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Prioritization of Strategic Factors for Revitalization of the Sports Contents Distribution Industry

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Abstract

Purpose: The objective of this study is to explore and prioritize strategic factors for revitalization of the sports contents distribution industry. **Research design, data and methodology:** To this end, strategic factors for revitalization of the sports contents distribution industry were explored based on literature review, and 14 experts were consulted to prioritize the factors. **Results:** Major conclusions deduced are the following: First, the factors were prioritized in order of legal policy factors, contents factors, and technical infrastructure factors. Second, subdomains of legal policy factors were prioritized in order of policy process factors, legislation enactment and revision factors, budget factors, business model factors focusing on sports contents. Third, subdomains of contents factors were prioritized in order of humanware contents factors, sports contents diversification factors, and high-quality sports contents production factors. Fourth, subdomains of technical infrastructure factors were prioritized in order of sports contents service platform factors, technical development and standardization, global distribution channel provision, and distribution metadata standardization. **Conclusions:** Findings of this study are of significance given that this study stratifies factors of sports contents distribution industry revitalization- about which there have been very few previous studies- analyzed mainly in terms of justifiability and timeliness, and presents preferential business strategies.

Keywords : Sports Contents Distribution Industry, Strategic Factors, Prioritization

JEL Classification Code : L83, Z21, Z28

1. Introduction

In the 21st century, knowledge and information is the most valuable in this knowledge-based society and added values are created mainly through intangible knowledge, creativity, emotion, etc. Accordingly, the culture industry and contents that are the main element of the industry are an important issue, and interests in the contents industry are increasing continually in line with the its weight in the national economy (Li, & Li, 2017; He, 2018).

According to a survey by Korea Creative Content Agency, as of 2017, the scale of the global contents industry is 2 trillion and 204 billion dollars, 5.3% larger than that of the previous year. Indeed, the scale of this industry has already exceeded that of the automobile market as great as 1 trillion 300 billion won. Accordingly, many global large enterprises are competing in expanding their investment into contents as this is viewed as one of the most promising industries in the future (Kwon, Park, Chang, & Chang, 2019).

Also, according to Ministry of Culture, Sports and Tourism, in reflection of this international trend, the Korean government has established and implemented various policies to foster and support the contents industry, and the turnover in the Korean contents industry in 2019 has increased as much as 5.6% compared to that in 2018 and amounts to 119 trillion and 606.6 billion won, which indicates the average annual increase rate from 2014 to 2018 is 5.9%. In recognition of such tangible achievements, the interagency committee of the Korean government

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jointly proclaimed the ‘key strategies to strengthen the competitive edge of the contents industry’ in December 2018 in order to concentrate capabilities of the entire government for dynamic forces of innovative growth such as continued distribution of contents and development of new growth strategies, maintaining the policy direction for concentrated fostering of the contents industry (Kim, 2019a).

Now that the contents industry of high added values is in the limelight as the industry that the government supports strategically, sports contents are recognized as a national industry of the next-generation as well as a potential resource that will lead the future trends of the culture contents industry (Lee, 2016). UNESCO as well as leading countries in Europe and North America pursuing the culture industry include sports contents in the context of the major industry classification system (Cho, 2002). As for sports industry sector classification, the subdomains of sports include sports game broadcasting, sports book publication sports film, and sports computer game (Milano & Chelladurai, 2011), which indicates that sports-based contents are recognized as part of sports consumption. Such sports contents function as an instrument to promote socio-cultural communication and to break down boundaries between countries, nations, and races, playing the role as a medium for contents integration. In addition, inherent ‘cultural elements’ are viewed as a source of creativity and imagination and as an area where high economic added values are created (Goo, 2011; Cho, Cho, & Yu, 2009).

In the sports contents industry, broadcasting rights and media-related distribution sectors take the largest portions. In 2015, the sports broadcasting right market of the U.S. amounted to 16 billion dollars. Indeed, this is an overwhelming share of sports contents (Kim, & Kim, 2016). In the sports contents distribution industry, on the other hand, Korea has shown a relatively low share of contents compared to other powers in the sports industry, playing a role as a consumer of broadcasting rights rather than a supplier (Cha, Cho & Kim, 2019; Yoon, 2019).

