

Original Research Article Investigation on XBRL Adoption Based on TOE Model

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ABSTRACT

One current new technology in financial issues is XBRL (eXtensible Business Reporting Language) that is based on XML (eXtensible Markup Language). Actually, XBRL is a language to transfer data and a new way to publish financial reports on internet. This is important for organizations which want to communicate internationally with other organizations in other countries and try to compare financial results with others. Meanwhile, all shareholders, stakeholders, competitors and public users want to know more about an organization for any usage and this kind of language can make easy the knowledge discovery procedure.

Aim: The purpose of this paper is to define a XBRL adoption model for organizations to implement a language in an attempt to provide financial reports. Actually, important aim is to explore the affecting factors on XBRL adoption.

Methodology: It was tried to investigate affecting factors based on TOE model including environmental, organizational and technological factors on the XBRL adoption with obtaining experts' opinion and finalizing indices.

Results: In investigating the effect of various factors based on TOE model, environmental factors with 0.95%, technological factors with 0.90% and organizational factors with 0.85% had importance and whole indicators are ranked in any cluster.

Conclusion: In order to implement a technology and innovation, every organization should assess the foundations for implementing as well as operational capabilities of a new project so that it can prevent relevant risks.

Keywords: Financial reporting, eXtensible Business Reporting Language (XBRL), TOE model, eXtensible Markup Language (XML)

1. INTRODUCTION

Extensible Business Reporting Language (XBRL) is a language for the electronic business and financial communication that can change the way of information distribution. International data format has been designed specifically for business communication and data transmission [14].

XBRL has created a structure for organizations to report their information through internet. Financial information can include all the financial statements and key information in an organization to extract any analysis. Much of the information published in this way can be used repeatedly and can be archived [8]. In addition, organizations can implement XBRL to reduce their emission and compliance costs and thereby take advantage of potential investors [5].

26 Many researchers consider factors such as environmental, organizational and technological
27 factors to be effective in implementing this type of innovation. Some studies like Cordery et
28 al., (2011) [5], Henderson et al., (2012) [13], Alshamaila et al., (2013) [1], Sohrabi and
29 Khanlari (2008) [23], Golkar and Nikbakht (2012) [11], Ramdani et al., (2013) [19] and
30 Gangwar et al., (2014) [9] discussed the effect of environmental, organizational, and
31 technological factors on XBRL adoption as a new technology.

32 Before undertaking any form of innovation and technology, it is essential to investigate the
33 organization's environment, culture, conditions and prior experience and the ability of
34 implementation. Thus, in this study, the effects of these constructs and factors have been
35 studied in the form of TOE model on XBRL implementation.

36 **2. RESEARCH BACKGROUND**

37 In background, research history, internet financial reporting, the necessity of using non-
38 traditional models of reporting and the necessity of using the extensible reporting language
39 are discussed.

40 **2.1. Research History**

41 Today, the speed of the preparation, distribution and comparability of information specifically
42 financial information is very important. Financial statement users look for the fastest way to
43 achieve the desired results in the least time possible, with the highest accuracy and
44 transparency. It is clear that the financial information is prepared and offered in traditional
45 formats such as PDF, Excel, HTML, etc. but the users of this kind of information cannot use
46 and archive information practically. On the other hand, the use of the internet leads to the
47 distribution of data and information without standard and specific format. In other words, this
48 data doesn't have new financial reporting formats and cannot be easily compared and
49 wastes much time. But in the digital format, information can be compiled and put together on
50 a regular basis and can be easily compared and analyzed [22].

51 According to the researchers, XBRL is associated with accounting standards, encoding,
52 publishing and editable information by users. XBRL is a language derived from XML, but its
53 capabilities are more and its usage is designed more advanced and more extensible [6].

54 Extensible Business Reporting Language encrypts related items using specified and
55 common national or international labels to define the concepts of financial reporting. Labels
56 can be used instead of words to relate users with the information of financial reports and in
57 this way, that will be more understandable for browsers [12].

