

Determinants of XBRL adoption: An institutional perspective

Abstract

In this paper, we examine the institutional factors that influence the adoption of eXtensible Business Reporting Language (XBRL) at the country-level. We use a large sample of 175 developed and developing countries over 14 years. Data is obtained from different sources including, World Development Indicators, the World Bank, ROSC website, IFRS Foundation, IFAC membership profile, and Quality of Government database. Our results highlight the significance of coercive, mimetic, and normative pressures, respectively, in terms of ROSC reports, the extent of accounting globalization, technological access, and education. Further analyses show that the results on coercive are more pronounced in developing countries, while that of normative is stronger in developed countries. However, we find that the mimetic pressure measured by accounting globalization is a significant determinant of XBRL all countries regardless of their status as developed or developing. To the best of our knowledge, we contend that this is the first study to examine the institutional factors influencing the global adoption of accounting technology. By using the institutional theory, we provide a better understanding of the global diffusion of XBRL, which have attracted little attention.

Keywords: Accounting system; Financial reporting; Institutional theory; XBRL;

1.0.Introduction

The eXtensible Business Reporting Language (XBRL) is an open standard for preparing, communicating, exchanging and analyzing business information over the Internet (Alkhatib et al., 2019; Eierle et al., 2014). XBRL enables companies to file one set of information instead of filing it repeatedly in different forms to different professional organizations and government agencies for different purposes (Sinnott and Willis, 2009). Many regulators and professional organizations have recognized the XBRL as a standardized format for electronic financial reporting with more benefits in the creation, preparation, exchange, analysis, communication of business information than other reporting formats (e.g. Word, Excel, PDF, XHTML).

Adopting of XBRL technology in the financial reporting process is a signal of better disclosure and lower information asymmetry (Kim et al., 2012). This leads to a reduction in the cost of capital and an increase in company value (Premuros and Bhattacharya, 2008), and improvement of business to- government reporting process (Liu et al., 2017). These benefits are important in the context of dealing with problems related to transparency and accountability of financial reporting.

Following prior studies focusing on the dynamics of adopting international standards (Judge et al., 2010; Hassan et al., 2014; Boolaky and Soobaroyen, 2017; Boolaky et al., 2020), this paper draws from institutional theory. According to this perspective, jurisdictions are conceptualized as social actors that seek to gain or maintain their legitimacy, and as such, they are subject to international, and national forces (or pressures). These forces (or pressures) bring about a wide array of pressures that shift nation-states towards the adoption of similar practices (i.e., isomorphism) within a determined institutionalized environment of global norms, customs, and rules of governance (Alon & Dwyer, 2014; Chua & Taylor, 2008; Hopper et al., 2017). These pressures could be conceptualized as coercive, mimetic and normative forces, as proposed by DiMaggio and Powell (1983). These institutional factors (i.e., forces) could play a key role in adopting world-accepted models such as XBRL (Touren, 2005; Judge et al., 2010), and it is essential for government, regulators, investors, and the professional bodies to have a better understanding of these influences. There is a need to examine the different country-level factors (Hassan et al., 2014, Judge et al., 2010, Wallace and Gernon, 1991) that shape the accounting system infrastructure and countries' strategic decisions such as the XBRL adoption. Ramanna and Sletten (2014) argue that the adoption of new accounting systems

in firms is associated with a country's internal politics, for example, ideology-driven policymakers and special interest groups. Therefore, studying the determinants of countries' adoption of new standards contributes to an improved understanding of the adoption process. To this end, this present study employs institutional theory to understand better what drives countries to adopt the XBRL.

We use a large sample of 175 developed and developing countries between 2005 to 2018. Our sample size and period yield a minimum of 1452 observations in the regression estimations. Data is obtained from different sources including, World Development Indicators, the World Bank, ROSC website, IFRS Foundation, IFAC membership profile, and Quality of Government database.

Our results highlight the significance of coercive, mimetic, and normative pressures, respectively, in terms of ROSC reports, the extent of accounting globalization, technological access, and education. Further analyses show that the results on coercive are more pronounced in developing countries, while that of normative is stronger in developed countries. For the mimetic pressure, our findings show that it is an influential factor for all countries regardless of their status as developed or developing.

These findings should be of interest to government policymakers and regulators, as it highlights the need to consider technological infrastructure and the existence of other international reporting standards in their decision to adopt XBRL. Also, the identification of relevant factors influencing the adopting XBRL could encourage non-adopting countries that have these characteristics to consider XBRL reporting system.

Our study responds to the lack of research on the country-level factors of countries' adoption of XBRL (Liu et al., 2014). The present study contributes to the literature by providing additional evidence on the country-level factors that influence XBRL adoption. Our study complements prior literature on the adoption of international accounting and financial reporting practices (Judge et al. 2010; Boolaky et al. 2020; Boolaky and Sooborayen 2017; Sellami and Gafsi 2018). Our paper is different from these studies as we focus on the adoption of XBRL, which is more of a reporting structure or platform than a set of standards. To the best of our knowledge, we contend that this paper is the first to examine the institutional factors of XBRL adoption. Second, by referring to the institutional theory, we provide a better understanding of the global diffusion of XBRL; a quality, and relevant reporting system, which have attracted little attention.

The remainder of the paper is organized as follows. We present an overview of XBRL in the next section. Section 3 presents the theoretical background and hypotheses development. Section 4 presents our research design. The results and discussions are presented in Section 5. The paper concludes in Section 6.