However, as the year of 2020 is divided to ‘the era of BC (Before Corona)’ and ‘the era of AC (After Corona)’ or ‘globalization 1.0’ and ‘globalization 2.0,’ COVID-19 pandemic is showing a significant impact in terms of economy and civilization (Oh, 2020) and this is a new turning point in the perspective of Korea’s sports contents industry. While having played a role only as a consumer in the sports contents industry, Korea started to act as a supplier in the area of professional sports broadcasting. Since the KBO league sold broadcasting rights to the U.S. ESPN, its games are broadcast live to 130 countries including the U.S. And Japan. Such live broadcasting overseas has made the ‘bat-flip’ culture, which is one of Korea’s unique baseball cultures, known widely and drawing keen interests from foreign fans. In addition, K-

league has sold its broadcasting rights to 36 countries around the world including the U.K., which is the very birthplace of soccer (Yoon, 2020). Korea could play such a role as a supplier of sports contents because of its excellent sports performance and unique sports culture (Kim, & Kim, 2020). As the world purchases Korea’s such sports contents, the popularity of the sports contents industry indicates that it is a business model securing economic gains. However, this phenomenon is based on the periodical peculiarity of the pandemic, and efforts need to be put forth in various aspects for Korea to keep its role as a supplier in the sports contents market and address the possible adverse tide to its export industry.

Particularly in this era of the 4th Industrial Revolution, relevant studies state that contents are not merely supplied by business operators but distributed by users, and that the processing, sharing, restructuring, and mixing of contents occur instantly (Kim, & Kim, 2019; Song, & Lee, 2016). Even some studies suggest that sports contents are optimized and even can replace traditional contents in the traditional contents distribution industry (Park, Han, & Seo, 2017). In addition, sports contents can not only be applicable to a variety of experience marketing on the basis of the experience economy theory but also easily involve a combination of various technologies in their distribution (Kang, 2019). As such, the justifiability and timeliness of the research on the sports contents distribution industry in consideration of the high marketability and various other advantages of sports contents. Accordingly, this study aims to set up major factors to revitalize the sports contents distribution industry, analyze the importance of each factor, and present implications of its findings for strategies of the sports contents distribution industry.

2. Research Methods

The objective of this study is to understand strategic factors to revitalize the sports contents distribution industry in this ever changing environment, determine the priority of such factors, and come up with most effective strategies. However, this study relies heavily on subjective and experiential data due to insufficiency of academic references, and thus it has limitations in clarifying universal truths through establishment and verification of hypotheses. Thus, in order for explorative research on similar documents regarding changes in the media and online contents distribution market, actual cases, etc., this study adopts the decision-making methodology of the AHP (Analytic Hierarchy Process).

2.1. Advisor

For advisor selection, such elements as professionalism

and majors were considered (Kim, 2019b). Advisors for this research were selected from various majors such as business management, marketing, information and communication, policies, and administration as well as physical education areas such as sports business management, sports marketing, and sports information science. In addition, advisors were from various occupations such as professor, S/W developer, researcher, administrative public official, and National Assembly legislation advisor, etc. They had to be able to present professional insight on social systems. As for AHP implementation, the group was formed with 14 advisors according to the previous study specifying that about 10 advisors would be sufficient (Kim & Park, 2017). The research overview, necessity, and objective were explained to advisors on the phone, and their agreement to participate in this research was asked

2.2. Questionnaire Sections

The questionnaire included the research overview section regarding the necessity and objectives of the research, and the questions were of a single-item question and answer format, designed to improve the understanding of how to respond. In order for better understanding of advisors, the classification table for priority estimation shown in Figure 1 was presented. The classification table for priority estimation included in this questionnaire was prepared in consultation with advisors and in reference to previous studies (Ambarwati, Haria, & Thamrin, 2020; Burch, Frederick, Zimmerman & Clavio, 2011; Cho, 2002; Cho, et al., 2009; Culanova, 2017; Curtin, Holt & Sanson, 2014; Gil, Seo, Lee, & Ko, 2019; Goo, 2011; Jung, 2018; Kim, 2019b; Kwon, et al., 2019; Lee, 2016; Milano, et al., 2011; Moon, 2020; Park, Jang, Koh, & Kim, 2014a).

