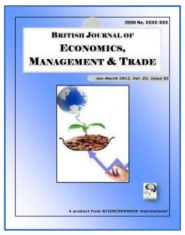

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The Application and Improvement of XBRL in China's Retail Industry in the Era of Big Data

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Authors' contributions

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

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ABSTRACT

With the continuous development of the Internet, the business mode of China's retail industry is transformed the traditional entity store into online store. As a result, more comprehensive data will be produced and saved, which makes retailers get them more easily. China's retail industry ushers the advent of the era of big data. How to excavate and make use of these data to become useful information is the key to the development of this industry. As a new financial reporting language, XBRL can process multidimensional data in complicated structure, tag metadata, retrieve data rapidly and precisely and extend tags. So, it has the ability to process big data. This article discusses how to use the characteristics of XBRL and the attribute of data to make connections among retailers' financial information, its customer management, supplier management and order management, then help companies make business decisions and obtain greater value appreciation. On the basis of it, this article also suggests revising the XBRL taxonomy standard elements.

Keywords: Big data; XBRL; retail industry.

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1. INTRODUCTION

With the development of human society, the business mode of China's retail industry is changing ceaselessly, from the original department store, later to supermarket, then to the chain store, and finally to the online store now. As long as users type a set of characters in the search box on the web page, a series of data will be produced and possibly be very large in every minute (it depends on the website's flow). Sorting and analyzing the data not only can be used to understand the users and market better, but also can be used to forecast and plan something in advance and stimulate greater spending power. The development of China's retail industry embodies the advent of the era of big data. Big data helps retailers do customer segments, simulate reality, improve investment return, provide data storage space rental, manage customer relationship, set up personalized accurate recommendations and data search [1]. But in addition to these advantages of big data, its data structure is increasingly complex and its processing procedure is more difficult. The XBRL (eXtensible Business Reporting Language) as a new financial reporting language, which has unstructured data structure and can handle more complex multi-dimensional data. Its data structure also has some characteristics, such as metadata tags and rapid accurate retrieval. Besides, it has the functions of inputing fast, excavating financial data and extending tags, Shen Yingling, [2]. By transforming the traditional corporate financial reports into data formats helps computers identify them directly, which reduces the number of conversion of profiled data formats, lows the data redundancy and improves the efficiency of analytical work, Sun Fan and Yang Zhounan, [3]. Therefore, XBRL has the ability to process big data to promote the further development of retail industry.

This article analyzes in the era of big data, how to use the characteristics of XBRL and the attribute of data to make connections among retailers' financial information, its customer management, supplier management and order management, then help companies make business decisions and obtain greater value appreciation. Based on it, this study also suggests revising the XBRL taxonomy standard elements.

2. RESEARCH STATUS

2.1 Related Researches on Big Data

McKinsey Global Institute [4] publishes its report and notes that "big data" is data collection, which cannot get, manage and process them by using traditional database software tools within a certain time. McAfee A and Brynjolfsson E [5] find that big data is another expression of analysis, which seeks extracting knowledge from the data, and converts it to intelligence activities with commercial advantages. The study of Grobelink and Marko [6] summerize that big data has three characteristics, namely the definition of 3V - Volume, Velocity and Variety.

The domestic research on big data is also emerging in these years, most studies hold that big data will bring opportunities for the development of future technology and economy society, but also carry with many challenges. Li Guojie and Cheng Xueqi [7] make some scientific thinkings on the development of big data based on its current situation. They believe that it is a major strategic field for future social development, and analyze the problems people faced during the application and research of big data. Finally, they make some suggestions to solve the problems. Meng Xiaofeng and Ci Xiang [8] introduce the concept of big data, make a brief contrast to the major application of it, describe the basic framework of data processing, analyze the effect of cloud computing to the data management and summerize the challenges people faced in the era of big data. Zhu Donghua, Zhang Yi et al. [9] study the problems of U.S. defense sector first, then discuss the new changes and national strategies under the environment of big data, think about how to make technical innovation to quickly adapt to big data, and make full use of the opportunities and challenges brought by it.