2.0. Overview of XBRL

XBRL is a product of XBRL International (www.xbrl.org), a non-profit consortium of over 4506 global financial services, technology, government, stock exchange, and professional accounting organizations (Kaya, 2014; Premuroso and Bhattacharya, 2008). As one of the top ten technologies in the field of accounting (Liu, 2013), XBRL has attracted much attention in accounting research to understand its influences for accounting and auditing professionals (Hsieh et al., 2019).

It belongs to the family of XML languages. A key attribute of XBRL is tagging firm data which permits the specific identification and retrieval of individual items of data from reports such as financial statements. It also allows for "the automatic exchange and reliable extraction of financial information across all software formats and technologies, including the Internet" (Xbrl.org White Paper, 2002, 5).

XBRL enables companies to file one set of information instead of filing it repeatedly in different forms to different professional organizations and government agencies for different purposes (Sinnott and Willis, 2009). It also requires the creation and the use of taxonomies that provides standardized information formats and descriptions and allows to tag the data (Hao et al., 2014; Dhole et al., 2015). Hence, duplicated data and unnecessary descriptions are driven out (Eierle et al., 2014). The number of Standard Business Reporting (SBR) implementation projects based on XBRL is growing quickly. For instance, such initiatives have been launched in the Netherlands (Cohen et al., 2014), Australia, India, China, Finland, Brazil, Belgium, New Zealand, and Singapore (Ojala et al., 2018). In 2010, inline XBRL (iXBRL) was developed in the UK to absorb large amounts of information (HMRC, 2011). While XBRL can be used to present financial information in a machine-readable format, iXBRL presents it in both machine-readable and human-readable formats (Cohen et al., 2014). This allows the company's information to be presented in a normal document format, but with XBRL tags embedded in the soft copy document (Lai et al., 2015; Eierle et al., 2014).

Sir Kurt Ramin, the Chairman (Emeritus) XBRL International and a member of the Financial Executives International (FEI) Globalization Oversight Committee (GOC) note that through its Foundation, the International Accounting Standard Board (IASB) was involved early on in preparing and creating a taxonomy to drive worldwide adoption of both International Financial Reporting Standard (IFRS) and XBRL. This powerful combination has an important role in catering to people who know the accounting standards on one side and people who utilize technology tools to organize financial reporting information. He added that the Foundation's XBRL team is one of the important support functions for the standard-setting process at the IASB. Its XBRL Advisory Council (XAC) and Quality Review Team (XQRT) span members from around the world, who are moving the implementation of XBRL and IFRS through the use of XBRL forward¹.

3.0.Theoretical background and hypotheses development

3.1.The institutional theory

The present study refers to the institutional theory as a fundamental theoretical framework to examine the country-level factors associated with XBRL adoption. This theory has been used to analyze the influence of institutional environment's pressures (professional bodies, regulatory authorities, State, etc.) on countries' strategic decisions (Bookey and Soobaroyen, 2017; Judge et al., 2010; Sellami & Gafsi, 2018). These institutional pressures create the isomorphism of nations which lead to legitimizing their practices via adopting globally-accepted models (Judge et al., 2010), such as XBRL. In this study, it is expected that the decision taken by jurisdictions to adopt XBRL reflects isomorphism at the national as well as international level. DiMaggio and Powell (1983) suggest three forms of isomorphism (coercive, mimetic, and normative).

Coercive isomorphism stems from legitimacy issues and refers to the institutional pressures on organizations/nations to adopt XBRL. It suggests that in an institutionalized environment, there is an "elaboration of rules and requirements" including "pressures for conformity to public expectations and demands" (Oliver, 1997, p. 101). Hence, countries try to gain and maintain their legitimacy by conforming with these rules, requirements and regulations, even if changes made are more symbolic than actual (DiMaggio & Powell, 1983). In other words, jurisdictions can be forced to conform to international regulations

¹ https://www.ifrs.com/overview/Financial_Management/XBRL_and_IFRS.html (last access at 24th October 2020)

and standards due to coercive institutions and institutional pressures outside the economy. These might be international financing organizations and regulatory system such as the World Bank and the International Monetary Fund (IMF) (Judge et al., 2010).

Mimetic isomorphism is the second form within the institutional theory. It refers to the tendency to imitate the model of more efficient organizations when the environment is uncertain, and objectives are ambiguous. According to Meyer and Rowan (1977), imitating the behaviours of successful organizations/nations is the most effective and least costly solution for organizations/nations that operate in an uncertain environment.

Normative isomorphism is the final form of isomorphism suggested by DiMaggio and Powell (1991). It emphasizes the collective values and beliefs that lead to the conformity of thought and actions within institutional environments (DiMaggio & Powell, 1991). It refers to pressures exerted on organizations/nations by professional bodies to make them more homogenous (Hassan, 2008). The level of education is an example of the outcomes of normative pressures brought about through professionalization (DiMaggio and Powell, 1983; Judge et al., 2010).