58 Financial reports' results that are consistent with the labels are called a sample document.
59 Each industry can design its own glossary for optimal use of this language [20].

60 EXtensible Business Reporting Language, as a tool, can enter the information in the
61 financial reporting system by estimating the highest level of information. In the study
62 conducted by Peng and Chang (2010), it was stated that XBRL is one of the two successful
63 technologies in the field of accounting and auditing [16] and Yoon and Ciganek (2011)
64 introduced this language as a factor increasing levels of accuracy, reliability and efficiency of
65 electronic business financial communication [29].

66 The use of this language for business reporting is proposed as an essential source in the
67 information value chain. EXtensible Business Reporting Language enhances the capacity of
68 intra-organization electronic commercial transactions by increasing the flow of information

69 and interaction and expands the contribution of organizations in others' information
70 repertoire [24]. In other words, XBRL is a dynamic format that enables electronic changes of
71 organization's information [11].

72 Also Hannon (2003) considers this language as a non-specific standard language based on
73 the Internet that is used to provide and publish financial statements via computer and
74 software platforms based on the accounting standards [10].

75 Organizations can use XBRL as a global framework with the aim of increasing efficiency and
76 improving the reporting path and thereby increase the quality of their financial disclosure and
77 dissemination of information and attract more investors by raising the level of trust resulted
78 from transparency of information.

79 EXtensible Business Reporting Language can increase organizations' ability to compare
80 themselves with other organizations. Using XBRL, flexibility of organizations' information for
81 immediate analysis and compliance with financial models increases and with this view,
82 foreign investors are interested in starting up an activity with the organization [22]. With this
83 innovation, many of the costs and time related to the release of information are reduced.
84 Main XBRL adoption affecting factors studies are showed in table 1.

85 **Table1. Main XBRL adoption affecting factors studies**

Authors	Subject	Citation	Interest for article
Steenkamp, L.P., Nel, G.F. (2012) [22]	The adoption of XBRL in South Africa: an empirical study (South Africa)	The Electronic Library	This study is indicating a low level of awareness and slow adoption of XBRL as a new technology.
Henderson et al.(2012) [13]	The determinants of XBRL adoption	International Journal of Accounting Information Systems	Technological, environmental and organizational factors affects the XBRL adoption
Golkar, R., Nikbakht, M.(2011) [11]	XBRL implementation in Iranian organizations (in case of petroleum organizations)	Ms. Thesis, University of Tehran	XBRL implementation success factors identified in petroleum industry
Carolyn et al.(2011) [5]	A solution looking for a problem: factors associated with the non-adoption of XBRL	Pacific Accounting Review	This study shows the effects of environmental, organizational and technological items on XBRL adoption
Troshani, I., Lymer, A (2010) [25]	Translation in XBRL standardization	Information Technology & People	For enhancing understanding of role XBRL standardization networks
Troshani, I., Doolin, B. (2007) [24]	Innovation diffusion: a stakeholder and social network view	European journal of innovation management	This study investigates the adoption of XBRL in qualitative form
Kaya, D. (2014) [15]	The influence of firm-specific characteristics on the extent of voluntary disclosure in XBRL, empirical analysis of SEC filings	International Journal of Accounting and Information Management	This study is about voluntary disclosure in XBRL and depicted that firm size and level of innovation are related to adoption of XBRL
Hao, L., Zhang, J.H., Fang, J. (2014) [12]	Does voluntary adoption of XBRL reduce cost of equity capital?	International Journal of Accounting and Information Management	Increasing knowledge, this study is about voluntary XBRL adoption and its financial outcomes

86 **2.2. Internet Financial Reporting**

87 Focusing on all human aspects of technology and IT has started in the 21st century which
88 called information era. In this era, internet, as a tool associated with human activities, has
89 changed the flow of information from suppliers to users and vice versa, as well as access to
90 information. Internet users can process and analyze the data [2].

91 Today, financial reporting via internet has increased in many organizations. Using the
92 Internet as an information distribution channel is a growing phenomenon and organizations
93 provide financial information on their sites voluntarily [4].