2.2 Related Researches on XBRL That Applied in China's Specific Industry

In recent years, related studies about XBRL focused on the applications of financial reporting, marketing strategies, taxonomy standard and so on, but there are few relevant literature on its application in China's specific industry. In general, there are some studies in banking industry, oil and natural gas industry, but almost no in retail industry. He Qin [10] finds item omission, item misstatement, order error, amount misstatement and omission, amount symbol error, total amount error and so on in XBRL

reports by comparing the XBRL reports of listed banks in Shanghai Stock Exchange to their PDF reports, and finally puts forward some countermeasures to solve the above problems. Chen hongming and Yang Ruihong [11] get the content and number of new elements by comparing XBRL general taxonomy standard elements with extensible taxonomy standard elements of oil and natural gas industry, and analyze the extension of XBRL taxonomy standard elements from the integrity, accuracy and comparability of the disclosure quality of accounting information. Wu Zhongsheng, Zhang Tianxi and Zhou Chongan [12] analyze 902 XBRL reports in 2011 of Shanghai Stock Exchange, and match each report with taxonomy standard. They find that there is a significant difference among different industries in the use of taxonomy standard, but it doesn't exist in all industries. Then they divide 21 industries into 7 categories further through the cluster analysis and the disclosure of each report item, and analyze the extension of various kinds of elements by combining with industry characteristics. Finally, authors suggests the industrial extension of XBRL taxonomy standard elements in China.

Based on the current status of research, there are few relevant research about the development of China's retail industry driven by big data, and there is almost no literature about the application and improvement of XBRL in China's retail industry in the era of big data, so it also provides the motivation for this study.

3. THE APPLICATION AND IMPROVEMENT OF XBRL IN CHINA'S RETAIL INDUSTRY IN THE ERA OF BIG DATA

3.1 The Characteristics of China's Retail Industry in the Era of Big Data

Since China's reform and opening up, the retail industry has developed fast. Especially since 1990s, with the rapid influx of foreign capital, it has entered a stage of fast development. At the same time, the business mode of China's retail industry mainly has three important shifts and has experienced four stages, as shown in Fig. 1. In the process, its sales mode, operation mode and organization management, etc have undergone tremendous changes.

Nowadays, with the development of information technology, more retailers tend to choose the business mode of online store, it not only can break the boundaries of time and space and save cost greatly, but also can collect, save and excavate data through the Internet. Take a shopping website as an example, according to the users' browsing history, buying record and so on, it can speculate their possible fond products and create a column of "your possible fond products" for them. What's more, according to the contact information left by users, it sends the information of new products, favourable activities and so on to them in order to stimulate more consumption. Behind this, taking a huge amount of data and the management of it as a support, online stores can make a large number of profits.

3.2 The Characteristics of Financial Report in the Era of Big Data

Financial report as an important disclosure way of accounting information, it can help accounting information users have a timely and comprehensive understanding of enterprises' financial situation, operating results and cash flow to support decision. With the changes of accounting bookkeeping methods, the generation of financial report has also changed, as shown in Fig. 2.

It is the time that enterprises are constructing informationized accounting on a large scale. XBRL as a computer language specifically to business reports, it can process multidimensional data in complicated structure, tag metadata, retrieve data rapidly and precisely. Besides, it analyzes and excavates data, and also can be extended markup. In that case, it strengthens the readability and usefulness of financial report, and it will become a technology to promote the construction of enterprises' informationized accounting. In addition to the above benefits, the characteristics of XBRL and its processing way to data completely meet the requirements for the development of the era of big data.