3.2.Hypothesis development

Coercive Isomorphism

Coercive isomorphism refers to the tendency of nations/organizations to exert formal and informal pressures on other nations/organizations to endorse their practices (DiMaggio and Powell, 1983). As suggested by previous studies on IFRS and ISA (International Standards of Auditing) adoption, international institutions such as the IASB, the IMF and the World Bank have put pressure on a lot of jurisdictions to adopt IFRS and ISA (Boolaky and Soobaroyen, 2017; Judge et al., 2010). Boolaky and Soobaroyen (2017) support that the theoretical framework of institutional theory affects the extent of commitment to ISA adoption and harmonization. More particularly, they show that the coercive pressures represent significant forces driving ISA harmonization. Sellami and Gafsi (2018) have shown that the pressures of international financing institutions support the adoption of IFRS for SME by developing countries. In other words, these countries are likely to face pressure to adopt IFRS from powerful global aid organizations. As such, these economies will be subject to the coercive power of a range of non-government organizations seeking to bring about changes through foreign aid (Judge et al., 2010).

Prior research supports this proposition. Judge et al. (2010) support the proposition that foreign aid, as a proxy for the coercive isomorphism, is a significant predictor of IFRS adoption. In the same way, in the United Arab Emirates, Irvine (2008) shows the influence of coercive pressures from the World Bank on the decision of IFRS adoption at the national level, and Ashraf and Ghani (2005) find that the IMF played a key role in shaping accounting practices in Pakistan. Hence, countries seeking aid from the World Bank and the IMF are expected to meet their demands for the capital market, and the implementation of more rigorous reporting practices.

Based on the same reasoning, international institutions are likely to influence the implementation of XBRL, as it is strongly linked to IFRS. In fact, through its Foundation, the IASB was involved early on in building a taxonomy to drive global adoption of both IFRS and XBRL (Ramin and Reiman, 2013). This strong combination caters to people who understand accounting standards on the one hand, and people who use technology tools to segment and organize financial and business information².

Therefore, this study posits that:

H1: Coercive isomorphism positively influences the adoption of XBRL.

Mimetic Isomorphism:

According to DiMaggio and Powell (1983), mimetic isomorphism is the tendency of organizations/nations to imitate other organizations/nations that are considered to be more successful or legitimate. Ritsumeikan (2011) concluded that mimetic isomorphism is a powerful factor that affects IFRS adoption in emerging countries. Moreover, Judge et al. (2010) showed that mimetic pressures, measured by imports as a percentage of gross domestic product (GDP), strongly stimulate the adoption of IFRS. Sellami and Gafsi (2018) found that developing countries that have a high degree of external openness are exposed to more mimetic pressure, which encourages them to adopt IFRS for SMEs. Boolaky and Soobaroyen (2017) also find that mimetic pressures represent significant forces encouraging the extent of commitment to ISA adoption and harmonization.

Based on the same reasoning, the increasing number of countries that adopt the XBRL could push several governments to imitate the successful experiences and practices of other

² https://www.ifrs.com/overview/Financial_Management/XBRL_and_IFRS.html, last access, 29/09/2020

countries towards the implementation of XBRL at the national scale. The more countries that exhibit particular forms of behaviour (such as XBRL adoption), the more pressure there will be on others to copy that behaviour (Irvine, 2008). If adopting XBRL becomes the norm in several groups of countries, so those that resist change are likely to miss out on valuable development opportunities.

This study proposes the following hypothesis:

H2: Mimetic isomorphism positively influences the adoption of XBRL at the country level.

Normative isomorphism:

Normative isomorphism refers to the collective values and beliefs that lead to the conformity of thought within institutional environments (DiMaggio & Powell, 1983). Previous research has stated that standards-setting bodies influence the adoption of international standards. Hassan (2008) and Muniandy and Ali (2012) agreed that the accounting profession facilitates the implementation of international standards. Albu et al. (2011) and Joshi et al. (2008) concluded that The Big Four influence the government's decision to adopt IFRS.

Previous studies in accounting show how the educational level of a country can enhance or suppress accounting development (Zeghal & Mhedhbi, 2006; Archambault & Archambault, 2009). For example, Zeghal and Mhedhbi (2006) suggest that modern accounting systems depend on a nation's educational level. Also, Boolaky and Soobaroyen (2017) suggest that the commitment to ISA adoption and harmonization requires an appreciation of whether there is a sufficient level of competence, both from an academic and a professional standpoint, to be able to understand and apply these standards, together with the ability to make professional judgements and process complex information

Dow and Karunaratna (2006) provide evidence that the higher the level of education of a country, the greater will be its trade, as a consequence, of adopting international standards. Parboteeah et al. (2002) compare the national culture of US and Japanese accounting firms and conclude that the norms of the accounting profession have a more significant influence on accounting practices than the national cultures of the two countries. Furthermore, there are many other studies which support that level of education has a significant effect on the adoption of international standards (Guler et al., 2002; Hassan, 2008; Judge et al., 2010). Judge et al. (2010) empirically showed that normative isomorphism, measured by the level

of education, is a factor that strongly influences the adoption of IFRS. In addition, Ritsumeikan (2011) found that this type of isomorphism facilitates the implementation of IFRS. Furthermore, Sellami and Gafsi (2018) have shown that normative pressures have a negative but insignificant effect on the decision to adopt IFRS for SMEs. Boolaky and Soobaroyen (2017) find that normative isomorphism represents significant forces driving ISA harmonization.

Based on the same reasoning, we expect that normative isomorphism is an important force that influences the adoption of XBRL at the national scale. Accordingly, this study makes the following hypothesis:

H3: Normative isomorphism positively influences the adoption of XBRL at the country level.

