Research on XBRL Financial Reporting Model under Big Data

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Abstract. The third wave of informatization marked by cloud computing, Internet of Things, and big data is coming. The application of informatization is expanding from the enterprise level to the social level. The enterprises will face the reconstruction of computing platforms and information platforms, as well as the reconstruction of enterprise operation management models and business models. This article conducts extensive surveys and statistics on the application of XBRL financial reports under the big data environment from the two dimensions of the supervisory level and the enterprise, and conducts visual analysis and in-depth discussion, in order to use big data technology to improve the quality of XBRL financial report submission information.

1. Introduction
In 2020, a sudden epidemic has had an unprecedented impact on Guangdong’s economy and society. In the first quarter of 2020, Guangdong experienced negative quarterly economic growth for the first time since 1992. Under the wise leadership of the party and the government, the province’s anti-epidemic organizations have been effective, the epidemic has been effectively controlled, and the province has basically resumed work and production. In April, Guangdong's production and demand recovered significantly, the macroeconomic operation continued to improve, consumption and investment gradually recovered, and the development of modern industries was in a good state. In particular, multinational companies and listed companies need to bravely advance in the tide of the world economy, and must abide by the rules of the game. Financial reporting, as an accounting language product, also needs to converge with the international community. XBRL, as an internationally unified standard and specification, has the advantages of cross-border, cross-platform, cross-language, etc. XBRL can make financial reports more comparable, complete and timely, and improve the level and quality of corporate financial information reporting[1]. Therefore, the research and promotion of XBRL has great economic value and social benefits. The article research helps to enrich the research in the field of XBRL financial reporting, helps companies attach importance to and strengthen the application of XBRL, enhance their management level and agility to respond to the global market, and provide richer strategic financial information and decision support information.

2. Analysis of the problems and causes in the XBRL financial report submission
The financial and accounting reports disclosed by companies have always been the most important way for investors, securities companies, and securities analysts to obtain accounting information of
listed companies. However, with the continuous increase in the number of listed companies and the increase in the content of external disclosures, in the face of huge amounts of information, investors, creditors, regulatory agencies and other relevant external entities and individuals have found it increasingly difficult to grasp the effective financial business of listed companies information[2]. For this reason, a cross-platform, cross-language, standardized, and extensible business report that can help all parties to capture listed company information more conveniently and efficiently. XBRL was born in the United States and quickly promoted its application worldwide. After more than ten years of development, there is still a gap between the actual application of XBRL in Chinese enterprises and the original expectations[3], such as: the overall satisfaction of the enterprise is not high, the management level is limited, the cost of XBRL implementation is high, and the enterprise lacks the inherent motivation for XBRL implementation, etc. The article analyzes the application of XBRL in enterprises from the two dimensions of supervisory level and enterprise, in order to find the cause of the problem.

At present, the supervision of XBRL applications in my country is mainly composed of three institutions: the Ministry of Finance, the Securities Regulatory Commission, and the stock exchange. However, so far, the application level of XBRL has remained at the financial reporting level, and XBRL has not been drilled down to the account book level and business level. Investors and creditors are not concerned about the disclosure of XBRL financial reports. The main reasons are the following two aspects.

2.1. The regulatory authorities have inconsistent requirements for the submission of XBRL financial accounting reports

In my country, the CSRC was the first to promote XBRL, followed by the Shenzhen Stock Exchange and the Shanghai Stock Exchange, and finally joined the Ministry of Finance. The three major regulatory agencies have all made great contributions to the promotion and application of XBRL. Therefore, at present, there are three sets of XBRL format of financial reporting standards in our country, which undoubtedly increase the reporting cost of enterprises and cause an invisible waste of enterprise resources. Although both the Shenzhen Stock Exchange and the Shanghai Stock Exchange formulate XBRL classification standards in accordance with the "Standards for Electronic Disclosure of Information for Listed Companies", their structure, naming rules, development mechanism, web page presentation methods, and related services are different. The listed companies must submit financial reports in XBRL format in accordance with the requirements of their exchanges[4].

The Ministry of Finance requires centrally-managed state-owned enterprises, large state-owned enterprises, banking financial institutions, some local state-owned enterprises, and 12 large-scale accounting firms engaged in H-share corporate audits to compile XBRL instance documents in accordance with the "General Classification Standards for Accounting Standards for Business Enterprises". However, the National Audit Office does not accept financial business data in XBRL format and requires the audited entity to submit data that meets the audit requirements. Therefore, in order to meet the reporting requirements of different regulatory authorities, companies have to prepare XBRL financial reports of different standards. This consumes a lot of financial staff's time, resulting in loss of corporate efficiency. The Ministry of Finance, the China Securities Regulatory Commission, the Shanghai Stock Exchange and the Shenzhen Stock Exchange and other government authorities should unite to form a technological synergy and reduce the burden on enterprises for reporting.