Table 1: Characteristics of Experts

ID	Specialty	Position	Degree	Division
1	Sports Business Science	Professor	Ph.D.	academic expert
2	Sports Business Science	Professor	Ph.D.	
3	Sports Marketing	Professor	Ph.D.	
4	Sports Information Science	Adjunct Professor	Ph.D.	
5	Sports Policy	Professor	Ph.D.	
6	Sports Policy	Researcher	Ph.D.	
7	Business Administration	Professor	Ph.D.	
8	Marketing	Professor	Ph.D.	
9	Information and Communication	Professor	Ph.D.	
10	Information and Communication	Researcher	Ph.D.	
11	Policy Studies	Researcher	Ph.D.	
12	Policy Studies	National Assembly Legislative Adviser	Ph.D.	field expert
13	Administrative Studies	Administrative public officer	Ph.D.	
14	Administrative Studies	Administrative public officer	Ph.D.	

Table 2: Model of Hierarchical Configuration factors

Hierarchy 1	Hierarchy 2
Technical Infrastructures	Securing a Global Distribution Channel
	Technical Development and Standardization
	Establishment of a Sports Contents Service Platform
	Distribution Metadata Standardization
Contents	Production of High-quality Sports Contents
	Diversification of Sports Contents
	Humanware Contents
Legal Policy	Legislation Enactment and Revision
	Policy-making Procedures
	Budgeting
	Sports Contents Business Model

Strategic factors for revitalization of the sports contents distribution industry are quite various and complicated. In this study, major factors for revitalization of the sports contents distribution industry were divided mainly to technical infrastructures, contents, and legal policy factors in reference to previous studies. First, technical infrastructures included securing a global distribution channel, technical development and standardization, establishment of a sports contents service platform, and distribution metadata standardization. Second, contents included production of high-quality sports contents, sports contents diversification, and humanware contents. Third, legal policies included legislation enactment-revision,

policy-making procedures, budgeting, sports contents business models, etc.

2.3. Analysis of Upper and Lower Hierarchy Elements

2.3.1. Technical Infrastructures

2.3.1.1. Securing a Global Distribution Channel

As the portion of mobile businesses continues to increase in the digital business sector, this is recognized as an area where businesses should enter and grow by developing their own contents. In order to expand infrastructures for sports contents distribution, accordingly, it is necessary to focus on expanding a digital platform in connection with key elements of digital businesses such as mobile messenger, portal, global OTT (Over The Top), etc.

‘OTT’ means “Over the X.” This term encompasses services and commodities that go beyond the boundaries of existing business areas. Particularly, ITT services in the area of culture contents broadcasting and communication go beyond the boundary of Set Top Boxes. In other words, terrestrial broadcasting, IP-TV, cable TV, and other similar services that utilize a set top box are all a type of OTT service. Thus, OTT services are drawing a keen attention in the area of culture contents. In the U.S., NETFLIX and Hulu already provide such services, and Apple, Disney, and Amazon as well are offering or planning to offer OTT services.

2.3.1.2. Technical Development and Standardization

Standardization is of great importance when it comes to industry development and international competitiveness. Recently, technical standard competition in the area of contents has been fierce among countries and relevant enterprises, and a lot of efforts are put into standardization

and securing of intellectual property rights (Kim, & Shim, 2018). Particularly, as the globalization of the contents industry is accelerating, only a small number of global standards remain in the contemporary times. In order for preoccupation in the global market by securing standard technology and intellectual property rights, therefore, establishing technical standards on a national level is essential. Especially regarding areas where Korea is competitive, it is necessary to develop strategies to hold a superior position in international standards and to expand the cooperative network with advanced countries in inferior areas. It is also necessary to develop standards in major standardization areas and to come up with international standardization strategies for each step of market maturity (Park, et al., 2014a).