4.0. Research design

4.1. Sample selection

We use a large sample of 175 developed and developing countries over 14 years, covering 2005 to 2018. Our sample size and period yield a minimum of 1452 observations in the regression estimations. We obtain data from different sources including, World Development Indicators, the World Bank, ROSC website, IFRS Foundation, IFAC membership profile, and Quality of Government database. The list of sample countries is presented in Appendix A

4.2. Description of proxies

Dependent variable: The main dependent variable is *XBRL* adoption status of a country, which is a binary variable equal to 1 for countries that have adopted XBRL and 0 for non-adopters. As with any international standards or global innovation, there could be variation in the approaches with which the country adopts XBRL³. However, once a country mandate for a particular set of firms, others also use it. As argued by Archambaut and Archambaut (2009) and Clement et al. (2010), once a country allows the use of a global standard for any set of firms, it implies the country acceptance of that standard or system. Therefore,

³ Some countries have adopted XBRL for listed firms, while others have adopted for financial institutions.

we take a holistic approach by coding all countries which have adopted XBRL for any industry as an adopting country.

Independent variables: Consistent with our stated hypothesis, we group the independent variables along the three-level of institutional isomorphism; coercive, mimetic and normative.

Coercive Isomorphism: By its definition, coercive pressure emanates from external sources. Therefore, following prior studies (Ben Othman and Kossentini, 2015; Boolaky et al. 2020; Judge et al. 2010), we use external debt and ROSC (AA) to proxy coercive pressures. *External debt* is measure by the total amount of debt as a percentage of gross domestic product. We argue that external capital providers are likely to pressure firms to adopt global standards and systems to ensure transparency (Judge et al. 2010). ROSC is a report that is issued by the IMF and World Bank on the strength of the financial reporting environment of a country. The report also makes recommendations for countries to adopt international best practices. Although these appear to be recommendations, empirical evidence shows that the ROSC report has facilitated the adoption of global accounting standards such as IFRS (Boolaky et al. 2020; Zori 2015). We measure *ROSC* based on the number of ROSC reports that have been issued on a country. More reports indicate high external pressure on a country to adopt XBRL.

Mimetic Isomorphism: A country's desire to emulate global practices largely depend on its relative openness and exposure to international business (Judge et al., .2010). Prior studies argue that countries connected to the global economy through trade and foreign investment are more likely to mimic the best practices from other countries (Ben Othman and Kossentini 2015; Boolaky et al. 2020; Boolaky and Sooborayen 2017; Ramanna and Sletten 2014). Therefore, following these prior studies, we use trade openness and foreign direct investment to proxy mimetic pressure. Trade openness is measure by the sum of total import and export as a percentage of GDP, while foreign direct investment is the net inflow of FDI as a percentage of GDP. Given that XBRL is part of the financial reporting framework, we argue that the level of accounting globalization of the country is also a critical source of mimetic pressure. *Accounting globalization*, defined as the number of international accounting standards a country has adopted, shows how the country is connected to the global accounting practices. Consequently, we expect a country adoption status on other accounting standards such as IFRS and ISA to exert significant influence

on the adoption of XBRL. *Accounting globalization* ranges between 0 and 2, where 0 equal to no adoption of IFRS and ISA, 1 = adoption of either IFRS or ISA 2 = adoption of both IFRS and ISA.

Normative isomorphism: Regardless of the external pressure and the desire to mimic global practices, a country needs formal education and technological infrastructure to harness the benefit of any global innovation. Considering that XBRL is a technological-based system, some level of education and access to technology such as the internet could be relevant indicators of its adoption. Therefore, we use the number of internet users to proxy the level of technological access in the country. We expect a high number of internet users (*Technology*) to be associated with a high likelihood of adopting XBRL. Similarly, following prior studies (Judge et al. 2010), we use secondary school enrolment to proxy *Education*.

Control variables: The selection of the control variables are based on prior studies on the adoption of international accounting practices (Boolaky et al. 2020; Boolaky and Soobaroyen 2017; Ben Othman and Kossentini Judge et al. 2010; Zeghal and Mhedhbi 2006; Sellami and Gafsi 2018). We use *Economic development* measured by GDP per capita and *Economic growth* measured by annual GDP growth to control for different stages of development among the sample countries. We also use *Legal origin* to control for differences in the legal set-up of the countries.

4.3. Econometric approach

Given that our dependent variable is binary, it is more appropriate to use logit regression. Therefore, following Boolaky et al. 2020; Judge et al. 2010 Sellami and Gafsi 2018; we use the pooled logit regression estimation, and our baseline model is specified below.

$$\text{Zitlog} \frac{p(XBRL = \pi)}{1 - \pi} = a + \delta_1(\text{Coercive isomorphism})_{it} + \delta_2(\text{Mimetic isomorphism})_i + \delta_3(\text{Normative isomorphism})_i + \delta_4(\text{Control variables})_i + \varepsilon_{it} \dots \text{EQ1}$$

Where i represent country, and ε_{it} is the associated error. All variables are defined in Table 1

[Insert Table 1. Description and sources of variables]

5.0. Results and discussion

5.1. Univariate analysis

Table 2 present the descriptive statistics of the variables used in this study. The statistics include the mean, 25th percentile, median, 75th percentile, and the standard deviation. The mean of *XBRL* is 0.0746, and the median is 0 suggesting low adoption of XBRL among the sample countries. In absolute terms, the sample is made of 40 adopting countries and 135 non-adopting countries as of 2018. However, we see a high average of *Accounting globalization* with a median of 1, indicating a high level of adoption of IFRS and ISA among the sample countries. The average of *ROSC* (0.447), with a median of 0, indicates that not many reports have been issued on the sample countries. As of 2018, 72 countries have received only one ROSC, 25 countries have received two reports, and only 3 countries have received three reports. The mean of *Technology* (30.47) shows that less than half of the population has access to the internet, but with large variation across the sample countries. We observe a similar trend in *Education*.