3.3 Improving the Formulation of XBRL Taxonomy Standard Elements

In the era of big data, China's retail industry will deal with a large amount of data about customers, suppliers, inventories, orders and so on. If we can analyze and excavate these data truly and make them become useful information, they will bring greater profit space to enterprises. However, these data's variety is various, their scale is large, and their structure is complicated. So, the difficulty of processing them will be

greatly improved. The characteristics of XBRL have the ability to process big data. How to use XBRL to make connections among retailers' financial information, its customer management, supplier management and order management, then increase the management efficiency of data and reduce management costs. In the following paragraghs, some suggestions about the formulation of XBRL taxonomy standard elements will be given.

3.3.1 Making connections among financial information, customer management and supplier management

Customers and suppliers are retailers' god. So, it is necessary for them to process these data efficiently. We can use XBRL to make connections among enterprise's financial information, its customer management and supplier management. In that case, it is easy for companies to do customer segments, customer relationship management and supplier management.

Accounts receivable and accounts payable in financial statements belong to the same data attributes actually. If we record data about specific customers and suppliers and make connections with customer and supplier database to realize data sharing when we draw up financial statements, it will help companies improve the management of customers and suppliers. In today's XBRL taxonomy standard elements, the suppliers' detailed data is embodied in notes to accounts payable, but customers' data are not completely recorded and only their total number is embodied in notes to accounts receivable. Therefore, this article suggests revising accounts receivable element. In addition to according to the age structure, amount and risk structure of accounts, they also should be disclosed in accordance with specific customer categories, as shown in Table 1.

3.3.2 Making connections among financial information, inventory management and order management

Inventory and order management is the key to the operation and development of retail enterprises. If we record data about suppliers and customers in the changes of inventories and track to the inventory and order management system to share some information when we draw up financial statements, we will carry out more meticulous management to inventories and orders. Therefore, this article suggests revising inventory element, as shown in Table 2.

Table 1. Accounts receivable disclosed according to customer categories

Element	Element type	Standards
[837230] Notes_Accounts Receivable		
Accounts receivable information disclosure[text block]	text block	CAS 37
Accounts receivable disclosed according to customer categories [abstract]		CAS 37
Accounts receivable disclosed according to customer categories [table]	table	CAS 37
customer categories [axis]	axis	CAS 37
Customer [member]	member	CAS 37
Customer A	X	CAS 37
Customer B	X	CAS 37
……	……	……
Accounts receivable disclosed according to customer categories [line items]	Line items	CAS 37
Book balance of accounts receivable	X	CAS 30，CAS 33，CAS 37
Accounts receivable/total book balance	X.XX	CAS 37
Accounts receivable bad debts	X	CAS 37
Accounts receivable/total bad debts	X.XX	CAS 37
Other matters to accounts receivable [text block]	Text block	CAS 37

CAS is the abbreviation of China Accounting Standards

Table 1 refers to the general taxonomy standard elements list of China Accounting Standards for enterprises

Through the above revision, enterprises can quickly and clearly know which products are more popular among customers, which consumer groups like these products, and then subdivide consumer groups and do customer relationship management to make subsequent marketing strategies. At the same time, these data can also be traced to inventory and order management system. In addition, according to the data of products and suppliers, enterprises can choose their main suppliers. At this point, the connections among enterprises' financial information, its customer management, supplier management, inventory management and order management are set up (as shown in Fig. 3). And data are interconnected in more subsystems to make enterprise's whole operation more dynamic.

