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Chunhui Liu Grace O'Farrell

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The role of accounting values in the relation between XBRL and forecast accuracy

Chunhui Liu and Grace O'Farrell
*Department of Business and Administration,
University of Winnipeg, Winnipeg, Canada*

The role
of accounting
values

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Abstract

Purpose – This study aims to examine the role that cultural dimensions at the accounting subculture level play in the relation between XBRL mandate and quality of financial information environment.

Design/methodology/approach – Analyst forecast accuracy with empirical data of firms from six nations is assessed.

Findings – Results show that accounting values across nations play a significant role in influencing information quality change from XBRL mandate.

Originality/value – This research paper is the very first in assessing the role of national culture in realizing information quality improvement value of XBRL.

Keywords Culture, Cross-cultural IS studies, XBRL, Accounting, IT diffusion, IS evaluation

Paper type Research paper

Introduction

Ranked as one of top ten technologies for accounting and auditing professionals by the American Institute of Certified Public Accountants (Peng and Chang, 2010), eXtensible Business Reporting Language (XBRL) is pledged to enhance the accuracy, reliability and efficiency of electronic communication of business financial data (Yoon *et al.*, 2011). XBRL is an information technology that provides an identifying tag for business information such as total sales to create an unambiguous way to identify and compare information of one company to another (Hoitash *et al.*, 2006). The tags are based on a systematic classification scheme called a taxonomy that defines business reporting concepts and their relations according to specific legislation or standards (Lester, 2007). Quality of information is improved as XBRL streamlines financial statement preparation (Taylor and Dzurinin, 2010) and facilitates the automated production of large volumes of business performance information. Errors from duplicative data entry are removed (Yoon *et al.*, 2011). Efficiency of communication is improved as a result of the immediacy and reach of the web, the ability of information consumers to incorporate corporate information directly into their data warehouses and decision models (Debrecey *et al.*, 2010), and the ability of the engine to find and return specific relevant information enabled by the tag definitions and taxonomies that allow machines to understand the context data and relation among data types (Vasarhelyi *et al.*, 2012).

By separating content from format, XBRL benefits all members of the financial information supply chain by making information exchangeable between different

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applications and systems and easy to extract, search, and reuse by users (Jensen and Xiao, 2001). Quinlan (2010) says that XBRL will make it easier for analysts to identify the best-performing stocks, for executives to monitor competitors, and for regulators to identify potential problems in a company's financial data. Yoon *et al.* (2011) find XBRL to reduce information asymmetry for investors.

Due to such expected benefits (Estebanez *et al.*, 2010; Bovee *et al.*, 2005), XBRL is quickly becoming the reporting standard for financial information worldwide (Taylor and Dzurainin, 2010). Many countries such as Belgium, China, Germany, Italy, Japan, Luxemburg, Singapore, Spain, South Korea, and the USA have mandated XBRL adoption for listed corporations. XBRL has been used in a variety of contexts, such as loan application, business to government reporting, and SEC filings.

However, a single set of standards may not be suitable for all settings and thus may not uniformly improve accuracy, reliability, and efficiency due to differences among countries (Liu *et al.*, 2011). It is thus critical to identify factors influencing XBRL impact across nations. For instance, different cultural values can contribute to remarkably different usage of information and communication technology in various nations of the world (Bagchi and Kirs, 2005). Culture has been shown to play a fundamental role in determining reactions to new information technologies (Fang *et al.*, 2011).

This research investigates the role of cultural dimensions at the accounting subculture level as a moderating factor influencing the global impact of XBRL on the quality of financial information environment as reflected in analyst forecast accuracy. Financial analysts in the capital market are good proxies for informed traders as well as signals of information asymmetry because of their superior information processing capabilities (Roulstone, 2003; Yu, 2010). Platforms like EDGAR-online's IMetrix, Morgan Stanley's Modelware platform, and PwC's iDP platform facilitate analysts' use of XBRL. Willis (2012) of PricewaterhouseCoopers reports that over 50,000 retail analysts use IMetrix and that iDP has 65,000 monthly users. Thus, examining how the adoption of XBRL affects analyst forecast accuracy across nations contributes to a better understanding of the role of culture in the influence of XBRL on the quality of information environment.