[insert Table 2. Descriptive statistics]

To determine the appropriateness of the independent and control variables regarding potential multicollinearity, we perform the Person pairwise correlation analysis. The results are presented in Table 3. The results show that none of the correlation coefficients is higher than the standard threshold to possess any threat of multicollinearity in the estimation (Field 2000; Tabachnick and Fidell 2007).

[Insert Table 3. Correlation matrix]

5.2. Multivariate analysis

Given that the three sources of isomorph pressures are likely to have different influences on a country's decision to adopt XBRL, we use a two-stage multi-hierarchical technique to execute our logit model. In the first stage, we run separate regression for each set of isomorph pressures with the control variables. In the second stage, we combine all the proxies and control variables in a single equation. The multi-hierarchical regression technique helps to reveal how each set of isomorph pressures relate to the adoption of XBRL. The results are presented in Table 4. We begin with the coercive isomorphism, which is presented in column 1. The coefficient of ROSC is positive and highly significant at 1 percent, indicating that the IMF and World Bank, through their recommendation in the ROSC report, have a positive influence on the adoption of XBRL. The World Bank and

IMF as a global organization have always been the promoters of international reporting framework; hence it is not unusual for them to exert pressure on countries to adopt the XBRL reporting system. Contrarily to the ROSC, the coefficient of *External debt* is negative, indicating an inverse relationship with XBRL. This is probably due to the fact that debt providers have strict covenants with the government, which stipulate the specific reporting requirement. Also, debt providers are mostly interested in the periodic repayment, which does not require any complex reporting system such as XBRL. Therefore, external debt providers are less interested in the reporting system of the borrower.

Next, in column 2, we present the results of mimetic isomorphism. The coefficient of *Accounting globalization* is positive and highly significant at 1 percent. However, the other two measures, namely, *Trade openness* and *Foreign direct investment*, are insignificant. These results imply that the level of accounting globalization exerts the most significant mimetic pressure on a country's adoption of XBRL. Arguably, countries that have adopted other international standards, such as IFRS and ISA, are more motivated to adopt other international financial reporting frameworks such as XBRL because they are easily compatible. More so, countries that are more globalized in the accounting area will always like to lead any new accounting innovation; hence they are quick to mimic any new globally accepted practices. The result shows that countries are more likely to adopt XBRL due to their adoption of other international best practices.

The results of normative isomorphism are presented in column 3. The coefficient of *Technology* (0.0351***) and *Education* (0.0131***) is positive and highly significant at 1 percent, indicating that the level of formal education and technological advancement are key factors in explaining why some countries are yet to adopt XBRL. As stated earlier, XBRL is a computer-based reporting system that requires technological infrastructure such as the internet to operate efficiently and widely. Therefore, it is logical that the level of technological capacity is positive and significantly associated with a country's XBRL adoption decision. Similarly, as with any global financial reporting system, formal education is essential in the successful implementation of XBRL. Hence, countries with high literacy are more likely to adopt XBRL than countries with low literacy.

In the final column (4), we present the second stage of hierarchical multi-level regression, where all the factors of the three forms of isomorph pressures are combined in a single

equation. The coefficient of the variables retains their direction at a 5 percent significant level or better. The results in column 4, therefore, indicate that the different sources of isomorphism have a significant influence on XBRL adoption as individual variables and as a combined set of variables.

The results of the controls meet the standard assumption in most cases. For example, we find economic development and economic growth to be positive and significant, indicating that countries with high gross domestic product per capita and growth are more likely to adopt XBRL. This result is consistent with the standard expectation that high development is associated with adequate infrastructure to support the implementation of international financial reporting system (BooLaky et al. 2020, Sellami and Gafsi 2018).

5.3.Sensitivity analysis – Developed and Developing countries

Using a large sample has the advantage of high generalisability and fair representation of the population. However, a dominating set of countries within a large sample could bias the results. This could be the case of this study, given the dominance of developing countries in the sample. Indeed, 143 countries representing more than 80 percent of the sample are developing countries. To some extent, we have control for the difference in developing and developed countries in the main results by including *Economic development* and *Economic growth*. There are still significant differences between these sets of countries that could bias the results. First, developing countries receive more external pressure from the World Bank and other capital providers than in developed countries. This is evidence in a large number of ROSC on developing with less or no report on most developed countries.

On the contrary, technology and education, the main source of normative isomorphism, are very high in developed countries than in developing countries. Therefore, to mitigate the influence of a particular set of countries, we employ a sub-sampling technique to generate separate results for developed and developing countries. We adopt a hierarchical multi-regression approach, as done in the main analysis. The results are presented in Table 5. Columns 1 to 4 contain the results of developing countries while that of developed countries in columns 5 to 8.

The coefficient of *ROSC* (source of coercive isomorphism) is positive and significant for developing countries but insignificant for developed countries. This result suggests that the influence of external players such as the World Bank and IMF in pushing XBRL is limited

to developing countries. Contrarily to the results of the coercive isomorphism, the coefficient of *Accounting globalization* is positive and significant for both developing and developed countries. The result implies that countries that use other international standards are more likely to adopt XBRL regardless of been developed or developing countries. That is to say, countries mimic or transfer their achievement from adopting one international standard to another. Regarding normative isomorphism, which is proxy by technology and education, the result shows that technology is a significant determinant for developed and developing countries, while education is only significant in developed countries.