2.3.1.3. Establishment of a Sports Contents Service Platform

A service platform is part of infrastructures to promote sports contents distribution, and it is an essential element to provide contents service directly and exchange contents between countries. In general, a contents service platform is required to secure such services as contents acquisition, transcoding, registration, publishing, player provision (API provided), etc. (Choi, & Ju, 2012).

While sports environments are changing in line with the wide distribution of smart media and a large quantity of sports contents are released one after another, however, there are only few service platforms to manage and share such contents. Particularly, there need to be service platforms that are not only to distribute sports contents distribution but also to share values of sports and produce sports contents (Kang, 2019).

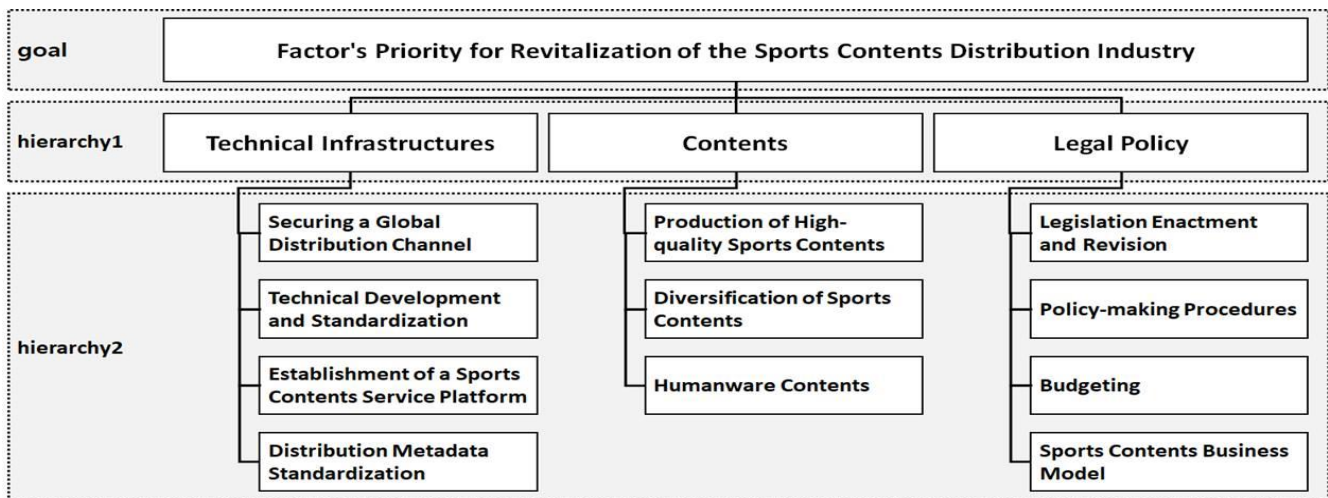


Figure 1: Hierarchical Factors for Revitalization of the Sports Contents Distribution Industry

2.3.1.4. Distribution Metadata Standardization

A distribution system needs to be established in order for the advancement of sports contents distribution and a systematic approach to global distribution paths. The key is standardization of distribution metadata. ‘Metadata’ means a type of data used to describe, identify, and classify contents. In the distribution industry that reflects sports contents characteristics of each country, item, and league, live broadcasting is essential and it is required to provide VOD service metadata. In addition, various multiscreen services need to be provided and feedbacks of account records need to be prepared and offered to league or player associations and broadcasting systems providing such sports contents. As such a wide range of metadata is produced in the contents production process, metadata forms are varied among contents producers. Thus, a mash-up metadata exchange system needs to be provided between platforms so that joint marketing is available for different platforms owned by various producers and distributors (Jung, Kim, & Park, 2011; Park, et al., 2014a).