Firms from six nations that have completed mandatory adoption of XBRL by 2009 are analyzed to assess the adoption's impact on analyst forecast accuracy across different cultures. The research is among the first to empirically test the role played by cultural values in understanding the impact from information technology (IT) adoption of XBRL. Building on contingency theory, this paper proposes that cultural values play a significant role. Findings can be informative to regulators, investors, and potential adopting firms.

Literature review and hypotheses

One major expected value of improved corporate disclosure from a new technology like XBRL is the reduction of information asymmetry and an improvement to the quality of information, which can be reflected in improved analysts' forecast accuracy (Yoon *et al.*, 2011). Financial analysts are among the most important, sophisticated and visible users of financial reports (Yu, 2010). Analysts play important roles as information intermediaries and economic agents whose actions affect security pricing (Rock *et al.*, 2001). Many studies reveal positive association between the quality of disclosures and forecast accuracy (Hope, 2003). Many expect XBRL to reduce re-keying information, diminish errors in duplicated data entry,

and thus increase data accuracy (Janvrin and Mascha, 2010; Pinsker and Wheeler, 2009). Yoon *et al.* (2011) find XBRL to reduce information asymmetry.

Besides, enhancing transparency and quality of financial information disclosure, XBRL enables analysts to gain more time for value-added analysis to increase forecast accuracy by reducing manual tasks to change data to usable form or the time spent waiting for intermediaries (e.g. information consolidators) to get usable data. Improved efficiency and accessibility to financial data due to XBRL leads analysts to incorporate more data into their analysis with greater accuracy to improve their investment decisions (Baldwin and Trinkle, 2011; Bovee *et al.*, 2005). Quinlan (2010) believes that XBRL provides the foundation for a new generation of financially oriented web services that will make it easier for analysts to identify the best-performing stocks. XBRL tags make searching through financial statements easier than ever (Rezaee *et al.*, 2002) and facilitate analysts' analyses since investment analysts need to disaggregate financial statements, selecting only the data they want to incorporate in their analyses (Yoon *et al.*, 2011). Hunton and Mcewen (1997) reveal that directive information search strategy, which is enabled by XBRL, is associated with accurate analysts forecast. Arnolda *et al.* (2012) find that risk information increases in saliency for professional analysts during the formulation of risk assessments and stock price predictions when using tagged information. Investigating the impact of XBRL adoption on analyst forecast accuracy may provide insight on the quality of the XBRL standard and the impact of the standard on information quality, because analyst forecast accuracy is a good proxy for the quality of financial information environment (Roulstone, 2003; Yu, 2010).

Research into the relation between capital market information environment and XBRL adoption reveals mixed findings. Yoon *et al.* (2011) find a significant negative association between XBRL adoption and information asymmetry proxied by bid-ask spread in the Korean stock market. Kim *et al.* (2012) show that that XBRL disclosure under the SEC mandate increases information efficiency and decreases return volatility. Liu *et al.* (2013a) evidence positive impact of XBRL on analyst behavior in the US, but negative impact in China (Liu *et al.*, 2013b). Different contingent factors in different contexts/nations may have caused the differences in XBRL impact as identified by these early-stage empirical studies.

Contingency theory implies that accounting information technologies are an important part of the fabric of organizational life and need to be evaluated in their wider environmental context (Liu, 2011; Otley, 1980; Yao *et al.*, 2010). Assessment of value realization of a technology, hence, depends on the fit between accounting information system integration and contingent factors (Nicolau, 2000). Accounting information is contingent on national culture, law and financing systems (Alexander, 2011; Ionascu *et al.*, 2011). National culture, in particular, has been shown to play a key role in determining reactions to new information technologies (Fang *et al.*, 2011) and in influencing the success of IT adoption and usage (Leidner and Kayworth, 2006). Culture matters in shaping national accounting standards and practices (Gray, 1988; Hope, 2003). The impact of cultural differences on the use of XBRL is of particular importance because it is developed to be a global standard while cultural differences among nations may result in different views of the relevance, applicability and value of XBRL.