Overall the results in Table 5 shows that different set of factors is likely to have a different level of influence on the adoption of XBRL in developing and developed countries. More specifically, coercive isomorphism is more likely to be the main force of countries' adoption of XBRL in developing, whereas normative isomorphism is the major driving factor for developed countries. However, the adoption of international standards such as IFRS and ISA are significant determinants of XBRL in both developed and developing countries.

5.4. Robustness check

In this section, we perform additional analyses to check the robustness of our main findings that the adoption of XBRL is influenced by institutional isomorphism. First, we adopt the probit estimation technique as robustness on the model specification. The results, as presented in Table 6, are qualitatively similar to the main results in Table 4. That is, all variables retain their sign and are significant in explaining why some countries have adopted XBRL, and others have not adopted it.

[Insert Table 6. Probit results]

Second, we include market capitalization and foreign aid as additional control variables. Arguably, XBRL, as a financial reporting system, is likely to be used predominantly by listed firms. Also, empirical evidence shows that international capital providers such as the World Bank and IMF influence the financial reporting environment of a country through foreign aids and grants (Judge et al. 2010; Ben Othman and Kossentini 2015). However, due to inadequate data, we did not consider these two factors in the main analysis. Further, these two factors are at extreme ends of developed and developing countries. For example, developed countries have large market capitalization but no receipt of foreign aid. On the contrarily, developing countries receive large foreign aid, but their market capitalization is

minimal. Therefore, in column 1 of Table 7, we provide results where we control for the capital market using *Market capitalization* and international aid and grant with *Foreign aid*. *Market capitalization* is measured by the market value of all listed firms as a percentage of GDP, and *Foreign aid* is measured by net official development assistance received as a percentage of gross national income. The results came out similar to the main results. The result of *Foreign aid* is similar to the external debt, which is insignificant, confirming that the influence of external capital providers on a country's decision of XBRL is mainly through recommendations, not the offering of loans or grants.

In the final robustness check, we attempt to account for the different approaches towards the adoption of XBRL. As with any international standards, not all countries adopt it for all industries or firms. Some countries make it mandatory for firms with a public interest, namely financial institutions and listed firms. Therefore, we use two alternative measurements of XBRL adoption based on the set of firms mandated to use it. The results, as presented in columns 2 and 3 of Table 7, indicate that the factors found in the main findings are still significant in providing evidence on determinants of different routes towards the adoption of XBRL.

In sum, all the results in Tables 6 and 7 provide evidence that our main findings are robust to alternative model specification and measurement of XBRL adoption. The results also remain robust after accounting for additional control variables.

[Insert Table 7 – Robustness check, additional controls, and alternative XBRL]

6.0. Conclusion

In this paper, we have operationalized institutional theory to examine the factors influencing the adoption of XBRL. We use a large sample of 175 developed and developing countries over 14 years, covering 2005 to 2018. Our sample size and period yield a minimum of 1452 observations in the regression estimations.

Our results highlight the significance of coercive, mimetic, and normative pressures, respectively, in terms of ROSC reports, the extent of accounting globalization, technological access, and education. However, in further analyses, the results on coercive are more pronounced in developing countries, while that of normative is stronger in

developed countries. Nevertheless, the mimetic pressure is an important, influential factor for all countries regardless of their status as developed or developing.

These findings provide a number of policy implications and make incremental contributions to the literature. First, from a policymaking perspective, the findings highlight the significance of crucial factors by which the case of XBRL adoption can be made. For instance, our findings show that technological access and accounting globalization are essential for the adoption of XBRL. Therefore, regulators and policymakers need to consider technological infrastructure and the existence of other international reporting standards in their decision to adopt XBRL. Second, the findings can also provide evidence for XBRL promoters in lobbying countries to adopt the reporting system. Third, the identification of relevant factors influencing the adopting XBRL could encourage non-adopting countries that have these characteristics to consider XBRL reporting system.

Regarding academic literature, our study complement and updates other studies on the adoption of international accounting and financial reporting practices (Judge et al. 2010; Boolaky et al. 2020; Boolaky and Sooborayen 2017; Sellami and Gafsi, 2018). Our paper is different from these studies because we focus on the adoption of XBRL, which is more of a reporting structure or platform than a set of standards. To the best of our knowledge, we contend that we are the first to examine the institutional factors of XBRL adoption. Second, by operationalizing the institutional theory, we provide a comprehensive understanding of the global diffusion of XBRL; a quality, and relevant reporting system, which have attracted little attention. The study also paves ways for future studies to analyses the consequences of XBRL at both the firm and country level. Other studies can focus on the challenges of XBRL implementation, especially in developing countries.