2.2. The company's submission of XBRL financial reports is a mere formality

In 2012, my country's listed companies have basically realized the "formal disclosure" of XBRL financial information. In order to ensure the quality of the financial reports submitted, the two stock exchanges require their listed companies to provide XBRL instance documents when submitting PDF files for verification. The reason why listed companies submit XBRL documents is because of the unified requirements of the regulatory authorities, and the enthusiasm of companies is actually not
At the beginning of XBRL application, the Shanghai Stock Exchange designated XBRL software vendors to provide listed companies with XBRL automatic conversion and import services free of charge, realizing "one input, multiple generation" to facilitate the automatic collection of information of listed companies by the regulatory authorities. However, the listed companies have not paid sufficient attention to XBRL financial report reporting, and are not very clear about the process of XBRL software conversion and the generation of XBRL instance documents.

Based on the above situation, the research team conducted a questionnaire survey on XBRL financial information disclosure of 50 listed companies. The questionnaire designed a total of seven questions including the concept of XBRL, the principles of XBRL, the meaning of XBRL, the history of XBRL, the development process of XBRL software, the current application of XBRL, and the method of obtaining XBRL information. The survey results are shown in Table 1 and Figure 1.

**Table 1.** Statistical results of the application of XBRL in listed companies.

| Project                                      | Unfamiliar | Generally familiar | Very familiar | Total (number of copies) |
|----------------------------------------------|------------|--------------------|---------------|--------------------------|
| XBRL concept                                 | 4          | 32                 | 14            | 50                       |
| Principles of XBRL                          | 15         | 31                 | 4             | 50                       |
| The meaning of XBRL                         | 12         | 33                 | 5             | 50                       |
| The history of XBRL                         | 34         | 12                 | 4             | 50                       |
| The development process of XBRL software    | 45         | 4                  | 1             | 50                       |
| The current application of XBRL             | 7          | 40                 | 3             | 50                       |
| The method of obtaining XBRL information    | 6          | 33                 | 11            | 50                       |

It can be seen from Table 1 that in terms of the XBRL concept, there are 4 unfamiliar companies, accounting for 8%; generally, there are 32 familiar companies, accounting for 64%; very familiar companies are 14 companies, accounting for 28%. This shows that with the promotion and application of XBRL for more than ten years, most listed companies have a clearer concept of XBRL. From the perspective of XBRL principles, there are 15 unfamiliar companies, accounting for 30%; there are 31 companies that are general familiarity, accounting for 62%; there are 4 companies that are familiar, accounting for 8%. According to the statistical results, 30% of listed companies have a rather vague understanding of XBRL principles. From the perspective of XBRL, there are 12 companies that are unfamiliar, accounting for 24%; there are 33 companies that are generally familiar, accounting for 66%; there are 5 companies that are very familiar, accounting for 10%. This shows that most companies have a clearer meaning to XBRL. From the history of XBRL, there are 34 companies that are unfamiliar, accounting for 68%; there are 12 companies that are generally familiar, accounting for 24%; there are 4 companies that are very familiar, accounting for 8%. It shows that only about one-third of enterprises are more concerned about the development of XBRL. From the perspective of the development process of XBRL conversion software, there are 45 companies that are unfamiliar, accounting for 90%; there are 4 companies that are generally familiar, accounting for 8%; there are 1 companies that are very familiar, accounting for 2%. This shows that, because the development of XBRL technology involves computer expertise such as XML and databases, and requires high computer proficiency for financial personnel, only 10% of enterprises have a better understanding of XBRL software development technology. Judging from the current application of XBRL, there are 7 companies that are unfamiliar, accounting for 14%; 40 companies that are generally familiar, accounting for 80%; 3 companies that are familiar, accounting for 6%. This shows that only about 85% of companies are familiar with the current application of XBRL. From the perspective of obtaining XBRL information, there are 6 companies that are unfamiliar, accounting for 12%; there are 33 companies that are generally familiar, accounting for 66%; 11 companies that are familiar, accounting for 22%. It can be seen from the statistical results that most listed companies are relatively familiar with the current application of XBRL.