Extant literature reveals that IT is symbolic and hence subject to the various cultural interpretations of those using it (Leidner and Kayworth, 2006). Cultural differences may influence information technology value realization by exerting

a significant influence on the management of IT and IS (Davison and Martinsons, 2003). Dagwell *et al.* (1983) note that systems designers from different cultures have different preference for using theory X (process and efficiency) or theory Y (people) orientation in the systems development process. Kumar *et al.* (1990) discover that Danish designers of more socialist values place greater emphasis on people-related issues in systems development process while Canadian designers of more capitalist values tend to focus more on technical issues.

Culture is the collective programming of the mind that distinguishes the members of one group of people from another (Hofstede, 1991). Cultural values can be seen as the very heart of culture, the bases for the specific norms that tell people what behavior is appropriate in various situations (Hofstede, 1991). Due to the tight linkage between cultural values and the subsequent actions of social groups (Posner and Munson, 1979) and cultural values' relative ease of study in comparison to cultural assumptions or artifacts (Schein, 1999), cultural values have been generally accepted as effective measurements of cultures (Leung *et al.*, 2005).

While culture refers to societies as a whole (Hofstede, 1980; House *et al.*, 2004), subculture is used for the level of an organization, profession or family (Gray, 1988). Gray (1988) is the first to theorize that national culture influences countries' adoption of accounting systems (Nabar and Boonlert-U-Thai, 2007). He contributes to a better understanding of the subculture of accounting profession by identifying accounting as an intervening subculture that links Hofstede's cultural values and the development of accounting systems in practice (Foo, 2008). Gray (1988) proposes four major dimensions of accounting values at the level of the accounting subculture: professionalism versus statutory control (a preference for the exercise of individual professional judgment and the maintenance of professional self-regulation as opposed to compliance with prescriptive legal requirements and statutory control), uniformity versus flexibility (a preference for enforcement of uniform accounting practices between companies and for consistent use of such practices over time as opposed to flexibility suitable for the perceived circumstances of individual companies), conservatism versus optimism (a preference for a cautious approach to measurement so as to cope with the uncertainty of future events as opposed to a more optimistic, laissez-faire, risk-taking method), secrecy versus transparency (a preference for confidentiality and the restriction of disclosure of information about the business only to those who are closely involved with its management and financing as opposed to a more transparent, open and publicly accountable method). Gray's model has received empirical support and been used in international accounting research (Braun and Rodriguez, 2008).

Extant research shows that differences in cultural values result in differences in use and outcomes of IT as cultural value shapes how people use IT (Leidner and Kayworth, 2006). For example, Leidner *et al.* (1999) note that cultural values influence perceptions of usage outcomes of executive information systems. Sia *et al.* (2011) report that trust perceptions in an online environment is influenced by national cultural differences. Tan *et al.* (1998) demonstrate that teams in Singapore with a high power distance and collectivist culture using computer-mediated communication tools achieved a greater degree of reduction in harmful majority influence effects than their US counterparts who are of a low power distance and individualist culture. Calhoun *et al.* (2002) find that high context cultures like South Korea experience higher levels of information overload from IT use than lower context cultures like the US. However, little is known about how

cultural dimensions at the accounting subculture level influence XBRL use as a data standard. We explore this issue on the basis of Gray's models of accounting sub-cultural values. We hypothesize that accounting values matter in the relation between information quality as proxied by analyst forecast accuracy and XBRL adoption.

