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Effectivness of the Adoption of the XBRL Standard in the Indian Banking Sector[1]

Abstract: The XBRL standard was adopted by the Reserve Bank of India (RBI) in the year 2008 as a standard by which the banks that are regulated by the RBI submit regulatory, prudential, supervisory, and other statistical data. This study focuses on estimating the effectiveness of the adoption of the XBRL standard in the Indian banking sector. The effectiveness has been studied on the basis of the responses received on the survey conducted targeting the commercial banks of India. Two important factors, namely, 'Effectiveness of the XBRL Data Submission' and 'Savings of Time and Cost' have been considered mainly for the study. The study revealed that the overall efficiency of the reporting system in the Indian banking sector has increased to a great extent with the adoption of the XBRL standard. Although the overall effectiveness of XBRL adoption has been found to be satisfactory, there is always room for further enhancement of the system in order to achieve complete effectiveness.

Key words: XBRL, ADF, Technology, Effectiveness, Survey etc.

JEL Classification: O33, Q55, G21.

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[1]   The views and opinions expressed in this paper are those of the authors and do not necessarily represent the views of the RBI.

Introduction

The Reserve Bank of India (RBI) is the central banking institution of the country. Along with the many functions bestowed on the Reserve Bank, the RBI is entrusted with the major task of regulating and supervising the financial system in the country. As a part of this function, the RBI collects data in fixed formats (called 'Returns') from commercial banks, financial institutions, authorised foreign exchange dealers and non-banking financial institutions. With the view to adopt better technology solutions in reporting, the RBI adopted the eXtensible Business Reporting Language (XBRL) standard in the year 2008 for return submission. As the primary objective, this paper attempts to analyse the effectiveness of adoption of the XBRL standard in the Indian banking sector. The paper is arranged as follows. Section 1 gives a brief introduction about the XBRL standard and its prevalence in the RBI. Section 2 deals with literature review related to the study. Section 3 discusses the details of the survey conducted in order to obtain the required data. The results of the study are given in Section 4 of the paper. The paper analyses the benefits with respect to saving time and cost from the reporting entities' point of view in meeting the XBRL related reporting requirements of the RBI. Finally, Section - 5 provides concluding facts based on the findings of the study.

1.1. XBRL

The novel idea of XBRL using XML for electronic financial reporting was introduced by Charles Hoffman, a Certified Public Accountant (CPA) in Washington. After two years in the American Institute of CPAs, the XBRL brand was launched in April 2000. In the same year, XBRL-International (XII), an international non-profit consortium, released the first version of XBRL 1.0. Subsequently, a modified standard, XBRL 2.1 was released in 2003 which has been the standard since then. XII rapidly spread in the international arena and has acquired a global membership from national and international regulators. Presently XBRL is used around the world and it has become an internationally recognised standard for financial and business reporting. The wave of XBRL has swept the entire globe and a number of adopters have increased considerably over the past few years. Considering the benefits that XBRL provides, many regulators around the world have already mandated XBRL reports and few others have started voluntary XBRL programs.

1.2. XBRL at the Reserve Bank of India

At the Reserve Bank, the main vehicle for gathering information from regulated entities is the 'returns' submitted by the entities in the prescribed format and periodicity. These returns pertain to a wide spectrum of areas such as regulation, supervision of commercial banks, co-operative banks, primary dealers, authorised dealers, input data for the formulation of monetary policy, and various other statistical data. The present system of data and information management in the Reserve Bank has evolved over the years in order to keep in pace with the emerging needs of the RBI and to disseminate quality information. The evolution of the data collection process over the years at the RBI saw the migration from the 'Paper based' reporting to 'Program based' reporting and finally to the current 'Standard based reporting'.

This transition was implemented by the RBI mainly with a view to bring sophistication and automation in place. Presently, at the RBI, the XBRL is being used by banks for the purpose of online reporting of many returns and the same is being integrated with the Automated Data Flow (ADF) systems of banks. The ADF system that is required to be developed at the bank's end should ensure the flow of data in an automated manner from the source system of banks to the Reserve Bank. The ADF system aims to integrate the multiple systems of the banks to ensure data consistency and integrity. For the returns that are under the XBRL system, the banks should generate the XBRL instance document directly from the ADF, after ensuring that it has all the required data in the ADF system.

