,445	28,974	4,058	9,124	544	4,075	14,032	26,251	28,839	149,352	9.0%
	2012	33,628	33,068	5,065	9,242	550	4,089	14,510	27,451	34,065	161,668	8.2%
2007-2012 Average Gr		4.8%	19.3%	15.4%	3.1%	3.1%	2.8%	7.3%	8.9%	14.6%	10.1%	
2003-2012 Average Gr		9.3%	35.0%	1.5%	7.2%	6.7%	9.2%	12.1%	9.9%	12.4%	12.1%	

[Figure 7] Market Size by the Types of Digital Contents

### 4.3 Problems of the Korean Digital Content Distribution Market

Firstly, the infrastructure of revenue in order to promote digital content distribution is not strong. Because most enterprises in digital content industry are small-sized and have weak financial condition, it is difficult to create digital content with good quality in time or to implement their own dis-

tribution infrastructure of created contents.

Secondly, infrastructure or standardization of distribution/management for digital content leaves something to be desired. Although the technologies of distribution/management for digital content have been developed, there are no regulations and policies to implement various technologies into distribution channel.

Thirdly, trusted distribution framework of digital content is now absent. Distribution framework of digital content to distribute digital content reliably as well as to secure general rights for digital contents is not implemented.

Fourthly, the function to secure consumers through transaction verification systems is not weak. It is urgent to implement transaction verification systems for revitalize distribution of digital content. Quality verification systems are needed for revitalize digital content distribution with good quality. For continuous growth of digital contents industries during the quickening period, it is necessary to support policies about measures against illegal replications of digital content and interceptions of digital contents harmful to juveniles. In order to effect consumer protection of digital content, revitalized indicator systems specialized for digital content need to be put in place.

### 4.4 Analysis on Digital Content Distribution Industry

The strength of Korean digital content distribution industries is that the industries have advanced information technologies to secure competitive power in the world market. In particular, Korea has the infrastructure of information telecommunication to distribute various digital contents. However, Korea has also demerits in that it has insufficient standardized systems to control a large



amount of content and insufficient understanding about online content commercialization. Considering progress of media and development of various digital contents, the standardized systems would be most likely to rise to the issue in the distribution market of digital contents henceforth. An opportune factor for distribution industry of digital contents is the rapid expansion of markets. Even though the explosive expansion of the market is common in other markets in their early phase of market penetration, the market of digital content distribution has an odd phenomenon, in that the market of digital distribution acts as a mediator among industries and is used as a joint or new power to grow.

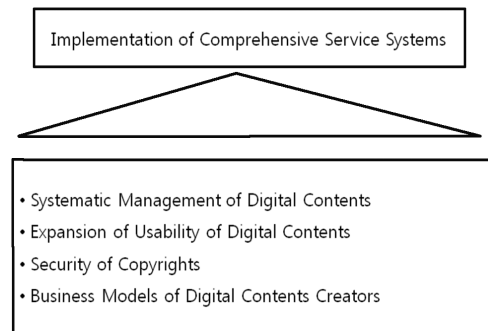
Finally, as a threat in Korean digital content distribution market, many companies in this market are poor as the market is getting smaller and smaller. Therefore, they are reluctant to spend money in technology development and investment. In fact, the index of average technology of Korean enterprises obtains an approximate 70 points out of a possible 100 points. Also, because there are many small enterprises in the market, their competition is keen. This causes redundancy of technologies. As the relative importance of basic content price is getting higher, the barrier of market penetration is now very low.

## 5. Implementation of a New Digital Content Distribution Market

### 5.1 Vision and Objectives

For a desirable market of digital content distribution in the future, it is urgent to implement the distribution infrastructure that enables players

related to digital content distribution, such as consumers, content providers, syndicators, and retailers, to do business with digital content on the basis of trust. [Figure 8] shows the vision and practical objectives of Korean digital content distribution markets so as to implement this trustworthy infrastructure. Detailed objectives are composed of 1) systematic management of digital contents, 2) expansion of usability of digital contents, 3) security of copyrights, and 4) making revenue by digital content creators.