According to the above survey results, Figure 1 is obtained after data visualization processing.
Through the above research, it is found that listed companies are still in their infancy regarding the concept of XBRL, the principles of XBRL, the meaning of XBRL, the history of XBRL, the development process of XBRL conversion software, the current application of XBRL, and the way to obtain XBRL information stage. The application of XBRL in SMEs, institutions and other enterprises and institutions has not yet been compulsorily promoted. With the gradual opening of the financial market and the continuous maturity of XBRL technology, it has become more and more convenient for companies to submit XBRL financial reports, and their enthusiasm has also become higher.

3. Suggestions on improving the XBRL financial report reporting model

According to the above analysis, it is found that there are still many problems in the application of XBRL financial reports in my country. From the government supervision level, XBRL has a multi-management situation; from the enterprise level, many listed companies and some central enterprises and state-owned enterprises are forced by the regulatory authorities in XBRL reporting, and their endogenous motivation is insufficient; from the capital market level, XBRL is not a mainstream reporting format, and financial reports in XBRL format have not yet been generally recognized by investors. However, XBRL has been widely recognized abroad. Our country should also adapt to the trend, deepen the application of XBRL in the financial field and big data field, learn more and apply more, further analyze the reasons, and propose improvement measures.

3.1. Establish a unified national XBRL classification standard

At present, my country's XBRL presents three authorities in charge of the Ministry of Finance, the Securities Regulatory Commission, the Shanghai Stock Exchange and the Shenzhen Stock Exchange. Although everyone follows the same accounting standards system, the three competent authorities have respectively formulated their own XBRL classification standards, which caused the Ministry of Finance and the Securities Regulatory Commission to have problems in the selection of classification standards in the implementation of supervision and management, and the implementation of supervision has changed. It's complicated. To this end, my country can learn from advanced international experience and practices, and the Ministry of Finance will lead the organization of the Securities Regulatory Commission, the Shanghai Stock Exchange and the Shenzhen Stock Exchange to establish a unified national XBRL classification standard. The Securities Regulatory Commission, the Shanghai Stock Exchange and the Shenzhen Stock Exchange, as well as various industries and regulatory authorities, can expand the classification standards according to their own management needs. In this way, the utility of XBRL classification standards can be maximized, and the cost of XBRL application by enterprises and regulatory agencies can be reduced.

3.2. The companies pay full attention to the application of XBRL

At present, the listed companies, the central enterprises and the large state-owned enterprises do not pay much attention to the disclosure of XBRL financial reports[5]. Many of their XBRL financial reports are prepared in a mere formality. The main reason is that the business community did not
participate in the formulation of XBRL classification standards, and enterprises did not have enough voice. The departments that formulate XBRL classification standards are mainly the Ministry of Finance, the China Securities Regulatory Commission, the State Administration of Taxation, the National Audit Office, the Chinese Institute of Certified Public Accountants, the two major stock exchanges, the Ministry of Industry and Information Technology, the National Standardization Administration, and the General Administration of Quality Supervision, Inspection and Quarantine. The formulation of XBRL classification standards took their interests into consideration, but as a business implementer of XBRL classification standards, they did not participate in the formulation process of the classification standards. If the XBRL classification standard is formulated without considering the needs of the enterprise, its value advantages will be difficult to give full play to. Therefore, when formulating XBRL classification standards, business representatives should be included in the scope of XBRL classification standards, and truly listen to the needs of the business community.

After introducing enterprises to participate in the XBRL classification standard formulation framework, the regulatory authorities should do a good job in supervision, and XBRL software vendors must do a good job in service. Establish public welfare free websites, such as XBRL China, or set up XBRL knowledge popularization columns on the official websites of Shenzhen Stock Exchange and Shanghai Stock Exchange to publicize the basic knowledge of XBRL, XBRL example document preparation methods, and comparison of XBRL financial reports of listed companies Data for corporate finance personnel and professionals to learn. On the other hand, XBRL software suppliers should strengthen the research and development of general XBRL conversion systems to reduce the difficulty and cost of enterprises using XBRL.

4. Summary and outlook

XBRL, as an internationally unified standard and specification, has the advantages of cross-border, cross-platform, and cross-language. XBRL can make financial reports more comparable, complete and timely, and improve the level of corporate financial information reporting. Therefore, the research and promotion of XBRL financial reporting under big data has huge economic value and social benefits.

[Fund Project] 2018 Guangdong Province Undergraduate College Teaching Quality and Teaching Reform Construction Project (Project Number: The Official Letter of Department of Education of Guangdong Province [2018] No. 179); The Key Scientific Research Project of Guangdong University of Science and Technology in 2019 (Project No.: GKY-2019KYZD-11); The Key Scientific Research Projects of Guangdong University of Science and Technology in 2020 (Project Number: GKY-2020KYZDW-2).

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