Charles Hoffman, the founding father of XBRL, recognizes that a lot of the use of XBRL has been regulator driven (Wenger *et al.*, 2011) due to the clear benefits for regulators and governments in allowing data to be filed once but used and shared in many ways by multiple agencies (Fisher, 2008). However, accounting professions in cultures with higher professionalism values prefer the maintenance of professional self-regulation as opposed to compliance with prescriptive legal requirements and statutory control. Countries rated higher in individualism, which is expected to positively correlate with professionalism (Gray, 1988), tend to have less government involvement in regulation and thus higher level of resistance to regulatory mandate (Milberg *et al.*, 1995). Hence, XBRL regulatory mandate is expected to experience greater resistance from the accounting profession with higher professionalism values. Resistance among accounting profession leads to a significant lack of XBRL knowledge (Said, 2011). Deficient XBRL knowledge and preference for professional freedom result in overuse of company specific taxonomy extensions. Debreceeny *et al.* (2011) find 40 percent of extensions in XBRL filings made to the SEC between April 2009 and June 2010 to be unnecessary due to the availability of semantically equivalent elements in US Generally Accepted Accounting Principles taxonomy. Taxonomy extensions decrease comparability of documents for information processing and analysis by users like financial analysts (Boritz and No, 2008; Debreceeny *et al.*, 2005). Such effects of professionalism lead us to the following hypothesis:

H₁. Professionalism negatively moderates the relation between analyst forecast accuracy and XBRL mandatory adoption.

XBRL is developed to unify online financial reporting to achieve global standardization and comparability (Bonsón *et al.*, 2009). XBRL mandate may be better received by cultures that prefer uniformity over flexibility because people that value uniformity prefer enforcement of uniform accounting practices. Such a preference reduces resistance to learn the technology and reduces overuse of the flexibility for taxonomy extensions. Better knowledge of XBRL taxonomies increases the quality of tagged information for analysis and comparison by analysts. Higher quality of disclosures increases forecast accuracy (Hope, 2003). Preference for uniformity associated with high uniformity values supports the second hypothesis:

H₂. Uniformity positively moderates the relation between analyst forecast accuracy and XBRL mandatory adoption.

Interviews conducted by Williams *et al.* (2006) indicate that making sense of and implementing emerging XBRL metadata standards for business reporting are challenging for organizations. Approximately, three months are needed to learn XBRL and the related software among voluntary adopters surveyed in a recent study (Choi *et al.*, 2008). Hwang (2005) reveals that uncertainty avoidance encourages firms to provide training that enhances perceived ease of use of enterprise resource planning systems. Conservative people with high uncertainty avoidance prefer a cautious approach to measurement so as to cope with the uncertainty of future events (Gray, 1988).

Better training as a cautious approach to cope with uncertainty improves ease of use. Better training and improved ease of use reduce errors in XBRL-rendered documents as identified by Boritz and No (2009) and Debrecey *et al.* (2010). Since analysts use the information from financial statements as an important source when determining their forecasts (Baker and Imam, 2008), financial statements of higher quality may lead to more accurate forecasts. Therefore, it is hypothesized that:

H₃. Conservatism positively moderates the relation between analyst forecast accuracy and XBRL mandatory adoption.

XBRL is considered an important enabler of corporate transparency (Debrecey *et al.*, 2011). Transparency decreases information asymmetry and increases analyst forecast accuracy (Yoon *et al.*, 2011). Since cultures that favor high transparency already prefer and use transparent, open and publicly accountable method, reporting financial information digitally with XBRL may improve transparency to a lower degree in comparison to cultures with high secrecy values that prefer the restriction of disclosure of information about the business only to those who are closely involved with its management. XBRL-enabled reporting process requires information providers to use common elements with defined meanings and thus levels the ground of disclosure (Debrecey *et al.*, 2011). To comply with the XBRL requirement, cultures with high secrecy values have to disclose information to a greater extent than before. Increased transparency in information disclosure leads to more accurate analyst forecasts. Therefore, it is hypothesized that:

H₄. Secrecy positively moderates the relation between analyst forecast accuracy and XBRL's mandatory adoption.