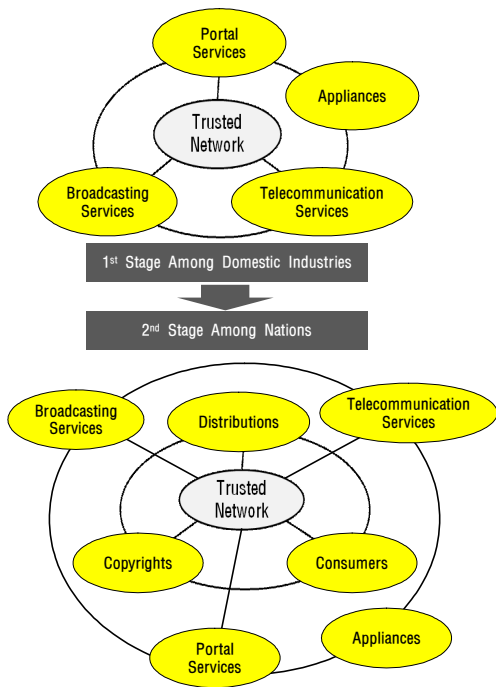


[Figure 8] Vision and Objectives of Digital Content Distribution Markets

### 5.2 Expected Effects

To realize vision and objectives of the distribution market [8] of digital content would certainly improve trust of the distribution environment of digital content nowadays. The expected effects are : (1) to develop environment for sound and fair electronic commerce of digital contents, (2) to promote efficiency to manage and connect digital contents, and (3) to promote to revitalize digitalization and information services. For requirements and objectives, consistent services should implemented from creation to distribution of digital contents in the distribution market of digital content. The services would enable digital content to be man-

aged, as a whole, not only among domestic industries but also among nations [Figure 9]. These effects would also secure rights of participants in related industries and speed up creation and production of digital content, which would finally induce industrial development of digital content.

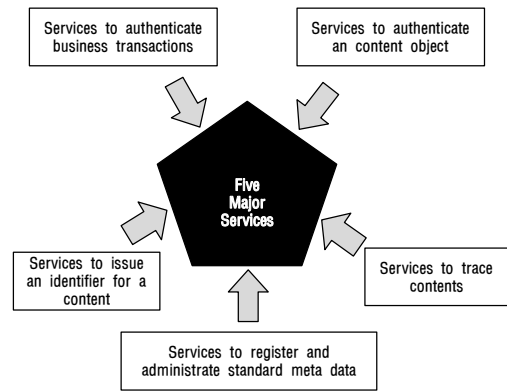


[Figure 9] Introduction Stage of Distribution Framework of Digital Contents

### 5.3 Major Services in Distribution

Three propositions should be set for 5 major services in digital content distribution markets. The propositions are as follows : to establish the trusted distribution environment of digital contents, to secure infrastructure for service distribution environment, and to develop fair business environment for service distributions. The 5 major services [Figure 10] mentioned above are as follows :

1) Services to issue an identifier : An identifier



[Figure 10] Five major services in digital content distributions

should be issued, to classify easily and systematically digital contents, to identify various contents by distribution domains of contents, to settle accounts, and to prepare statistics.

2) Services to register and administrate standard meta data : To search contents speedily and to administrate major information for contents efficiently, it provides contents creators and consumers with outstanding convenience.

3) Services to authenticate an object : Stability and reliability for distribution infrastructure are guaranteed by authenticating objects that are related to content distribution, such as contents, distribution subjects, consumers, distribution systems, machinery, software, and so on.

4) Services to authenticate business transactions : A would-be disagreement in business transactions could be settled for a trusted third organization to certify business dealing and usage scopes for securing consumer rights in the environment of content distribution.

5) Services to trace contents : Illegal contents could be detected and traced by various methods, in order to secure rights of content creators and owners.

## 6. Conclusions

This paper identifies vision, objectives, and major services for establishing new digital content distribution markets. The vision to establish new distribution markets is to implement comprehensive service systems from creation to destruction of digital contents. For efficient distribution, there are shortcomings of information; one being what service infrastructure should be implemented and the other is where each service provides. As we mentioned, 5 major services in digital content distribution markets are needed for efficient distributions; the 5 services are a service to issue an identifier, a service to register and administrate standard meta data, a service to authenticate an object, a service to trace contents, and a service to authenticate business transactions. Among these services, the service to identify digital contents is the most fundamental service.

After issuing an identifier which can identify specific digital contents, the service of object authentication or business authentication is possible by use of meta data. Also, it is expected to trace the distribution path of the digital contents and to secure its copyrights. Up to now, these services have not been systematic and, if any, they have been served sporadically so, there are some limitations to maximize ripple effects that these services provide. However, digital content identifiers such as UCI (Unified Content Identification) or DOI (Digital Object Identifier) could connect all the above defined services and at last establish a new distribution market.

Therefore, to deliver digital contents and their meta data with passing over the classification among

distribution domains that are managed by mutually different subjects, we need an identification system that can be commonly recognized in all distribution domains. The identification system should not be limited to subordinate domain in distributing or managing digital contents, could be applicable to general domains, and should be unique and clear though the whole life cycle of digital contents.

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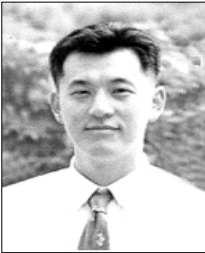
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