

# Research on the Dissemination Path of Virtual Reality Book Publications

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## Abstract

Based on the summary of the dissemination and management status of virtual reality book publications, this article builds a dissemination industry ecosystem of the virtual reality book publications with the core of IP operation, and also expounds the relationship among stakeholders in the ecosystem. Finally, this article discusses the dissemination path of virtual reality book publications in details from three aspects of marketing integration, IP operation and organization integration.

## Keywords

Virtual Reality Book Publications, Virtual Reality Technology, Dissemination Path

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## 1. Introduction

Virtual Reality (VR) technology originated in 1960s is a highly lifelike computer simulation in terms of sight, hearing, touch, smell and taste, and has a strong sense of interaction and immersion [1]. According to the “2015 Virtual Reality Analyst Report” published by Goldman Sachs Group, VR technology including desktop VR system, immersive VR system, enhanced VR system and distributed VR system four major categories has huge market potential, and its total market size will reach \$152 billion (including \$80 billion hardware market size and \$72 billion software market size) in 2025. In the field of publishing, many scholars have explored the VR book publications in succession. From the perspective of ecological theory, Kristan Harris *et al.* (2005) [2] explored how to build a sustainable development ecosystem of virtual reality books and publications, so as to conform to the trend of world development. Andy S.Y. Lai *et al.* (2005) [3]

discussed the application advantage of VR technology in the education book publishing industry from the microcosmic point of view. Zhang Ruijing (2015) [4] revealed the importance of the integration of VR technology and publishing industry from the perspective of internet thinking. Zhang Dan (2016) [5] put forward the improvement opinions on the dissemination content and dissemination channel of the VR book publications by discussing the three-level growth theory of creativity. Zhou Min and Li Yinan (2016) [6] thought that the combination of VR technology and digital publishing would form a new business marketing mode under the new dimension, such as experiential marketing, virality marketing, social marketing and different industry marketing. It is necessary to realize the transformation of ordinary network Intellectual Property (IP) to the core IP in order to master the discourse right of publishing industry, to realize cross-field and linkage IP operation in order to enhance the operation capacity, and ultimately to realize the transformation and upgrading of publishing industry [7] [8].

At present, there are also some problems in the process of the development of VR book publications. For example, in the content creation, content providers still remain in the self-service level in the digital publishing industry. The platform and author share the revenue of the publishing platform marketing together while the author makes a major contribution. So it has led to the fact that the author's enthusiasm cannot guarantee, which influences the stability of the content resource of the VR book publications and results in the difficulty of content optimization and screening [9]. In the business model, the VR book publications have not yet formed a mature design and business model [10]. In the Hardware facility, the corollary equipment of VR technology can easily cause the wearer's vertigo [11]. In the terminal services, VR book publications have important innovation but also have software running error, network connection failure, unattractive content and other defects, thus affecting the user experience and acceptance [12] [13]. In addition, the academia has emphasized how the VR technology combines with the publishing industry to further predict the development trend of the future publishing industry. However, there are few studies on the industrial ecological environment, dissemination characteristics, dissemination path and other important aspects.

Based on the above analysis, the article first elaborates the industry eco-environment of VR book publications from a macro perspective, and builds an industry eco-environment of VR book publications with the core of IP operation based on "2-3-6" model. Previous studies have shown that the integration of book publications and VR technology has a great impact on the dissemination of book publications and public reading behavior. Due to the difficulty of obtaining first-hand information, the next study is based on industry ecosystem of VR book publications with the core of IP operation and analyzes the dissemination path of VR book publications from the three aspects of marketing integration, IP operation and organization integration and provides theoretical guidance for the