Research method

Firms from six nations that have completed mandatory adoption of XBRL by 2009 are sampled. The six nations are Belgium, Italy, Japan, Singapore, Spain, and South Korea. Spain mandated the switch to XBRL since July 2005 for listed companies (O'Kelly, 2010). South Korea developed a mandatory filing program for listed companies since October 2007 (Yoon *et al.*, 2011). Singapore mandated XBRL filing for listed companies since November 2007 (O'Kelly, 2010). Belgium mandated XBRL for reporting since January 2008 (O'Kelly, 2010). Japan listed companies switched to XBRL filing since April 2008 (O'Kelly, 2010). Italy switched to XBRL with February 2009 decree signed by the President of the Council of Ministers (O'Farrell, 2010). Mandatory adoption of XBRL is studied to avoid self-selection bias. Data are collected between 2000 and 2010 to allow comparisons between the period before XBRL mandates and the period since the mandates.

Accounting is contingent on culture, law or financing systems (Alexander, 2011; Ionascu *et al.*, 2011). Therefore, legal enforcement and financial system variables such as outside investor rights and creditor rights are included in the study as control variables. Despite their completion of mandatory XBRL adoption by 2009, Chinese, Israelite and Luxembourgian firms are not sampled because of the unavailability of legal enforcement data which are critical factors influencing analyst forecast accuracy.

Information on analyst forecasts is obtained from the I/B/E/S international database while financial accounting information and stock information are obtained from Compustat Global database. Firms with missing values of analyst forecasts, financial accounting and stock information are removed to result in 1,850 sample firms with

6,941 observations. Sample firms are from different industries: 50.66 percent manufacturing, 14.59 percent services; 12.19 percent wholesale and retail trade, 8.82 percent finance, insurance and real estate, 6.48 percent mining and construction, 6.18 percent transportation, communication and utilities, 0.55 percent public administration and non-classifiable, and 0.53 percent agriculture, forestry and fishing. Detailed information about the sample is provided in Table I.

Following Barniv (2009) and other studies on determinants of forecast accuracy (Brown, 1997; Frankel *et al.*, 2006; Kross *et al.*, 1990), the research model identifies the impact of XBRL adoption on analysts' forecast accuracy while controlling variables influencing the forecast accuracy as follows:

$$\begin{aligned}
 FACC_{jt} = & \alpha_0 + \alpha_1 * XBRL_{jt} + \alpha_2 * NANA_{jt} + \alpha_3 * STD_{jt} + \alpha_4 * EPS_{jt} + \alpha_5 * MVE_{jt} \\
 & + \alpha_6 * Loss_{jt} + \alpha_7 * Industry_{jt} + \alpha_8 * Legalenforcement_{jt} \\
 & + \alpha_9 * Outsideinvestorright_{jt} + \alpha_{10} * Creditorright_{jt} \\
 & + \alpha_{11} * Culturevalue_{jt} + \alpha_{12} * XBRL_{jt} * Culturevalue_{jt} + \varepsilon_{jt}
 \end{aligned} \tag{1}$$

where $FACC_{jt}$ expressed in percentage is forecast accuracy for firm j in year t , defined as $FACC_{jt} = -AFEP_{jt}$ as per (Barniv, 2009; Hope, 2003) while $AFEP_{jt}$ is forecast error (Coen *et al.*, 2009). $AFEP_{jt}$ is obtained through deflating the absolute difference between actual earnings per share (EPS) and consensus forecast EPS by year-start stock price. Stock price is used to deflate the difference between actual and forecasted EPS to facilitate comparisons across firms (Hope, 2003).

$XBRL_{jt}$ is a dummy variable equal to 1 if a firm-year observes mandatory adoption of XBRL and 0 otherwise. $NANA_{jt}$ is the number of analysts following a firm which is found to positively influence forecast accuracy by previous research (Barniv, 2009; Coen *et al.*, 2009) because a significant number of analysts following a firm should induce an increase in competitiveness and an improvement in forecast accuracy (Alford and Berger, 1999; Coen *et al.*, 2009; Hope, 2003). STD_{jt} is standard deviation of forecasts in the consensus for firm j in year t or cross-analyst dispersion which is a proxy for risk (Kross *et al.*, 1990). It is found to have negative relation with forecast accuracy (Barniv, 2009). EPS_{jt} is the actual EPS found to have positive relation with forecast accuracy as a proxy for the magnitude of earnings (Barniv, 2009). MVE_{jt} is the natural logarithm of the market value of equity of firm j for year t as a proxy for firm