94 Internet financial reporting increases mentally and reduces the cost of distribution. Thereby,
95 linking suppliers and users will be easily accomplished [11]. Information is made available for
96 users quickly and it's usable and able to be processed [17]. On the other hand, the
97 disadvantages of the dissemination of information via the Internet is hacking and destroying
98 information by hackers; also, not all have access to the Internet, causing a loss of some
99 investors and users of financial reports.

100 **2.3. The Necessity of Using Non-Traditional Models of Reporting**

101 Unfortunately, traditional dissemination of financial reporting has some disadvantages. Lack
102 of access to information and opportunities for investment for some people and lack of direct
103 relationship between investors and other users and suppliers of information decrease the
104 efficacy of provided reports [23].

105 Also, lack of knowledge about measurement indices of financial instruments and the success
106 of organizations for key decisions by all users is of the disadvantages of traditional reporting
107 that will be resolved with the use of the Internet and Internet dissemination and analysis. The
108 uses of Internet platforms and integrated frameworks increase the comparability of reports
109 and analysis of information can be easily accomplished [2].

110 Today most organizations record their accounting information in physically and disseminate
111 it by releasing the report pages; and in many cases, they are recorded in physical form [5].
112 To increase the transparency of the information, it is necessary to give the commercial
113 realities to individuals by particular encoding of the related formats and in many cases, the
114 possible accounting rumors may be prevented. Non-traditional models will enable users to
115 uses the information within the disseminated reports and, if necessary, depending on the
116 application, change or analyze them [11].

117 **2.4. The Necessity of Using The Extensible Reporting Language**

118 Many people need to focus on specific information of organizations that has been set up and
119 expanded based on the accounting and financial reporting rules and standards [2]. Many of
120 the relevant financial reporting and analysis are simply copy and do not have a clear and
121 coherent form; therefore, they are not comparable and confidence in the transparency and
122 accuracy of information decreases. To increase confidence in the disseminated information
123 and optimal use of users, financial reporting needs certain frameworks for the expected
124 information. EXtensible Business Reporting Language offers specific formats by which a lot
125 of the referred problems will be solved. Information published in this way is comparable, and
126 the difficulty and complexity of its realization will be decreased [11].

127 By applying new technologies and innovations, organizations will be able to use their
128 manpower to analyze, select and process information instead of just recording accounting

129 and time-consuming traditional activities and thus increase the quality of their reports and
130 manpower [6]. By defining specific formats and encoding, XBRL will enable the organization
131 to reduce its possible mistakes and make the maximum benefit of reporting standards [17].
132 Business data created by transactions are being used in many parts of the organization. All
133 the organizations need to gather business information, review and analyze [3]. So, these
134 activities can make success:

- 135 1. Management needs to get into the details of the business information
- 136 2. Providing information to users using Rules and Regulations
- 137 3. Identify the company's financial results
- 138 4. Companies need to engage and negotiate with parent companies and shareholders to
139 support the business activities [3].

140 By the research, platform for implementing XBRL or the affecting factors have been studied.
141 Because the most important question in accepting XBRL is which factors could affect XBRL
142 adoption?

143 **3. RESEARCH METHODOLOGY**

144 In methodology, research model, Research tools and measurement model are discussed.

145 **3.1. The Research Model**

146 TOE model is a multi-aspect framework developed by Rocco DePietro and Edith Wiarda and
147 Mitch Fleischer [1]. This framework is a theory of organizational levels and is often used for
148 research and study issues related to the organization.

149 In 2010, Wang and Yang said that this model is an appropriate picture for the users that can
150 improve XBRL implementation, to face challenges, to effect on the value chain activities, to
151 promote the inter-organization adoption, to make decision based on adaptation with
152 innovation and organization's capabilities and to put a more appropriate way [27].

153 According to the TOE model, three categories of factors can alter XBRL adoption.
154 Technological factors are the internal and external technologies and can affect the
155 implementation process by comparing and analyzing technology in an organization with
156 peers and competitor organizations. This technology can be comprised of any type of
157 equipment or software. In 2003, Premkumar claimed that all issues related to the field of
158 technology arise from organizational factors [18].