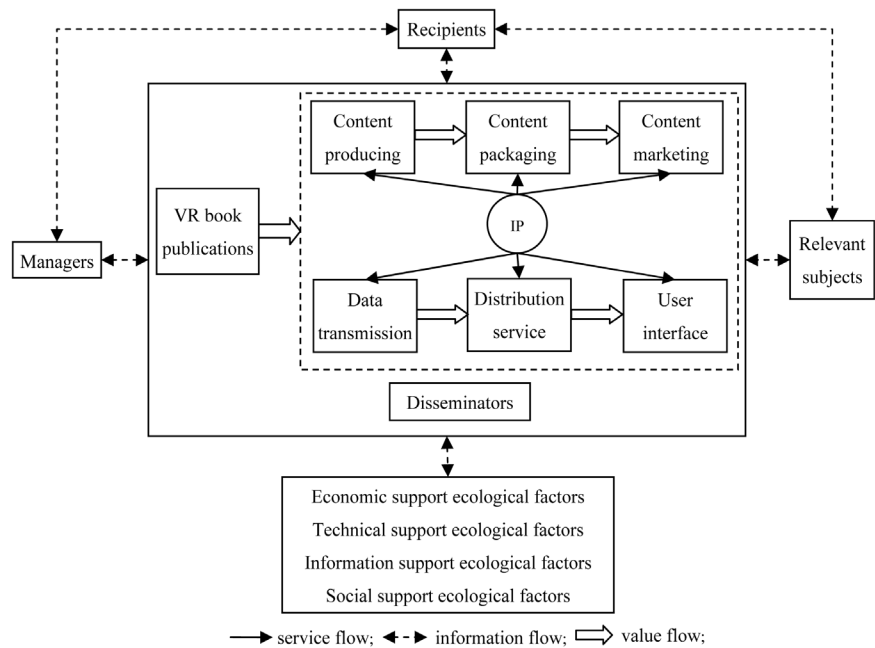
future development of VR book publications.

## **2. Dissemination Industry Eco-Environment of VR Book Publications**

With the rapid development of internet information technology, the management of book publishing enterprises plays a decisive role in the transformation of enterprise technology, in the optimization of organization structure, in the supply chain management of resources and in the stability of user structure. The enterprises' managers of different levels need to coordinate the planning and work together for the operation and management tasks of the book publishing enterprises. The specific content of the operation and management of VR book publishing enterprise is as follows: 1) the influence mechanism of different factors on the management of VR book publishing enterprises; 2) the situation of the changes in the operation and management of VR book publishing enterprises in different geographical environment and different periods; 3) adjusting the management process when the enterprise is facing problems meanwhile changing the management mechanism and avoiding the risk in time. Therefore, the operation and management of VR publishing enterprises reveals an operating condition in both internal and external level, which is also a comprehensive assessment of the internal and external management, rather than a single level management status of VR publishing enterprises. It is not difficult to find that the management of the VR book publishing enterprises focuses on value promotion (including user value, technological value, and resource value) and concept innovation, compared with the operation and management of the traditional book publishing enterprises whose management mode is single and lack of professional and standardized management strategy. In view of above content, based on the previous research results and the theoretical basis of "2-3-6" model [14] ("2" as vertical level, the industrial chain is divided into the content level and the channel level; "3" as horizontal level, the content level and the channel level are divided into three stages; "6" as a whole, the industry chain can be divided into six processes), and taking IP operation as the core, the paper constructs the dissemination eco-system of the VR book publishing industry based on IP operation (see **Figure 1**). The dissemination path of VR book publications is roughly divided into two layers: the content layer and the channel layer. And IP operation runs through the whole chain of VR book publishing industry and acts on six stages: content production, content packaging, content marketing, data transmission, distribution service and user interface.

### **2.1. Content Producing**

The process of content producing of book publishing not only includes the organic mosaic of the original books' content and the various types of media and terminals, but also includes the effective aggregation relationship between product R&D of various books' content and content production from users', forming



**Figure 1.** Sketch map of dissemination industry eco-environment of VR book publications with the core of IP operation.