	Belgium	Italy	Japan	Singapore	South Korean	Spain
Pre-adoption period	191	435	3,110	391	289	251
Post-adoption period	127	109	1,447	319	185	87
<i>Industry</i>						
Agriculture, forestry and fishing	7	1	22	5	2	
Mining and construction		23	313	66	25	23
Manufacturing	168	258	2,345	297	287	161
Transportation, communication and utilities	33	66	168	66	46	50
Wholesale and retail trade	24	37	662	109	14	
Finance, insurance and real estate	45	89	298	100	34	46
Services	35	63	733	67	57	58
Public administration and non-classifiable	6	7	16		9	

Table I.
Sample: firm year
observations

size (Barniv, 2009). Much research associates firm size with analyst research and forecast, but the net effect of firm size is ambiguous (Frankel *et al.*, 2006). Local currencies are converted to Euro to be comparable. $Loss_{jt}$ is a dummy variable that equals 1 if the reported EPS is negative and 0 otherwise. Hope (2003) finds that firm-specific factors like profits versus losses are the most important in explaining the characteristics of analyst forecast. Loss can be negatively associated with forecast accuracy (Barniv, 2009; Coen *et al.*, 2009) due to analysts' well-known tendency toward optimism (Bradshaw *et al.*, 2006). $Industry_{jt}$ is an indicator variable for a firm's industry membership also found to relate to forecast accuracy (Brown, 1997), possibly due to the influence of sector competitiveness on earnings (Luttman and Silhan, 1995). $Legalenforcement_{jt}$, measured as the mean score across three legal variables used in La Porta *et al.* (1998): the efficiency of the judicial system, an assessment of rule of law and the corruption index, is found to affect the quality of reported earnings which influences analyst forecasts (Leuz *et al.*, 2003). $Outsideinvestorright_{jt}$, with an anti-director rights index that captures the voting rights of minority shareholders as the proxy, is evidenced to determine financial information quality (Leuz *et al.*, 2003). $Creditorright_{jt}$ is an index aggregating different creditor rights by La Porta *et al.* (1998). $Culturevalue_{jt}$ is the culture value for a cultural dimension hypothesized to influence value realization from XBRL adoption. The cultural values are obtained from Braun and Rodriguez (2008) as illustrated in Table II. Values for $Legalenforcement$ and $Disclosureindex$ are obtained from the findings by La Porta *et al.* (1998) and Leuz *et al.* (2003) as shown in Table II.

Research findings

Descriptive statistics

Table III summarizes the descriptive statistics about the sample. When variables are compared between the period before XBRL mandates and the period afterward, no difference is found in NANA, STDEV, EPS, or MVE. FACC is significantly higher after mandatory XBRL adoption at $p < 0.05$ level (mean FACC before adoption = -16.52 whereas mean FACC since adoption = -7.20), implying improvement to analyst forecast accuracy since XBRL mandates.

Model testing

This finding provides empirical support for expected benefits of XBRL adoption in terms of improving the transparency and quality of financial accounting information as proxied by forecast accuracy. This finding also confirms former findings that EPS has

	Culture value dimensions	Belgium	Italy	Japan	Singapore	South Korean	Spain
H_1	Professionalism ^a	53	65	48	61	39	51
H_2	Uniformity ^a	57	46	63	50	72	60
H_3	Conservatism ^a	51	39	47	43	72	61
H_4	Secrecy ^a	55	42	49	51	69	60
	Legalenforcement ^b	9.4	7.1	9.2	8.9	5.6	7.1
	Outsideinvestorright ^b	0	1	4	4	2	4
	Creditorright ^b	2	2	2	4	3	2