159 Technological factors include competitive advantages in contrast to the costs, complexity
160 and rigidity of the system, the ability to adapt and the visible results [24]. In other words, the
161 ability of adaptation and integration of the system can make its acceptance easier [23].
162 Perceived costs to income and benefits of an innovation, difficulty and complexity are of the
163 technological factors [26]. Testability, integrity and ease of technology affect its acceptance
164 [5].

165 Organizational factors are related to the resources and structure and ability of an
166 organization [1]. According to Salwani and Marthandan, 2009, organizational factors are all
167 the descriptions related to an organization such as the size, ideas, manpower and
168 management [21]. Also Dedrick and West (2003) stated that the phenomenon of adaptation
169 to an innovation is affected by formal and informal intra-organization mechanisms for
170 communication and control of resources and initiatives [7]. Structure and attitudes of
171 managers, staff capabilities and resources are among the organizational factors [26].

172 The size of the organization in terms of the workforce and the managers and the power of
173 organization are effective in accepting innovation and technology [23].

174 Environmental factors refer to the environment of an organization including industry,
175 competitors and technology suppliers. In 1990, Depietro et al., added that the dependent
176 variables in the industry including communications between buyers and sellers, a sense of
177 competition and defining the nature of the industry are among the factors that give meaning
178 to the environment. Relevant set of rules and guidelines, government and monitoring
179 agencies are among effective environmental factors [28].

180 In this research, based on TOE model and conducted studies, indicators for each factor are
181 determined and after obtaining the opinion of experts, the following model in figure 1, has
182 been used.

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185 **Figure 1. Research model based on the standard organizational TOE**
186 **model**

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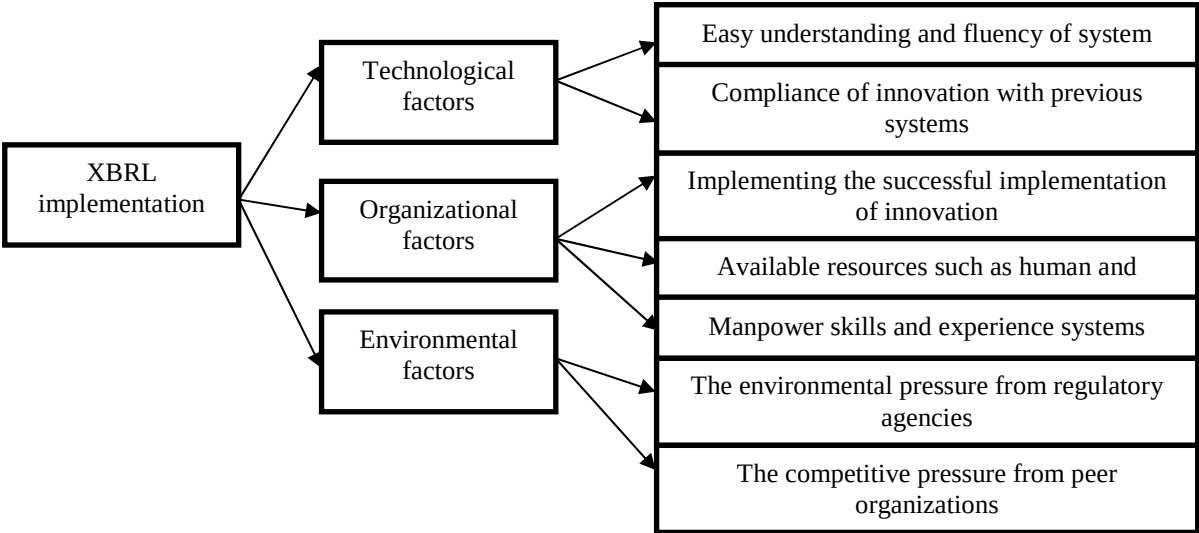
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204 In the research model, easy understanding and fluency of system and compliance of
205 innovation with previous systems have been considered as indicators of technological factor,
206 implementing the successful implementation of innovation and available resources such as
207 human and financial forces and manpower skills and experience have been considered as
208 indicators of organizational factors and finally, the environmental pressure from regulatory
209 agencies and the competitive pressure from peer organizations have been considered as
210 indicators of environmental factors and after finalization of the model, the effect of
211 parameters on the implementation of XBRL has been studied and analyzed.