Out of the around 300 returns being submitted to the Reserve Bank, around 240 returns are submitted by the commercial banks. Of the 300 returns, 97 returns have been developed under the XBRL system in a phased project which started in the year 2008. Of these 97 returns, majority of the returns are submitted by commercial banks. The Reserve Bank is working towards bringing more returns under the ambit of the XBRL standard (Joshi et al. 2016).

2. Review of Literature

This section reviews some of the latest studies done in the area of XBRL and related technologies in India and other countries. Fellegi, I. P. (2004) was of the view that development of harmonised international business accounting practice would be one of the key benefits of globalisation. Further, consistent exploitation of XBRL, which is emerging as an international financial reporting language, would facilitate international accounting practices. XBRL acceptance in India in

the light of behavioural aspects was studied by *Chouhan, and Goswami (2015). According to them, XBRL brings structure to business information as well as contextual advanced analysis and it also enhances* the efficiency of financial reporting, accuracy, timeliness and reliability of financial data. Chowdhuri et.al. (2014) addressed the implications of XBRL interoperability issues in financial decision making process with the concept of information value chain. They proposed a model called an Ontology-based Framework for XBRL-mapping and Decision-making (OFXD), which provides interoperability between different XBRL filings which enable heterogeneity of the elements and context definitions in various XBRL filings and generates XBRL ontology. The results of their study show that OFXD is capable of addressing semantic heterogeneities between different XBRL filings. The information management in the context of capital markets was studied by Yoon et.al. (2011). According to them, the information asymmetry in the Korean Stock Exchange was impacted due to the effect of XBRL adoption in the Korean Stock Exchange. Their findings signalled that the adoption of XBRL led to the reduction of information asymmetry. They also pointed out that the effect of XBRL adoption on reducing information asymmetry is stronger for larger-sized companies than medium and small-sized companies. Further, they recommended that government authorities should promote XBRL adoption for business reporting. The information asymmetry aspects in the European area were examined by Liu et al. (2017). On account of the high implementation cost associated with XBRL, as the future mandate of fully XBRL adoption by 2010, they examined whether the expected benefit of information asymmetry reduction is realized through XBRL adoption in the European context. Their finding suggests that XBRL is a viable option as an electronic reporting format. The findings are arrived based on the analysis performed among European non-financial firms – revealed a significantly increase market liquidity and thus reduce information asymmetry. A stronger association is found for larger firms as they have resources and expertise to implement the technology.

Chen (2012) examined the effect of the implementation of XBRL in four countries viz. Netherlands, Australia, the Unites States, and Singapore based on a case study method. The author selected the countries in order to account for the diversified implementation of XBRL focusing on e-government, institutionalism, collaborative public management, regulatory compliance, and management information systems. The author attempted to find the various determinants of the successful implementation of XBRL. The findings of the study emphasised the importance of program goals and strategic alignment for achieving information transparency and efficiency. The paper also highlighted the advantages of strategies correlating to an institutional setting, the critical need to provide incentives for adoption, and the usefulness of incremental implementation. Liu et al. (2014)

investigated the benefits of mandatory adoption of XBRL in Security Exchange Commission (SEC) in the U.S. The implementation happened in phases (phase I in 2009 and phase II in 2010). Their empirical analysis suggests a significant positive association between mandatory XBRL adoption and both analytic and forecasting accuracy. Furthermore, such association is larger in phase I filers than phase II filers. Their findings not only support the SEC's requirement for detailed tagging of footnotes, but also showed that the benefits of adopting XBRL are realised regardless of errors found and raised concerns at the early stages of adoption. A conceptual and benefit study on XBRL was conducted Lokesha, K (2013). The author has mentioned in the concluding part of the study that the awareness of XBRL needs to be enhanced. In order to get awareness, more training programs, conferences, seminars and workshops have to be conducted all over the world to gain awareness and practical implementation. This helps in taking the decisions more quickly and confidently. Further, the paper suggested that regulators and government have to take strong steps in making the application of XBRL standard mandatory for financial reporting to all the companies. In view of the internet security concerns, security aspects have to be given importance in order to minimise and control hackers and virus attacks which can cause failure of the financial database system. In the cost reduction aspect of the study, XBRL adoption helped in the U.S. and Japanese publicly listed firms to reduce their audit fees, which are positively associated with firm size (Shan et al., 2015). They have used 8 years of data after mandating XBRL standards. The results also highlighted XBRL moderates the association between a firm size and audit fees in both the U.S. and Japan, with these moderation effects being weaker among Japanese firms.