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Table of results

Appendix 1 list of countries

Adopted countries	Non-adopting countries			
Australia	Afghanistan	Dominican Republic	Mali	Tanzania
Belgium	Albania	Ecuador	Marshall Islands	Thailand
Brazil	Algeria	Egypt	Mauritania	Timor-Leste
Chile	Angola	El Salvador	Micronesia	Togo
China	Antigua and Barbuda	Equatorial Guinea	Monaco	Tonga
Colombia	Argentina	Ethiopia	Mongolia	Trinidad and Tobago
Denmark	Armenia	Fiji	Montenegro	Tunisia
Estonia	Austria	Gabon	Morocco	Turkmenistan
Finland	Azerbaijan	Gambia, The	Mozambique	Tuvalu
France	Bahamas, The	Georgia	Myanmar	Uganda
Germany	Bahrain	Ghana	Namibia	Ukraine
India	Bangladesh	Greece	Nepal	Uzbekistan
Indonesia	Barbados	Grenada	New Zealand	Vanuatu
Ireland	Belarus	Guatemala	Nicaragua	Venezuela, RB
Israel	Belize	Guinea	Niger	Vietnam
Italy	Benin	Guinea-Bissau	Nigeria	West Bank and Gaza
Japan	Bhutan	Guyana	Oman	Yemen
Kuwait	Bolivia	Haiti	Pakistan	Zambia
Latvia	Bosnia and Herzegovina	Honduras	Palau	Zimbabwe
Luxembourg	Botswana	Hungary	Panama	
Malaysia	Brunei Darussalam	Iceland	Papua New Guinea	
Malta	Bulgaria	Iran	Paraguay	
Mauritius	Burkina Faso	Iraq	Philippines	
Mexico	Burundi	Jamaica	Romania	
Netherlands	Cabo Verde	Jordan	Rwanda	
Norway	Cambodia	Kazakhstan	Samoa	
Peru	Cameroon	Kenya	Sao Tome and Principe	
Poland	Canada	Kiribati	Senegal	
Portugal	Central African Republic	Kosovo	Serbia	
Qatar	Chad	Kyrgyz	Seychelles	
Russian	Comoros	Lao PDR	Sierra Leone	
Saudi Arabia	Congo, Dem. Rep.	Lebanon	Singapore	
Spain	Congo, Rep.	Lesotho	Slovak Republic	
Sweden	Costa Rica	Liberia	Slovenia	
Turkey	Cote d'Ivoire	Libya	South Africa	
United Arab Emirates	Croatia	Lithuania	Sri Lanka	
United Kingdom	Cyprus	Madagascar	Suriname	
United States	Czech Republic	Malawi	Switzerland	
Uruguay	Dominica	Maldives	Tajikistan	

Table 1 variable description and sources

Variable name	Measurement	Sources
XBRL adoption	Binary variable equals to 1 for XBRL adopting countries and 0 for non-adopters	
<i>Coercive isomorphism</i>		
ROSC	The number of times an Report on Observance of Standard and Codes (Accounting and Auditing) has been issued on a country	World Bank ROSC website
External debt	Total external debt as a ratio to gross domestic product	World Development Indicators
<i>Mimetic Isomorphism</i>		
Accounting Globalization	The adoption status of IFRS and ISA where 0 equal to no adoption of IFRS and ISA, 1 = adoption of either IFRS or ISA 2 = adoption of both IFRS and ISA.	IFAC Member Profile IFRS Foundation
Trade openness	The sum of total import and export as percentage of gross domestic product	World Development Indicators
Foreign direct investment	The net inflow of foreign direct investment as percentage of gross domestic product	World Development Indicators
<i>Normative Isomorphism</i>		
Technology	The proportion of population using internet. Internet users are individuals who have used the Internet (from any location) in the last 3 months.	World Development Indicators
Education	The ratio of total secondary school enrolment to the population of the age group that officially corresponds to the level of education shown.	World Development Indicators
<i>Control variables</i>		
Economic development	Natural log of gross domestic product per capita calculated as the gross domestic product divided total population.	World Development Indicators
Economic growth	Annual growth in gross domestic product	World Development Indicators
Legal Origin	Binary variable equals 1 for common law countries and 0 for others	Quality of Government database

Table 2 Descriptive statistics

VARIABLES	(2) Mean	(3) p25	(4) Median	(5) p75	(6) sd
XBRL adoption	0.0746	0	0	0	0.263
ROSC	0.447	0	0	1	0.629
External debt	54.11	26.25	41.44	70.41	47.53
Accounting Globalization	0.828	0	1	2	0.856
Trade openness	87.73	56.18	78.81	105.9	49.69
Foreign direct investment	5.586	1.244	2.929	5.841	16.93
Technology	30.47	4.636	20.27	53.24	28.92
Education	35.93	11.16	31.22	58.03	26.47
Economic development	8.338	7.125	8.305	9.539	1.555
Economic growth	3.863	1.778	3.812	6.014	5.131
Legal Origin	0.303	0	0	1	0.459

Table 3. Correlation matrix

VARIABLE	1	2	3	4	5	6	7	8	9	10
ROSC	1									
External debt	-0.18	1								
Accounting Globalisation	0.26	0.05	1							
Trade openness	-0.12	0.3	0.06	1						
Foreign direct investment	-0.05	0.12	-0.02	0.28	1					
Technology	0.07	-0.02	0.35	0.28	0.08	1				
Education	0	0.09	0.23	0.15	0.03	0.73	1			
Economic development	-0.1	-0.17	0.21	0.31	0.1	0.62	0.64	1		
Economic growth	0.04	-0.14	-0.09	0.01	0.03	-0.21	-0.27	-0.17	1	
Legal origin	-0.07	-0.04	0.13	0.05	0.02	-0.01	-0.09	0	-0.03	1