2.3.2. Contents

2.3.2.1. Production of High-quality Contents

Now that the cultural contents industry of high added values is in the limelight as the industry that the government supports strategically, sports contents are recognized as a national industry of the next-generation as well as a potential resource that will lead the future trends of the culture contents industry (Lee, 2016). As an important element of cultures, sports are recognized as an economic resource to create new added values and as a key factor for national competitiveness (Moon, 2020). UNESCO and major countries in Europe and North America pursuing the culturing industry include sports contents in the context of their major industry classification systems (Cho, 2002). Particularly, sports contents secure the unique continuity of ‘seasons’ unlike ordinary culture contents, and it is advantageous that major elements of sports contents—‘players’ and ‘performance improvement’—can be secured in various ways such as ‘free agent’, ‘draft’, ‘trading’, etc.

2.3.2.2. Diversification of Sports Contents

Sports are expanding the boundary as they are utilized not merely for participation but also as materials for various types of works such as movie, cartoon, computer game, broadcasting, fiction, etc. Sports contents are easily available in daily life (Moon, Han, & Seo, 2020). As the sports contents market is more and more widened and its development is accelerating, sports are no longer for players and audiences but a sort of culture and contents for everyone, that is, for the general public (Kim, et al., 2010).

When it comes to sports contents, each country may have unified game rules and modes through ‘institutionalization’ which is a major concept of sports. However, since there are items unique to each country, cultural area, or region, the variety of contents also can be secured. Accordingly, global OTT NETFLIX has produced and distributed documentary series entitled ‘Home Game’ in 2020 which introduces unique sports games that make people around the world excited.

2.3.2.3. Humanware Contents

Humanware contents encompass not only general professional human resources in the contents industry but also celebrities as the key product. Areas that require professional human resources in the sports contents industry include work production (planning and creation), commercialization (development and production), media (service, network, solution, software, and hardware devices and systems), and delivery (distribution and marketing) which are required in most contents distribution industries (Kim, & Park, 2013). However, professional human resources are also required in certain areas unique to sports contents (Mukherjee, & Sen, 2019).

Sports star players are recognized as key professionals when it comes to sports contents. They are key factors “in promoting sports contents and securing consumers by using their images” (Won & Ham, 2010) and most influential (Park, Kim, & Jang, 2014b). In addition, it is emphasized that professionals required for combination of sports with other industry sectors are experts with full understanding of sports principles (Kim, 2020). Such expertise is required since actual sports phenomena are reflected such as sports player and team, sports system, rule, regulation, etc. (Moon, 2020).

2.3.3. Policy

2.3.3.1. Legislation Enactment and Revision

Currently in Korea, the Contents Industry Promotion Act is in effect. Enacted for the purpose of specifying aspects necessary for contents industry promotion to establish a foundation for the contents industry and strengthen its competitiveness, this law consists of 8 chapters and 42 articles. Since 2010, there have been 8 revisions regarding major issues including changes of terms, penalties, and fair trade. In order to respond effectively to the ever changing society and technology in the face of the pandemic and the 4th Industrial Revolution, however, continued legal revision and subordinate legislation are required such as provisions to form an organization with deep understanding of sports principles and key technical groups in the 4th Industrial Revolution and capable of responding to the changing technology lifespan (tentatively called ‘the sports contents promotion organization’). In addition, it is required to comply with standards for

metadata of sports contents distribution and effectively respond to ever-changing business environments and requirements by revising Articles 22 and 23 of the Contents Industry Promotion Act accordingly.

2.3.3.2. Policy-making Procedures

The sports contents industry has great potentials to become a key industry in the innovation directed industry that creates high added values with its unique characteristics such as the continuity of seasons, differentiation from other contents industries, and OSMU of distributed contents. Accordingly, it is necessary to expand policies and investments for global distribution of sports contents by developing policy directions and policy options (projects) specifically for the sports contents industry and supporting sports tourism businesses.

2.3.3.3. Budgeting

While funds have been secured on the basis for the Contents Industry Promotion Act to some extent, these are still insufficient since they are limited to SMEs or certain items aiming at distribution rationalization. Efforts need to be put forth to securing funds for promotion of the general industry (Kari, Masud, & Saifullah, 2017). In addition, financial prioritization also needs to be practiced for efficient budget execution and substantial realization of the sports contents industry (policy).