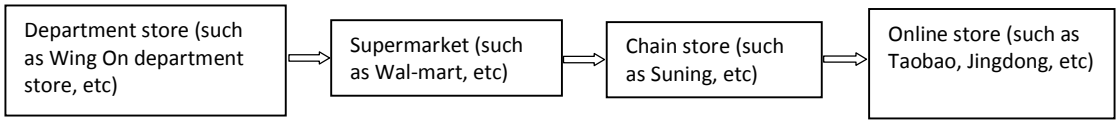

Fig. 1. Changes in the form of retail industry

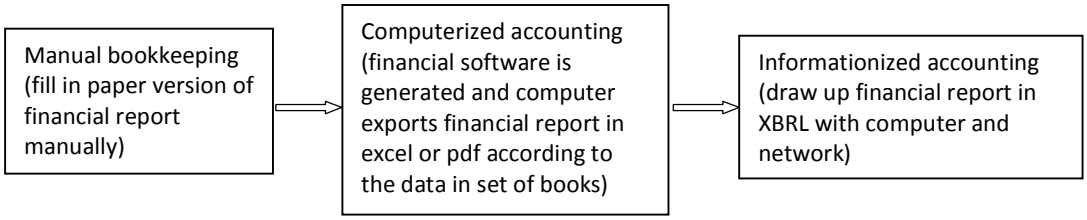

Fig. 2. The changes in accounting bookkeeping methods and the generation of financial report

Table 2. Inventory disclosed according to supplier and customer categories

Element	Element type	Standards
[801110] Notes_Inventory General industrial and commercial enterprises）		
Inventory of general industrial and commercial enterprises information disclosure [text block]	text block	CAS 1
Inventory changes [abstract]		CAS 1
Inventory increases [table]	table	CAS 1
Inventory categories [axis]	axis	CAS 1
Inventory [member]	member	CAS 1
Supplier A	X	CAS 1
Supplier B	X	CAS 1
……	……	……
……	……	……
Inventory decreases [table]	table	CAS 1
Inventory categories [axis]	axis	CAS 1
Inventory [member]	member	CAS 1
Customer A	（X）	CAS 1
Customer B	（X）	CAS 1
……	……	……
……	……	……

CAS is the abbreviation of China Accounting Standards; Table 2 refers to the general taxonomy standard elements list of China Accounting Standards for enterprises

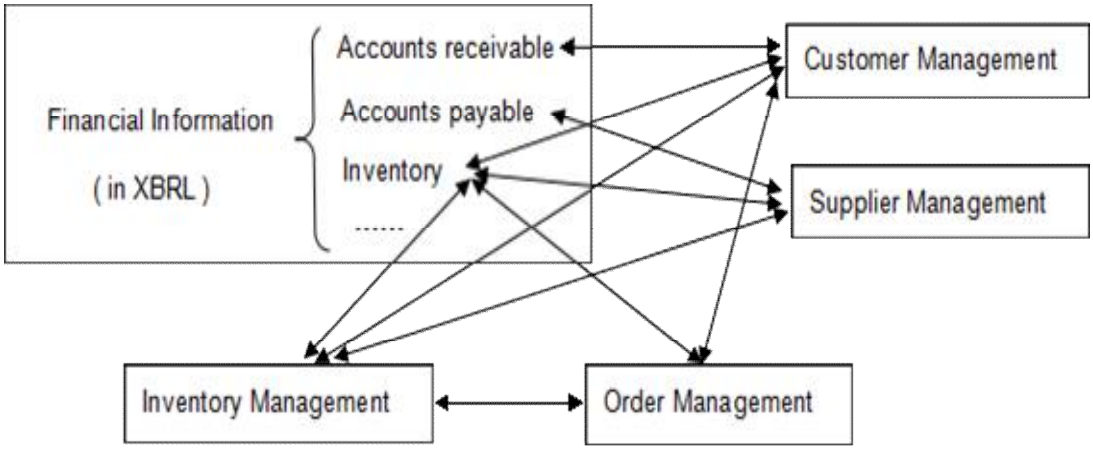

Fig. 3. Connections among retail enterprise's subsystems

4. CONCLUSION

At present, the business mode of China's retail industry is gradually turned to online store. With the advent of the era of big data, it brings some challenges to enterprises as well as some opportunities. These data's variety is various, their scale is large, and their structure is complicated. As a new financial reporting language, XBRL has the ability to process big data. Therefore, this article suggests improving the revision of XBRL taxonomy standard elements, and makes dynamic connections among China's retailers' financial information, its customer management, supplier management, inventory management and order management, then assists them to increase their management efficiency, make some decisions and eventually get greater value appreciation.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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