a “content + relationship” combination production model. The relationship between content products of book publishing and the user, the relationship between the content products of book publishing and the various types of media or terminals, the relationship between one user and another, the relationship between the user and the media or the terminal and so on, is often an important factor that affects the content producing of book publishing. In the transboundary fields of book publishing, such as film, cartoons, games, tourism and others, The soul of content producing of the book publishing is often not only from the multiple subjects but also the innovation and integration of the technical means. The flexible and changeable process of the content producing of book publishing is mainly based on content IP and content elements, to maximize the creation of diversified core content products or peripheral content products, so as to maximize the benefits of content value. With the development of the big data age and the formation of fragmented reading habits, the content form of book publishing has changed from single linear to diversified and divergent way, which can quickly catch users’ attention and enable users to immerse in the story content environment. In addition, different types of content products derived from the content IP, make users aggregate together and form new groups. In the group space, users can interact and speak freely according to their own knowledge of publishing contents, making up the second production of book publishing content. And in new group space, users can interact and speak freely according to their own understanding, and constitute the second content producing of book publishing. Many scholars call this phenomenon “User-Generated Content (UGC)”, which is a kind of multi-type user fusion in the content pro-

ducing of book publishing.

## 2.2. Content Packaging

Content packaging is the basis for the implementation of the content processing of book publications and also is the prerequisite for the content products of book publishing to enter the market. Content packaging can be roughly divided into two categories: digital content packaging and paper based content packaging whose core elements include editors, art design, layout design, and version division and so on. In the Internet environment, book publishing content is transformed from single text format to multilingual element format, which realizes decentration, resource sharing, and repository expanding. In recent years, the phenomenon of collaborative editing of book publishing industry and other industry or its professionals, as well as social Pro-Ams' secondary processing of the publications' content, occurs frequently. For example, the AR Book Sharing Session co-founded by *Pizza Hut* and *China Citic Press* in 2016, focuses on promoting "Science Runs out Series" AR books for users. While enjoying the delicious food, users can feel the living environment and habits of dinosaurs, even take photos with dinosaurs, giving users immersive reading experience. Users can share the acquired knowledge and some videos, pictures, hyperlinks and others related to book publishing to their friends' circle, or discuss some topics of book publishing in the online community, so as to achieve the secondary dissemination of book publications' content. The integration of content packaging link not only ensures the innovative development of the hypermedia storytelling mode of book publishing, but also designs the content products that can satisfy different user groups through the way of trans-boundary and collaborative content packaging of book publishing and finally facilitates the transformation and upgrading of book publishing industry.

## 2.3. Content Marketing

For users who are more liberalized, diversified and socialized, Content Marketing can quickly tap potential users, stabilize loyal users, and achieve "content is advertising". Content marketing which was first proposed in 1996 by Rick Doyle, a member of the *American Society of Newspaper Editors*, is not a new theoretical term and is known as a new form of communication. Because of the magnanimity and decentration of information, users are more willing to accept the content of high quality and interesting books. The content marketing of book publishing focuses on the value rather than the price of the book publishing content. The valuable content can help users (answer questions about the book content), seize users (attract users' attention), guide users (recessive control of the order to browse the book content), stimulate users (use original book publishing content to give special experience to users by means of technical means), and stick users (close the distance with the users). Network information technology drives the development of content marketing of book publishing,

promotes the integration of content, marketing and technology, and optimizes content production and management. Users can talk to the content products of book publishing in different channels, quickly capture useful information and then absorb and transform it, thus speeding up the flow of information. Content marketing aims to accurately deliver content while pursuing content quality, relying on virtual reality technology to enhance users' interaction experience, thus stimulating the integration and growth of book publishing industry.

#### **2.4. Data Transmission**

Data transmission, as one of the exogenous driving factors for the innovation of hypermedia storytelling mode of book publishing, provides network services with the features of internet transmission and mobile terminal downloading. The core and essence of the hypermedia storytelling mode of book publishing is to create and experience, but only by means of data transmission can it play its greatest value. The platform operation strategy of the digital media organization can flexibly cope with the changes of the external environment and the operation of the book publishing business ecosystem. With the continuous expansion of the application of new media technology in the network, data transmission can enter the service field that the book publishing industry was unable to provide. The intervention and expansion of each transmission platform can make the book publishing cooperate with ecological system in different fields and achieve a win-win situation.