2.3.3.4. Sports Contents Business Models

The contents distribution system that combines ICTs (Information and Communications Technology) is a kind of ecosystem of horizontal chains with contents (C) producers and users as the main entities and with such media as contents (C)-platform (P)-network (N)-device (D) (Jung, 2012). However, as the limitation that the contents industry has been ICT-centered (c-P-N-D) so far is pointed out, the necessity to advance into a contents-centered industry (C-p-n-d) emphasizing the roles and functions of contents is justified. Particularly in the distribution structure utilizing sports contents, there needs to be a rational eco system where sports contents providers from various parts of the world (C), platform service providers (P) capable of integrated management and marketing of such contents, global transmission service providers (N) transmitting contents around the globe, and device providers (N) form the contents distribution value chain called CPND and are allotted profits according to their respective roles (Bhandari, & Bansal, 2018).

2.4. Data Processing and Consistency

In order to prioritize strategic factors for revitalization of the sports contents distribution industry, the hierarchy analysis package—Expert Choice 11.5—was used. In

reference to the consistency ratio (CR) of the analyzed data, the consistency was reviewed (Bae, & Cho, 2020). The acceptable range of the consistency rate was set to 10% or less (CR .1). As long as the consistency rate remains within this range, the reliability of responses is secured (Lai, Huang, Siang, & Weng, 2020).

3. Result

In Hierarchy 1 of strategic factors to revitalize the sports contents distribution industry, the weight and priority of technical infrastructures factors, contents factors, and legal policy factors are as in <Table 3>. As 3 factors of Hierarchy 1 were analyzed, the value of CR was .001, which indicates that the consistency rate was within the acceptable range. The weight and priority were in order of legal policy factors (.447), contents factors (.310), and technical Infrastructures factors (.243).

In Hierarchy 1 of strategic factors to revitalize the sports contents distribution industry, the weight and priority of technical infrastructures factors, contents factors, and legal policy factors are as in <Table 3>. As 3 factors of Hierarchy 1 were analyzed, the value of CR was .001, which indicates that the consistency rate was within the acceptable range. The weight and priority were in order of legal policy factors (.447), contents factors (.310), and technical Infrastructures factors (.243).

As 4 factors of Hierarchy 2 were analyzed, the value of CR was .004, which indicates that the consistency rate was within the acceptable range. The weight and priority were in order of the sports contents service platform (.334), technical development and standardization (.274), global distribution channels (.207), and distribution metadata standardization (.185). As 3 factors of Hierarchy 2 were analyzed, the value of CR was .002, which indicates that the consistency rate was within the acceptable range. The weight and priority were in order of humanware contents (.358), sports contents diversification (.352), and sports contents production (.290).

As 4 factors of Hierarchy 2 were analyzed, the value of CR was .002, which indicates that the consistency rate was within the acceptable range. The weight and priority were in order of policy making procedures (.349), legislation enactment and revision (.257), budgeting (.221), and sports contents business models (.173).

The transcoding weight and priority of subdomain factors based on the weight of 3 factors of Hierarchy 1 and 11 factors of Hierarchy 2 were in order of policy making procedures (.156), legislation enactment and revision (.115), humanware contents (.111), sports contents diversification (.109), budgeting (.099), high-quality sports contents production (.090), sports contents service platform establishment (.081), sports contents business model (.077),

technical development and standardization (.067), global distribution channels (.050), and distribution metadata standardization (.045).