The futuristic aspects of the XBRL technology were studied by Amelia and Trinkle, (2011) using the Delphi method. The analysis revealed that that XBRL is very likely to impact corporations, financial reporting, users of financial reports and auditing. According to them, the most likely impacts of XBRL include: increased accessibility of financial reports, easier regulatory compliance, enhanced availability of financial reports, facilitation of continuous reporting, and improved efficiency in investment and business decision making. The Delphi panel's futuristic aspects were found true in the subsequent years of implementation of XBRL around the world. Some of the reviews done in this paper also substantiate the facts revealed by the Delphi experts in their study. Erlance et al. (2014) examined the financial reporter's perception on XBRL in Malaysia. They used a survey method and questionnaire as a tool for collecting data from 150 respondents of financial reporters. Their study revealed that XBRL is compatible and beneficial to the organisations for decision-making purpose. The findings in their study shed light on the need to provide more awareness and knowledge to preparers by

the regulators before XBRL could be utilised to the fullest. Further, the respondents opined that they faced some difficulty in implementing XBRL as it involved a huge amount of expenditure to implement XBRL. However, they believed that XBRL is useful in promoting corporate governance. They also claimed that these results were consistent with the previous findings that XBRL does improve the efficiency of an organisation's all round performance.

ZhenyangBai et.al, (2014) studied the impact of XBRL in Japan. They did a comparative analysis by examining various measures in the before and after the XBRL implementation periods. They discussed the adoption of XBRL and how it has helped to improve the information environment. The researchers are aimed at reducing information asymmetry, and improving parameters like transparency and quality of business reporting, etc. By examining various measures in the pre- and post-XBRL periods, they provide evidence consistent with the notion that the adoption of XBRL has helped to improve the information environment, as indicated by the reduction of event returns volatility, absolute cumulative abnormal returns, changes in the standard deviation of returns, and the abnormal bid-ask spread. XBRL usefulness in Australia was examined by Jacqueline et al. (2017). Their study focuses on the extent of awareness of XBRL reporting standards in Australia at present and finds that voluntary adoption of XBRL by preparers and users is low, possibly because of a lack of awareness about XBRL and its potential benefits. Their study yields significant implications for the accounting regulators in creating more awareness on the benefits of using XBRL and to create an impetus for XBRL adoption. The implementation of XBRL standard has not yet become a reality in some countries. Some are still in the experimental stage and some are using improved version of various standards that has already in use. For instance, in the Euro area, Montenegro has recently analysed the feasibility of XBRL possibilities in their region (Martic et al., 2017). Based on their study they believe that XBRL can be successfully implemented in Montenegro as XBRL can solve their existing problem of integration of multiple channels of reporting, financial sector consolidation, harmonisation of accounting practices, computerisation, and so on. They explained both negative and positive aspects of applicability of modern methods of accounting theory and practice.

Further, some of the recent studies on the technical aspects of XBRL include the integration of textual data with quantitative financial statements, as this being a challenge due to the formatting differences. Other aspects are digitally unified reporting methodology combination of sustainable reporting and performance control (Chou et al., 2016; Seele, 2016). The review of the literature reveals the research gap in the Indian context and our study is contributing in filling the gap.

3. Data and Methodology

The study is based on primary data collected by means of a survey for which questionnaires were circulated through email. The questionnaire was constructed in view of the objective of the study. The target of the survey was commercial banks in India. Banks in India are classified based on their ownership; Public Sector Banks (banks where a majority of the stake are held by the Government), Private Sector Banks (banks where greater parts of state or equity are held by the private shareholders and not by government) and Foreign Banks operating in India. A pilot survey was conducted with a draft questionnaire to check the feasibility of the study. The respondent banks were randomly selected for the purpose of the pilot survey from the target population. The questionnaire was finalised based on the pilot study. The key characteristics on which responses were sought from the banks include: Effectiveness in Business Decision Making Process, Aid in Research and Analysis, Reduction of Errors in Data Reporting, Facilitation of Audits and Reviews, Reduction in Time Lag in Data Submission, Data Processing and Analysis and Reduction in Total Cost for Development and Maintenance.