#### **2.5. Distribution Service**

Book publishing and distributing are the main body of the operation of the book publishing market. With the rapid development of the publishing industry and the whole cultural industry, people gradually realize that the distribution service plays an important role in the book publishing industry chain. Because of the users' demand for information quality getting higher and higher, foreign book publishing and issuing service enterprises have realized personalized, accurate and large-scale distribution service with the help of network technology compared to the domestic enterprises and provided publishers, individuals and group organizations more reasonable subscription services, information services, network services and so on. The issuing service, represented by subscription services, marketing services, packaging services, and data information services, and related to the process of making, packing, transferring, handling, and subsequent marketing and pricing of book publications content, is the core of the book publishing enterprises to improve its performance. The innovative operation of the book publishing hypermedia storytelling mode can only better improve the performance of book publishing and achieve the perfect transformation of book publishing industry by means of good distribution services. The wide application of distribution services brings great impetus to the innovation of book publishing hypermedia storytelling mode, especially the application of subscription ser-

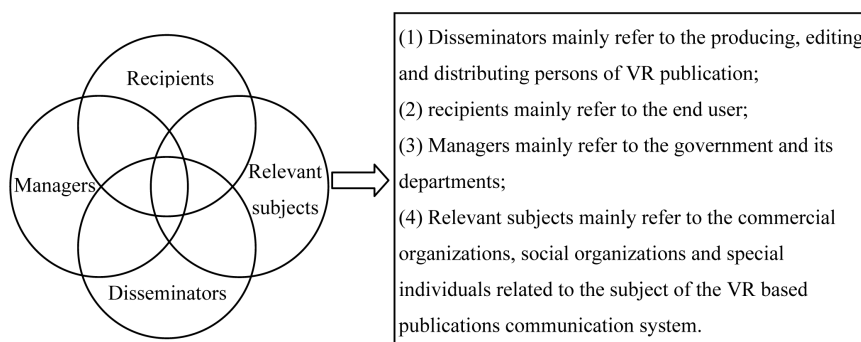
vice and data information service, providing strong support for the transformation and upgrading of book publishing industry.

## 2.6. User Interface

The innovative dissemination of VR books and publications cannot be separated from the external reading software. Especially in the process of technology convergence and content integration, user interface can push book publishing information and bring users different sensory experience with the help of new technology, such as cloud computing technology, virtual reality technology, augmented reality technology, tactile feedback technology and so on. The user interface involves computer graphics, cognitive psychology, aesthetics, behaviourology and other disciplines, which can be regarded as a human-computer interactive technology. The user interface in the field of book publishing is mainly designed and implemented for different types of browsers and various terminal reading software. From the exploitation and application of the current big book publishing enterprises to promote the user interface, information push technology has become more precision and individuation; content security services, user and content data, and content pricing have become more comprehensive and gradient; artistic design and interface layout have become more characteristic. This will provide external support for the creative dissemination of VR book publications.

As the development of the dissemination industry of VR book publications is a long evolution process, the book publishing industry is affected by economy, technology, information and society four ecological factors in the aspects of organization integration, content integration, technology integration, integrated marketing innovation and so on. And the four dissemination stakeholders (recipients, relevant subjects, disseminators and managers) play the role of information control and information guidance in the dissemination industry ecosystem. The traditional industrial chain of “editing-printing-distributing” of book publishing has become a huge obstacle to the development of book publishing industry in China because of its single operation mode, unsound infrastructure, mismatch between strategic planning and historical background, and lack of effective theory, method, system, and technical support. In view of this phenomenon, the four main stakeholders of VR book publications should cooperate with each other in the process of information flow of the VR book, which not only has a huge impact on the economic and social benefits of VR book publishing institutions, but also extends the VR publishing industry chain to various fields, in order to maximize the promotion of brand awareness (see **Figure 2**). VR book publications are across a variety of media platforms in the process of trans-boundary, and each content fragment has unique value to the core story world. Main subjects can set up various story clues at the early stage of the spread, and push these clues on different media to stimulate users’ desire to explore unknown information.