Table 3: Priority calculation between categories

Hierarchy 1	Weight	(rank)	Hierarchy 2	Weight	(rank)	Category Weight	(rank)
1. Technical Infrastructures	.243	(3)	1.1. Securing a Global Distribution Channel	.207	(3)	.050	(10)
			1.2. Technical Development and Standardization	.274	(2)	.067	(9)
			1.3. Establishment of a Sports Contents Service Platform	.334	(1)	.081	(7)
			1.4. Distribution Metadata Standardization	.185	(4)	.045	(11)
			Sub-total	1.000	-		
			CR	.004	-		
2. Contents	.310	(2)	2.1. Production of High-quality Sports Contents	.290	(3)	.090	(6)
			2.2. Diversification of Sports Contents	.352	(2)	.109	(4)
			2.3. Humanware Contents	.358	(1)	.111	(3)
			Sub-total	1.000	-		
			CR	.002	-		
3. Legal Policy	.447	(1)	3.1. Legislation Enactment and Revision	.257	(2)	.115	(2)
			3.2. Policy-making Procedures	.349	(1)	.156	(1)
			3.3. Budgeting	.221	(3)	.099	(5)
			3.4. Sports Contents Business Model	.173	(4)	.077	(8)
			Sub-total	1.000	-		
			CR	.002	-		
Total	1.000	-			1.000		
CR	.001	-			-		

4. Summary and Implications

The objective of this study is to explore and prioritize key resources to expand the range of business models, markets, and businesses for global sales increase of Korean sports contents. Implications of the major findings are as follows: First, Hierarchy 1 priority factors are legal policy factors, contents factors, and technical infrastructures factors in order. Thus, it turned out that legal policy factors

need to be considered first. Particularly with regard to policy research for industry promotion, legal policy factors mostly presented in the initial stage are considered the top priority. This analysis result probably reflects that the sports contents distribution in Korea is still in its initial stage.

Second, subdomains of legal policy factors were prioritized in order of policy process factors, legislation enactment and revision factors, budget factors, business model factors focusing on sports contents. Thus, it turned

out that policy making procedure factors need to be considered first. This result probably reflects the relation between laws and policies. Laws and policies are inseparable from each other. According to the policy cycle, policies may be developed first in line with the needs of the times and society and then followed by relevant legislations, but in general, legislations are enacted first and then followed by policies and policy making procedures on the basis of such laws. However, in order to revitalize the sports contents distribution industry, it is necessary to implement policy making procedures rather than legal revision since there is already the Contents Industry Promotion Act in effect.

Third, priority factors of contents subdomains are humanware contents factors, sports contents diversification factors, and high quality sports contents production factors in order. Thus, it turned out that humanware contents factors need to be considered first. Humanware contents are connected directly to the quality of contents in the sports contents industry, and these are of great importance in relation to securing consumers. In addition, humanware contents production and distribution require professional human resources with deep understanding of the unique principles of sports contents.

Fourth, subdomains of technical infrastructure factors were prioritized in order of sports contents service platform factors, technical development and standardization, global distribution channel provision, and distribution metadata standardization. Thus, it turned out that sports contents service platform factors need to be considered first. It is required to establish and develop a sports contents service platform reflecting characteristics of sports rather than distributing sports contents in a common media contents service platform. Sports contents are advantageous in life broadcasting. In general, sports games need to be watched real-time, and each game needs to be watched if viewers want to know the outcome. In addition, a service platform, through which stories and values of sports can be developed and shared as contents, needs to be developed (Kang, 2019).

One of the noteworthy findings of this study is that the transcoding weights of subdomain factors calculated based on the weight of 3 factors of Hierarchy 1 and 11 factors of Hierarchy 2 showed little difference from policy making procedures (.156) to distribution metadata standardization (.045). This suggests that technical elements of lower priority should not be excluded when global distribution strategies are established because the technical standard competition in the culture contents area is getting fiercer recently among nations and enterprises, and the technical hegemony is emphasized on the basis of standards and intellectual property rights (Park, et al., 2014a).

Findings of this study are of significance in that this study stratifies factors of sports contents distribution

industry revitalization, about which there have been very few previous studies, analyzes them mainly in terms of justifiability and timeliness, and presents preferential business strategies. In addition, this study presents the hierarchical weight and priority as well as the transcoding weight and priority among classes of the hierarchy, providing the basis for various ways that strategy developers and decision-makers can utilize. In other words, the weight and priority data can be utilized easily in a block format depending on the intended goals. However, the range of factors and priorities presented in this study is so wide that the future study needs to find new factors, develop specific methods, and verify their effects.

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