Source: ^aBraun and Rodriguez (2008); ^bLa Porta *et al.* (1998, pp. 1136, 1137, 1142, 1143) and Leuz *et al.* (2003, p. 516)

Table II.
Values for cultural dimensions relevant to hypotheses

Variables	Mean	SD
EPS	2.24	37.98
FACC	-13.47	184.26
Loss	0.15	0.36
MVE	19.61	1.81
NANA	4.31	5.09
STD	0.32	3.29

Notes: EPS is the actual earnings per share for firm j in year t ; FACC is forecast accuracy; Loss is a dummy variable that equals 1 if the reported EPS is negative and 0 otherwise; MVE is the natural logarithm of the market value of equity; NANA is the number of analysts following a firm; STD is standard deviation of forecasts in the consensus

Table III.
Descriptive statistics

positive relation with forecast accuracy (Barniv, 2009), that Loss can be negatively associated with forecast accuracy (Barniv, 2009; Coen *et al.*, 2009) due to analysts' well-known tendency toward optimism (Bradshaw *et al.*, 2006), and that Legaleenforcement positively affects the quality of reported earnings and analyst forecasts (Leuz *et al.*, 2003).

Table IV provides Pearson correlation coefficients among variables. All off-diagonal coefficients are far below 0.80. XBRL has a positive relation with FACC at $p < 0.05$, implying a positive impact on analyst forecast accuracy from XBRL mandatory adoption. Gray's accounting values are all found to significantly associate with FACC.

Table V shows empirical evidence in support of our hypotheses as coefficient α_{11} for the interactive terms of XBRL*culturevalue is significant when other variables known to influence FACC such as NANA, STD, EPS, MVE, loss, industry, legaleenforcement, outsideinvestorright and creditorright are controlled and included in the research model. The results show that all four hypotheses are supported by the data. XBRL*professionalism is found to negatively associate with analyst forecast accuracy in support of H_1 . XBRL*uniformity, XBRL*conservatism, XBRL*secrecy are found to positively relate to analyst forecast accuracy in support of H_2 , H_3 , and H_4 . Both tolerance and VIF tests agree with the findings from Pearson correlation coefficients to reveal no evidence of multicollinearity.

8.82 percent of sample firms are firms from finance, insurance, and real estate industry which often has unique accounting rules. The hypotheses are tested by removing firms from this industry as a robustness test. The same conclusions are drawn on all hypotheses even when firms of finance, insurance, and real estate industry are removed from the sample.

The period of this study (2000-2010) intersects the 2008-2012 recession which has affected the capital markets of many countries. Gross domestic product (GDP) information is added to the research model to find no change to conclusions drawn by the original research model. As an alternative robustness test, recession (a dummy variable equal to 1 for 2008-2010 but 0 otherwise) and an interaction term of XBRL*recession are added to the model to find the same conclusions to hold. The coefficient of the interaction term is not found to be significant.

In summary, the empirical findings suggest that accounting values play a significant role in affecting the change in analyst forecast accuracy due to mandatory XBRL adoption as the hypotheses propose.