**Figure 2.** Sketch map of various subjects and their relations.

### 3. Dissemination Path of VR Book Publications

In the process of R&D of new book publishing content products or the optimization of original book publishing content products, VR book publications integrate technology, organization and marketing, making the content of VR book publication more diversified, multi-terminal and multi-sensory experience. And combined with the integration of Internet thinking, the operation of VR book publishing industry becomes more flexible, open and trans-boundary. On the whole, the dissemination process of VR book publications is the process of increasing value of VR book publishing products from production to the market. In view of this, the dissemination path of VR book publications is roughly analyzed from three aspects: marketing integration, IP operation and organization integration.

#### 3.1. Marketing Integration of VR Book Publications

VR book publications open the original closed book text, break the boundaries between reality and virtual world with the help of new media dissemination channels and internet technology, and make technology and content highly integrated to drive the development of value chain of book publishing industry. The development process of VR book publications is the process of marketing integration in the cultural industry market. For book publishing enterprises that have successfully applied or are applying VR technology, they can gain market knowledge through marketing activities to enhance their economic benefits. Users, competitors, and trans-boundary collaboration with their large amount of information have a great effect for the market and marketing of book publishing. Therefore, the hypermedia storytelling mode of book publishing should pay much attention to the information of the multi-interest bodies, and to generate, transform, spread and apply the relevant information. It can also be said that the process of acquisition, creation and transformation of users' information, competitors' information and trans-boundary industries' information of book publishing enterprises is the process of market integration and marketing integration of book publishing industry. It is necessary for the book publishing enterprises to try to apply the VR technology. Otherwise, the book publishing is



difficult to deal with the market change and the value judgment of the internet marketing. At present, foreign book publishing enterprises have different market research and marketing experiments on the application of VR technology. For example, “Wonder book: Book of Spell” jointly written by J. K. Rowling (the author of Harry Potter) and Japanese Sony Corp, combines the entertainment forms such as games, movies and videos, and carries out comprehensive market analysis and marketing management. It gives users an extreme experience in the book story world, and greatly improves the management performance of hypermedia storytelling mode.

In the perspective of media convergence, VR book publishing enterprises first need to identify user groups, select appropriate time and place for virality dissemination on different media platforms according to different user attributes, so that users can understand and know the content of book publications in the shortest time. In addition, online and offline propaganda activities are needed to organize to integrate into user’ life network, to enable users to experience their own demands of information network relationship through VR technology, to strengthen users’ stickiness and to enhance users’ participation value, so as to establish the interactive relationship between the publishing products and marketing activities under the environment of VR technology. For example, Disney launched graffiti “Crayola’s 3D Stereoscopic E-book” in 2015, and the use of real-time texture capture technology allows the public to convert the 2D object on the paper into the 3D model. By changing the color and shape according to your own preferences, it fully mobilizes the public’s enthusiasm to participate in the creation, and break the “Zero Communication” situation of the books and the public. This book reading mode arouses the public’s thirst for information. The public can control the development of events according to information needs, mobilize their sensory system in an all-round way, and maximize the deconstruction and utilization of book information.

### 3.2. IP Operation of VR Book Publications

Because of the diversification of the user’s access to information, IP operation has gradually attracted the attention of people in various major industries. Based on the essential attribute and characteristic of book publications, content adaptation, technical support and trans-media storytelling have become the key links in the IP operation of book publications, and VR book publications are no exception. Trans-media storytelling was first put forward by Henry Jenkins in 2003, which is a distinctive way of content production and a unique cultural management concept. Trans-media storytelling involves all elements of the story, such as characters, storylines, space, time and so on, together with the strategic implementation plan and the expected benefits, to form a grand narrative system instead of simply presenting or displacing the story content. For book publishing, interactive experience with users plays an important role in the process of industry management. Multiple narrative carriers in book publishing,

namely across multi-media platforms, reveal the story world. Every media can design different texts for different user groups, and any user can experience the story from all aspects.