Table 4: Main results

VARIABLES	(1) Coercive	(2) Mimetic	(3) Normative	(4) All factors
ROSC	1.189*** (0.235)			0.840** (0.366)
External debts	-0.0328*** (0.00759)			-0.0362** (0.0158)
Accounting Globalization		0.355*** (0.102)		0.193** (0.092)
Trade openness		-0.00990 (0.0187)		-0.0353 (0.125)
Foreign direct investment		-0.0120 (0.00805)		-0.103 (0.108)
Technology			0.0351*** (0.00714)	0.0368** (0.0166)
Education			0.0131*** (0.00491)	0.0154*** (0.00164)
Economic development	1.264*** (0.222)	0.991*** (0.0759)	0.0249 (0.144)	0.358 (0.413)
Economic growth	0.0493 (0.0391)	0.0734*** (0.0249)	0.0589** (0.0272)	0.191*** (0.0686)
Legal origin	-0.216 (0.387)	0.0379 (0.171)	0.449** (0.208)	0.907 (0.571)
Constant	-13.81*** (2.000)	-10.88*** (0.760)	-5.283*** (1.055)	-6.103 (3.011)
Pseudo R-squared	0.2179	0.2091	0.1856	0.3046
Observations	1,546	1,792	1,452	685

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 5: Sensitivity analysis – Developing and Developed countries

VARIABLES	Developing countries				Developed countries			
	(1) Coercive	(2) Mimetic	(3) Normative	(4) All factors	(5) Coercive	(6) Mimetic	(7) Normative	(8) All factors
ROSC	1.189*** (0.235)			0.840** (0.366)	-0.578* (0.306)			-1.330 (1.429)
External debts	-0.0328 (0.0759)			-0.0362 (0.158)				
Accounting Globalization		0.610*** (0.151)		0.193*** (0.027)		0.336** (0.151)		0.229*** (0.0247)
Trade openness		-0.0250 (0.0453)		-0.0353 (0.125)		-0.00623*** (0.00189)		0.00118 (0.00320)
Foreign direct investment		-0.00155 (0.0108)		-0.103 (0.108)		-0.0118		0.00355
Technology			0.0404*** (0.00866)	0.0368** (0.0166)			0.0253** (0.0126)	0.0318** (0.0153)
Education			0.00778 (0.00609)	0.0154 (0.0164)			0.0243** (0.00947)	0.0280*** (0.0105)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	-7.043*** (2.264)	-10.15*** (1.251)	-6.035*** (1.363)	-6.103** (3.012)	-2.615 (2.595)	-6.089** (2.407)	-3.246 (2.780)	4.923 (3.850)
Pseudo R-squared	0.2179	0.1902	0.1579	0.3046	0.0217	0.0634	0.0588	0.0955
Observations	1,539	1,362	1,139	685	450	430	313	313

Standard errors in parentheses
 *** p<0.01, ** p<0.05, * p<0.1

Table 6: Robustness check – alternative estimation model – Probit regression

VARIABLES	(1) Coercive	(2) Mimetic	(3) Normative	(4) All factors
ROSC	0.596*** (0.120)			0.481** (0.196)
External debts	-0.0167 (0.0379)			-0.0184 (0.0782)
Accounting Globalization		0.181*** (0.0548)		0.0993 (0.144)
Trade openness		-0.00051 (0.000884)		-0.00167 (0.00624)
Foreign direct investment		-0.00678 (0.00430)		-0.0649 (0.0578)
Technology			0.0191*** (0.00381)	0.0194** (0.00871)
Education			0.00714*** (0.00269)	0.101*** (0.00869)
Economic development	0.599*** (0.104)	0.554*** (0.0412)	-0.00294 (0.0773)	0.188 (0.217)
Economic growth	0.0296 (0.0200)	0.0455*** (0.0138)	0.0359** (0.0145)	0.103*** (0.0366)
Legal origin	-0.0200 (0.179)	0.0572 (0.0940)	0.285** (0.113)	0.489* (0.291)
Constant	-6.798*** (0.933)	-6.144*** (0.403)	-2.794*** (0.556)	-3.498** (1.555)
Pseudo R-squared	0.2259	0.2136	0.1901	0.3144
Observations	1,539	1,792	1,452	685

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 7: Robustness check – alternative measurement of adoption and additional variables

VARIABLES	(1) Any kind	(2) Listed firms	(3) Financial firms
ROSC	0.443*** (0.0529)	0.673*** (0.0493)	1.272*** (0.438)
External debts	-0.0324 (0.1500)	-0.0655 (0.2260)	-0.0277 (0.0181)
Accounting Globalisation	0.260*** (0.0370)	0.221*** (0.0388)	0.130*** (0.0318)
Trade openness	-0.0259* (0.0140)	-0.0278 (0.0174)	-0.0454 (0.158)
Foreign direct investment	0.180 (0.165)	-0.046 (0.133)	-0.0358 (0.129)
Technology	0.0876*** (0.0262)	0.1340*** (0.0222)	0.0449** (0.0202)
Education	0.132*** (0.0227)	0.0896*** (0.0222)	0.197*** (0.0192)
Market capitalisation	-0.00616 (0.00606)		
Foreign aid	-1.501 (1.284)		
Economic development	-1.413** (0.610)	0.826 (0.580)	0.174 (0.484)
Economic growth	0.147 (0.0963)	0.404*** (0.0963)	0.155* (0.0800)
Legal origin	1.505* (0.858)	-0.157 (0.815)	1.786*** (0.679)
Constant	9.080* (5.001)	-9.938** (4.406)	-5.690 (3.558)
Pseudo R-squared	0.3832	0.3731	0.3239
Observations	250	685	685

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1