212 Each of the selected indicators of each factor can affect the implementation of XBRL. With
213 this model, the effect of individual indicators is assessed and the impact of each is calculated
214 and compared. In other words, by focusing on this research, an organization will realize
215 which of the indicators is more effective and has a greater significance on the
216 implementation of this innovation. Through statistical analysis, the effect of each factor on
217 the implementation of XBRL is also measured and calculated, because what is important for

institutions is which of the model's factors including environmental, organizational and technological factors can affect the course of implementation of a new technology and for more project management and implementation and adaptation of the project, it is necessary to have greater focus on that area.

3.2. Research Tools

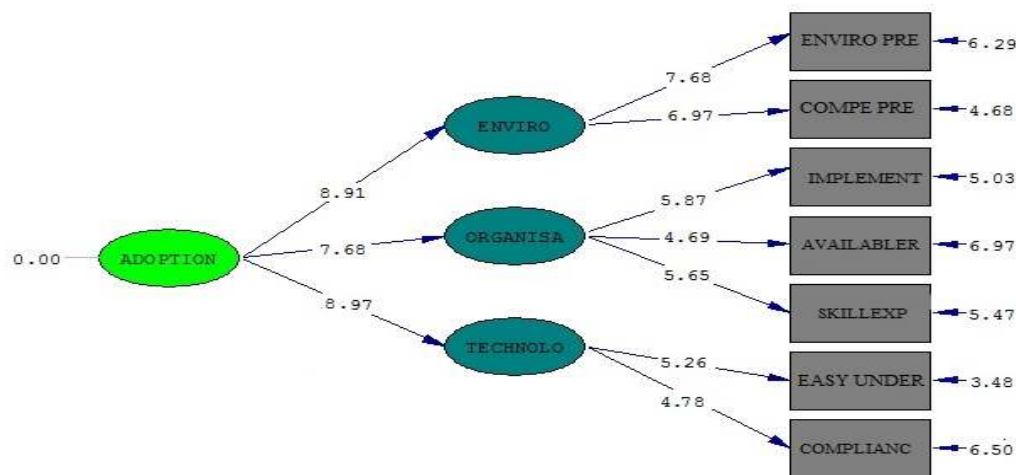
In this study, a standard questionnaire has been used as the instrument to measure the relationship between the TOE model's factors on implementing XBRL. The validity and reliability of the questionnaire was evaluated. To prove the validity of the questionnaire, Cronbach's alpha was used and to prove the reliability of structures confirmatory factor analysis (CFA) was used.

According to data collected, 20 managers, 12 deputies, 21 senior experts and 65 experts respond questionnaire. Also 37 percent of experts were female and 63 percent were male. Minimum age of the gathered sample was 21 year old and maximum was 70 year old. Also, Minimum work experience was about 2 years and maximum was about 50 years.

3.3. Measurement Model

In this study according to the research content, indicators and models, for construct validity of the measurement tools, Confirmatory factor analysis (CFA) is used and all variables and indicators of each construct are discussed. Also, Fit indices such as X2 (Chi-squared), DF (Degrees of Freedom), RMSEA (Root Mean Square Error of Approximation), NFI (Normed Fit Index), NNFI (Non-Normed Fit Index), CFI (Comparative Fit Index), IFI (Incremental Fit Index), RFI (Relative Fit Index), GFI (Goodness of Fit Index), AGFI (Adjusted Goodness of Fit Index) are provided to prove each measurement model. T-values and Fit-indices are showed as follows.