VR book publishing enterprises can assign story content according to the different media without changing the content IP, to realize channel trans-boundary, culture trans-boundary and technology trans-boundary, and to create a unique and multi-perception experience for the public, so as to tap potential users and try to transform loyal users. For example, Star Wars Series show different elements of story content, and each work uses different perspective to enrich the whole story on different media platform. In the film work, you will see that Han Solo and Princess Leia have feelings with each other. While in the book work, you will see that they have been married and give birth to twins. In view of the application benchmark (rich storyline, various narrative subjects, multi-level immersion experience and diversified narrative ways) of trans-media storytelling mode for book publishing, not all VR book publications could carry out IP operation. While IP operation of VR book publications keeps in close combination with market trends, it also should strengthen interaction with users so as to meet the needs of different users. For example, VR books should systematically and accurately classify to satisfy multi-sensory needs of the public when converts book text information into visual language and superposes to the real world, and create a new multi-sensory and deep reading experience for the public. The public can also present the 3D virtual image to the real environment through mobile and flip paper books or cameras, breaking the inherent dissemination form of information, expanding the public's control of books, and realizing the multi-level interaction between the public and the book information. In addition, VR books should adjust content resources flexibly according to the feedback of the public at any time, so that the augmented reality books should be more in line with the public's demand.

### **3.3. Organization Integration of VR Book Publications**

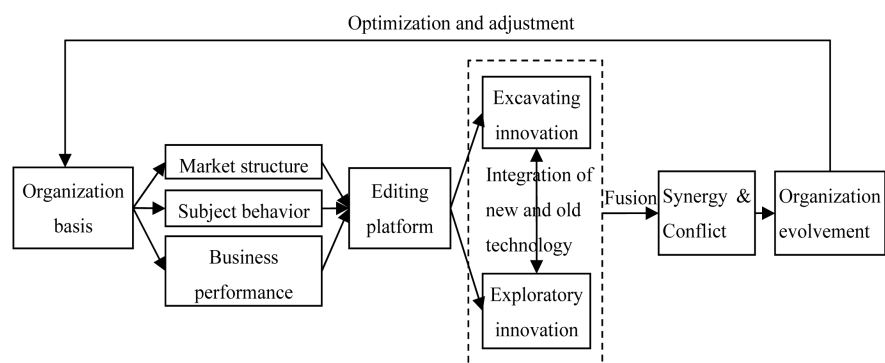
Based on the attributes and management features of VR book publications, the influence of content production and supply chain on the organization integration of VR book publications lies in that through the dissemination and application of the market knowledge (users' information, competitors' information, cross-boundary information of book publishing industry) of VR book publications, we can flexibly adjust the business path at any time, so that VR book publications can be more in line with the needs of users and markets. In the internet and information age, the process of organization integration of VR book publications involves value chain elements such as book content production, IP resource control, network community establishment, order management and delivery management of cross-border books, and enterprises' and users' behavior. Through the integration and application of all kinds of information resources including book content, market structure, business performance and subject be-

havior by editing platform, we can ensure the standardization of the dissemination mode of VR book publications, so as to enhance the economic and social benefits of book publishing. From the elements concerned, the process of content production and supply chain of VR book publication is the process of information flow and innovation, which exists in all links of organization integration of VR book publications. The content production system of VR book publications includes four aspects: content acquisition, integration, distribution and monitoring. The value of content resources produced by users is much higher than that of VR book publications, and that of co-produced by VR book publications and other industries. At the same time, in the supply chain management, VR book publications focus on IP resource control, network community establishment, order management and delivery management of cross-border book product, and make rational and effective use of the market knowledge related to book publications, to realize the market knowledge of VR book publications into high value-added cross-border products.

As a product of the integration of new technology (VR technology) and old technology (traditional editing technology), VR book publication is a great attempt of transformation and upgrading of book publishing industry. This attempt is not a simple replacement or superposition of the new and old technology, but a synergy and conflict generated by the new and old technology in the process of integration, which is a nonlinear innovation diffusion process. From the perspective of technology application, the nonlinear transformation of the new and old technology is an important driving force for the integration and evolution of VR book publications (see **Figure 3**).

#### 4. Discussion

Under the environment of media convergence, book publications have created a new development path to themselves by means of VR technology. The transformation of traditional book publications to VR book publications has become a reality, which is very helpful for guiding the public to read books, to actively explore new information and to relieve the conflict of reading books. VR book publications create a new reading experience for the public, enrich and change



**Figure 3.** Sketch map of organization integration of VR book publications.

the public's reading behavior, in the process of content decomposition, distribution, planning, interpretation, transmission and other chain-type progressive course. There are some drawbacks in the development of VR book publications.