It is quite common in the banking sector studies to cover all units of the population or to follow a purposive sampling method of sample selection, especially in empirical studies as indicated by Maurya, et al. (2011), Das and Ghosh (2004); Kumar S S (2013), Bardhan, S (2013), Bhattacharyya et al. (1997). However, since our study is based on a questionnaire, sample selection criteria have been adopted in order to obtain a true representative sample from the population. Simple random samples were selected from each stratum, after stratification based on the ownership pattern of the banks, namely: public sector bank, private sector bank and foreign banks operating in India. A total sample of 51 banking units (33% public, 20% private and 47% foreign banks) has been considered for the study. The respondents were asked to rate in four point Likert scale with an increasing degree of effectiveness. The scores were used to estimate two parameters such as *Effectiveness (E)* and *Savings in Time and Cost (S)* which have been used as a measure of overall effectiveness of the XBRL adoption in the Indian banking sector.

Application of parametric test on ordinal data has always been a subject of debate. Several studies on a composite Likert scale are available in social and behavioural sciences, applied parametric methods. This is very well established in the literature. (Gideon, V., 1977; Jakobsson, U. 2004; Likert, R., 1932; Dennis et al., 1994; Jacoby and Michael, 1971). In view of this, we have used both parametric and non-parametric method to study the effectiveness of the XBRL standard in India. One-way Analysis of Variance (ANOVA) has been used to test the effec-

tiveness of three categories of banks using composite Likert scale. Kruskal-Wallis test has been used to test the Likert items of each characteristic, namely: increase in efficiency of the overall system in comparison to the previous system, effectiveness in the decision making system of the banks, effectiveness in research and analysis, reduction in errors in the reporting system, facilitation in internal audit and review, the extent to which XBRL helped in reducing the Time Lag in Data Submission, reducing the Time Lag of Data Processing and Analysis, and reducing the Total Cost for Development and Maintenance.

4. Results and Discussion

**Chart-1a: Increase in Efficiency of the present system vis-à-vis previous system**
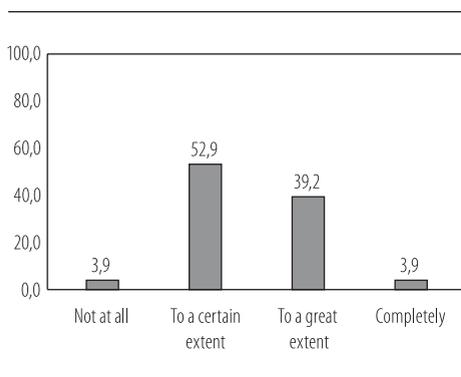
The overall *Effectiveness (E)* has been measured based on the five characteristics namely, increase in efficiency of the overall system in comparison to the previous system, effectiveness in the decision making system of the banks, effectiveness in research and analysis, reduction in errors in the reporting system and facilitation in internal audits and reviews. The responses received from banks against the increase in effectiveness of various characteristics in terms of percentages are presented in Chart -1a to Chart-1e.