3.3.1. T-values



Chi-Square=32.89, df=21, P-value=0.08132, RMSEA=0.071

3.3.2. Fit Indices

Degrees of Freedom = 21
Normal Theory Weighted Least Squares Chi-Square = 32.89 (P = 0.081)
Normed Fit Index (NFI) = 0.95
Non-Normed Fit Index (NNFI) = 0.89
Parsimony Normed Fit Index (PNFI) = 0.61
Comparative Fit Index (CFI) = 0.91
Incremental Fit Index (IFI) = 0.94
Relative Fit Index (RFI) = 0.93
Goodness of Fit Index (GFI) = 0.92
Adjusted Goodness of Fit Index (AGFI) = 0.88

Also, in this study the sample adequacy test is deployed at first. To this aim KMO and Bartlett's tests are used and results are provided in bellow table. According to KMO test results which is about 0.82 and based on Bartlett's test, significant level which is 0.00 the sample adequacy of the data for factor analysis is confirmed.

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.82
Bartlett's Test of Sphericity	Significant	0.00**

** signified at 99 percent of confidence

4. RESEARCH RESULTS

Financial reporting is very important from the perspective of investors, shareholders and other stakeholders and affects most decisions. Many people are interested to know the financial and economic situation of organizations before making any decision to invest or participation and compare it with other peer organizations in that industry in order to draw the right conclusions. Thus, focusing on an organization's financial statements and special reports is considered as an introduction to their investment activities.

In this study, it was tried to investigate factors affecting TOE model including environmental, organizational and technological factors on the implementation of XBRL. Based on the conducted studies on this issue, for each group of factors in the model a series of related indicators were selected and after obtaining experts' opinions with Delphi method and finalizing indices, the standard questionnaire was used and the effect of each index on implementing this type of innovation in an organization was investigated.

In this study, in investigating the effect of various factors on the implementation of XBRL based on TOE model, environmental factors with 0.95%, technological factors with 0.90% and organizational factors with 0.85% had importance, respectively.

In investigating the effect of each index, environmental pressure from regulatory agencies with 0.75% and competition between peer organizations with 0.74% were the affecting factors in the environmental factors' group and the results showed that both factors had nearly the same effect on XBRL implementation. In the organizational factors group, implementing the successful implementation of innovation with 0.65% and manpower skills and experience systems with 0.60% and available resources such as human and financial forces systems with 0.50% respectively were factors affecting XBRL implementation. In the third group, technological factors, easy understanding and fluency of system with 0.90% and

288 compliance of innovation with previous with 0.70% were discussed and it was found that
289 easy understanding of an innovation is very effective on its acceptance.

290 **5. CONCLUSIONS**

291 The analysis results showed that the factors of TOE model, as the affecting factors on new
292 technology can affect an organization. Thus, focusing on different factors can lead
293 organizations in adopting the correct decision. Paying attention to organization environment
294 that can include all competitors, peer organization or the government or monitoring
295 organizations can impose burden on organization and thereby affect XBRL implementation.
296 Directive assignment or obligation for implementation by monitoring organizations such as
297 the Stock Exchange or a sense of superiority in contrast to other organizations can serve as
298 motivation for this project.

299 Organizational factors such as available resources including financial and human resources
300 and organizational climate of the project implementation will be able to facilitate the
301 implementation track of XBRL and make adoption of this technological innovation easier.
302 Experience and skill of manpower and accepting the pattern of successful implementation of
303 the project can encourage managers in accepting the implementation of the context of this
304 eXtensible Business Reporting Language.

305 Technological factors and, especially, ease of understanding the language of financial
306 reporting in accordance with accounting standards can encourage organizations to hope in
307 the successful result of this pattern. In general, the effect of the TOE model, or in other
308 words the effect of environmental, organizational and technological factors will be different
309 with respect to the indicators of any organization and can be affected by many factors and
310 indicators and it is necessary to be analyzed and investigated before implementation of
311 XBRL in order to have more acceptable results. Evaluation of incomes and expenses and
312 the ultimate financial effects of the project and environmental forces are of the things that
313 certainly will be different depending on the type of organization.

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