#### **4.1. The Number and Category of VR Book Publications Are Fewer**

With the increase of the number and category of books and the increase of the public's demand for reading, many professional and popular book publishing platforms have emerged. On the one hand, the public can get more and valuable contents or derivatives of book publications. On the other hand, we can shape brand image and enhance brand influence with the help of users' attention, thumbs-up and retransmission. But the application of VR technology in book publications is mainly concentrated in the field of children's education books at present, while rarely applied in the field of public book publishing and professional book publishing. According to the statistics of the *State Administration of Press, Publication, Radio, Film and Television*, the total revenue of book publishing in China has reached 82.26 billion Yuan in 2015, an increase of 3.96% compared with 2014, while the proportion of VR book publishing accounts for a small proportion of the entire publishing industry. In today's media convergence, how to use virtual reality technology in more categories of books and publications to create the brand image and enhance the market and social effects of VR technology has become the key problem facing book publishing enterprises.

#### **4.2. The Management of VR Book Publications Is Inefficient**

According to statistics of "*the Fourteenth China's National Reading Survey Report*", in 2016 the per capita book reading increased by 0.02 compared with that in 2015, and the contact rate of digital reading (mainly based on Internet and Mobile Network) is up to 68.2%. It is obvious that the reading rate of the public in China has been greatly improved. In order to better meet the demands of the public and to enhance the competitiveness of the brand, book publishing is gradually changing to rely on the VR technology and Internet communication, to set up an application and service strategy system that integrates quality, platform and pan-entertainment, and to expand its mode innovation, technology application and market expansion, so as to increase business profits. But behind the rapid growth of book publishing economic income and operation scale, the whole book publishing industry has a bad momentum of development. Only a few book publishing enterprises have changed the traditional business model to develop steadily (for example, Chinese online integrates its own digital publishing resources into VR technology, and releases them to different media in the form of paper books, film, video, game, animation and so on, so that the main business revenue accounts for 81.2% of total business revenue), and the vast majority of the book publishing enterprises are in trouble or even bankrupt. The reason is that, on the one hand, the lack of richness of the contents and forms of

the VR book publications makes it difficult to attract the users' attention in a limited time. On the one hand, the low interaction with users makes it difficult to excavate potential users in mass information.

### **4.3. The Integration of Book Publications with VR Technology Is Weak**

There are also some technical problems in the public experience level of VR book publications. The first is the limitations of hardware technology. At present, the problem of VR technology, such as inconvenient use and poor effect, is still outstanding. The speed of hardware processing is far from meeting the public's demand for virtual world information. Secondly, the software availability is poor. Due to the limitations of hardware technology, there are many problems in the development of VR technology software, image processing, and related theoretical support. Thirdly, the size of the data is small. The combination of book publication and VR technology needs huge scale of data, just like a room needs various kinds of data, such as all kinds of furniture, substance material, different light, etc. At present, the collection, storage, transmission and analysis of virtual data have problems to be solved urgently, which is also one of the reasons why VR books can't be produced in batch.

## **5. Conclusion**

Based on the summary of the dissemination and management status of virtual reality book publications, this article builds a dissemination industry ecosystem of the virtual reality book publications with the core of IP operation, and also expounds the relationship among stakeholders in the ecosystem. Finally, this article discusses the dissemination path of virtual reality book publications in details from three aspects of marketing integration, IP operation and organization integration. According to the existing literature review and the author's experience in book publishing field (once planned to publish VR books such as "*The Lost World of Aghart*", "*The Future Mechanical World*" through crowd-funding platforms), it is found VR book publications have some limitations in the aspects of technical application, content production and operation. This article has provided some references for the future dissemination of VR book publications, the choice of business models and the improvement of content richness of VR publications. But the article also has some limitations. For example, it focuses on qualitative analysis and quantitative analysis is few. And second hand data can not directly reflect the development status of VR book publications. In the future, more data will be collected to verify and analyze the dissemination industry ecological model of VR book publications.

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