Chart-1b: Increase in the Effectiveness of business decision making process
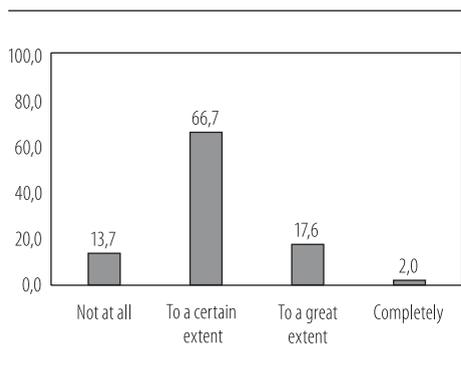
Chart-1c: Aid in research and analysis
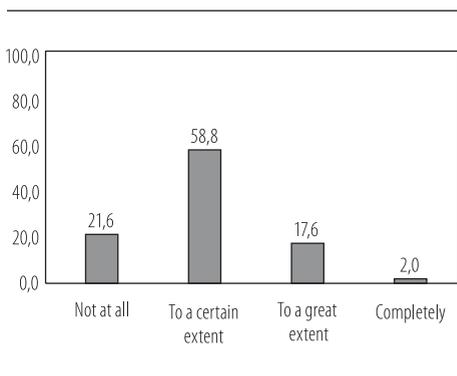
Chart-1d: Reduction of errors in data reporting
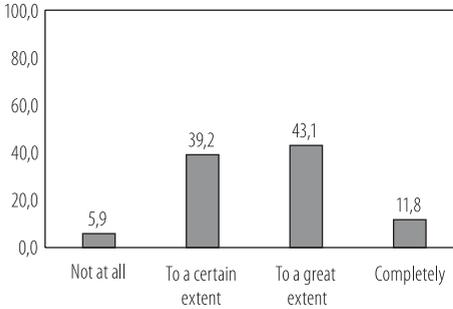
Chart-1e: Facilitation of audit and reviews
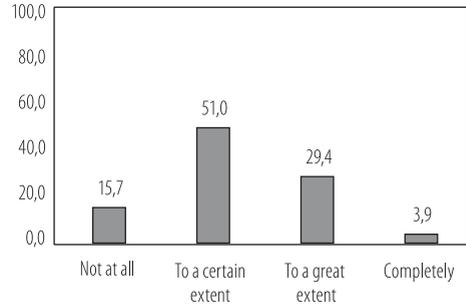
Note: charts 1.a to 1.e are the bar diagrams representing against five different effectiveness characteristics intended to measure the overall effectiveness of XBRL standards and system in India. Percentage of response is indicated in the top of each bar against the respective scale of Likert. Response in percentage is marked in X-axis

Around 39 percent of the banks felt that the overall efficiency of the reporting system has improved to a 'great extent' due to the adoption of XBRL standards and systems and 53 percent of the banks were of the opinion that the efficiency has increased to a 'certain extent'. In effect, the overall efficiency of the system has increased (Chart1- a). Around 86 percent of the banks responded that the XBRL adoption has increased the effectiveness of their business decision making process with a varying degree of effectiveness. However, the rest, 14 percent of the banks were of the view that XBRL based system has not helped in their decision making process (Chart1-b). The XBRL system has aided in research and analysis (78 percent) whereas 22 percent of the banks differed in opinion and responded that XBRL had not aided in research and analysis (Chart1-c). Another important achievement is the reduction of errors in reporting; an overwhelming response was received indicating reduction in errors due to XBRL platform as compared with the previous system with only 6 per cent reporting otherwise (Chart 1-d). The survey revealed that XBRL has facilitated Audits and Reviews for around 84 percent of the banks (Chart1-e).

With respect to the parameter *Savings in Time and Cost (S)*, three important parameters were studied: the extent to which XBRL helped in (i) Reducing the Time Lag in Data Submission, (ii)Reducing the Time Lag of Data Processing and Analysis and (iii) Reducing the Total Cost for Development and Maintenance. Around 47 percent of the banks felt that XBRL has helped in reducing the time lag in data submission by more than 50 percent. Similarly, around 41 percent of

the banks felt that the XBRL has helped in reducing the time lag for data processing and analysis by more than 50 percent. Banks have felt that (25 percent) the adoption of XBRL standard has helped in reducing the total cost of development and maintenance of their systems to a certain extent.

The effectiveness of the XBRL system in the Indian banking sector for three categories of the banks were also studied for the different parameters considered. The descriptive statistics of the composite scores based on 7 Likert items for the two effectiveness measures are given in Table- 1.

Table-1: **Descriptive statistics of *Effectiveness (E)* and *Savings in Time and Cost (S)* for all banks and bank category-wise.**

Effectiveness (E)	Sample size	Mean	Median	Mode	Standard Deviation	Skewers	Min.	Max.
Public sector banks	17	11.47	10.00	10.00	3.51	1.15	7.00	19.00
Private sector banks	10	10.20	10.00	10.00	2.69	1.04	7.00	16.00
Foreign banks	24	11.54	11.50	11.00	2.16	-0.71	6.00	15.00
All	51	11.25	11.00	10.00	2.77	0.68	6.00	19.00
Savings in Time and Cost (S)								
Public sector banks	17	5.52	5.00	3.00	2.91	1.01	3.00	11.00
Private sector banks	10	4.10	3.00	3.00	1.85	1.65	3.00	8.00
Foreign banks	24	4.70	4.00	3.00	2.45	1.72	3.00	12.00
All	51	4.86	4.00	3.00	2.52	1.42	3.00	12.00

The XBRL standards have been adopted by all commercial banks in India as per the direction of the RBI. The IT infrastructure at the reporting entity level is taken care by the respective reporting entities. The robustness of the system at the reporting entity level would be varying depending on their IT infrastructure, although the core infrastructure has been provided by the RBI. For instance, foreign banks are much superior in adopting robust IT systems as compared to others peers. With this intuition, the effectiveness of all three categories of the banks is expected to vary. To examine the statistical significance of effectiveness, we have formulated two hypotheses and the same is verified with the response data. The average effectiveness of both the parameters E and S has been found to be higher for the public sector banks (table-1). However, this needs to be verified using a suitable statistical test. In order to test the effectiveness (E) and Saving (S) among the three categories of bank, one-way ANOVA tests were applied to the two parameters separately to the corresponding null hypotheses given below:

   (i)   *Hypothesis (Null): Average effectiveness of public-sector, private sector and foreign banks are identical due to the adoption of XBRL standards*

(ii)   *Hypothesis (Null): Average time and cost saving of public-sector, private sector and foreign banks are same due to the adoption of XBRL standards*

Both the null hypotheses were accepted at 5 percent level of significance indicating that there is no statistically significant difference among public sector, private sector and foreign banks in terms of *Effectiveness (E)* and effect of *Savings in Time and Cost (S)* in adoption of XBRL standards in the Indian banking sector. The ANOVA test results for parameters E and S are indicated in Table - 2 and Table – 3, respectively.

Table-2: ANOVA of Effectiveness (E)

	Sum of Squares	df	Mean square	F	Sig.
Between Groups	13.89	2	6.94	0.89	0.415
Within Groups	371.79	48	7.74		
Total	385.68	50			

Table-3: ANOVA of Savings in Time and Cost (S)

	Sum of Squares	df	Mean square	F	Sig.
Between Groups	13.94	2	6.97	1.09	0.343
Within Groups	306.09	48	6.37		
Total	320.03	50			

The Kruskal-Wallis test has been performed for all seven characteristics considered in the study. The test suggests that there is no significant statistical difference in the effect of seven characteristics across public, private and foreign banks in India. The test results are presented in Table-4.

Table-4: Kruskal Wallis Test for 8 Likert items

Sr. No.	Various items evaluated	Chi-Square	df	p-value
1	Increase in efficiency of overall system	1.95	2	0.37
2	Increase in effectiveness of business decision making	3.72	2	0.15
3	Aid in research and analysis	3.14	2	0.20
4	Reduction of errors in data reporting	0.12	2	0.93
5	Facilitation of audit and reviews	3.31	2	0.91
6	Reduction in time lag in data submission	1.99	2	0.36
7	Reduced time in data processing and analysis	1.36	2	0.50
8	Reduced total cost in development and maintenance	4.00	2	0.13

Conclusion

This study focused on estimating the effectiveness of the adoption of the XBRL standard in the Indian banking sector. Two important factors, namely, '*Effectiveness*' of the XBRL Data Submission and '*Savings of Time and Cost*' were considered mainly for the study. The study revealed that the overall efficiency of the reporting system in the Indian banking sector has increased to a great extent with the adoption of the XBRL standard. The study further established that there is no statistically significant difference between public sector, private sector,and foreign banks in India in view of the '*Effectiveness*' and '*Saving of Time and Cost*' due to the adoption of XBRL standard. Although, the overall effectiveness of the XBRL adoption has been found to be satisfactory, there is always room for further enhancement of the system in order to achieve complete effectiveness. The development of a XBRL based reporting platform has aided in research and analysis with considerable reduction of errors in reporting. The study has not addressed the technological aspects of the XBRL standard and the information asymmetry aspects of the banking sector. As this is a survey based study on the perceptions of the banking sector, the results discussed in this paper would not be devoid of limitations of the survey based studies in general.

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