Table IV.
Pearson correlation
coefficients

	1	2	3	4	5	6	7	8	9	10	11
<i>Dependent variable</i>	1										
1 <i>FACC</i>	1										
<i>Independent variables</i>											
2 <i>XBRL</i>	0.02*	1									
3 <i>NANA</i>	0.03**	-0.01	1								
4 <i>STD</i>	-0.00	-0.01	0.02	1							
5 <i>EPS</i>	0.10**	-0.01	0.03*	0.02	1						
6 <i>MVE</i>	0.06**	-0.01	0.57**	0.01	0.05**	1					
7 <i>Loss</i>	-0.12**	0.04**	-0.08**	0.05**	-0.20**	-0.13**	1				
8 <i>Industry</i>	-0.01	0.02*	-0.06**	0.02	0.03**	-0.08**	0.01	1			
9 <i>Legalenforcement</i>	0.08**	0.02	-0.03*	0.02	0.01	0.01	-0.01	0.02	1		
10 <i>Outsideinvestorright</i>	0.03*	0.01	-0.02*	0.01	-0.01	-0.01	-0.04**	-0.01	0.51**	1	
11 <i>Creditright</i>	-0.05**	0.10**	-0.05**	-0.03*	-0.02	-0.19**	-0.07**	-0.02	-0.24**	0.02	1
12 <i>Professionalism</i>	0.04**	-0.01	0.08**	-0.04**	-0.02	-0.08**	0.02	0.03*	0.01	-0.31**	0.34**
13 <i>Uniformity</i>	-0.04**	0.01	-0.08**	0.03	0.02	0.08**	-0.02	-0.03*	-0.01	0.33**	-0.34**
14 <i>Conservatism</i>	-0.08**	0.03*	-0.00	0.01	0.01	0.04**	-0.04**	-0.04**	-0.64**	-0.16**	0.10**
15 <i>Secrecy</i>	-0.08	0.06	-0.00	-0.00	0.01	-0.01	-0.06	-0.04**	-0.61**	-0.16	0.34**

Note: Significant at: * $p < 0.05$ and ** $p < 0.01$

	Model 1			Model 2			Model 3			Model 4		
	Coeff.	<i>t</i>	<i>p</i> > <i>t</i>	Coeff.	<i>t</i>	<i>p</i> > <i>t</i>	Coeff.	<i>t</i>	<i>p</i> > <i>t</i>	Coeff.	<i>t</i>	<i>p</i> > <i>t</i>
<i>n</i> = 6,941												
Intercept	-124.95	-3.22	<0.01	-123.05	-3.17	<0.01	-74.28	-1.79	0.07	-100.32	-2.53	0.01
XBRL	13.67	2.92	<0.01	13.69	2.92	<0.01	13.09	2.80	<0.01	12.51	2.67	<0.01
NANA	-0.32	-0.61	0.54	-0.33	-0.63	0.53	0.08	0.14	0.88	0.18	0.34	0.73
STD	0.16	0.23	0.81	0.16	0.24	0.81	0.09	0.13	0.89	0.07	0.10	0.92
EPS	0.36	6.08	<0.01	0.36	6.08	<0.01	0.35	6.01	<0.01	0.35	6.00	<0.01
MVE	4.12	2.73	<0.01	4.13	2.73	<0.01	3.24	2.14	0.03	3.05	2.01	0.04
Loss	-56.10	-8.90	<0.01	-56.08	-8.89	<0.01	-56.17	-8.91	<0.01	-55.91	-8.86	<0.01
Industry	-0.00	-1.57	0.12	-0.00	-1.58	0.11	-0.00	-1.55	0.12	-0.00	-1.50	0.13
Legalenforcement	8.05	3.07	<0.01	7.70	2.91	<0.01	3.41	1.04	0.30	6.08	2.03	0.04
Outsidinvestorright	4.61	1.89	0.06	5.07	2.05	0.04	1.55	0.69	0.49	0.54	0.24	0.81
Creditortright	-18.80	-4.52	<0.01	-19.02	-4.56	<0.01	-11.95	-3.21	<0.01	-7.84	-2.07	0.04
Professionalism	2.96	6.30	<0.01									
XBRL*professionalism	-2.23	-3.00	<0.01									
Uniformity												
XBRL*uniformity				-2.99	-6.33	<0.01						
Conservatism				2.23	3.02	<0.01						
XBRL*conservatism							-2.71	-6.16	<0.01			
Secrecy							3.06	5.02	<0.01			
XBRL*secrecy										-3.15	-5.88	<0.01
<i>F</i>	21.26	21.29	21.68	21.49						3.97	5.08	<0.01
Adj. <i>R</i>	0.03	0.03	0.03	0.03								
Minimum tolerance	0.52	0.51	0.37	0.45								
Maximum VIF	1.92	1.96	2.69	2.22								

Table V.
Moderating role of
cultural values in the
relation between
XBRL and FACC

Conclusions

This study examines the role cultural dimensions at the accounting subculture level plays in the relation between XBRL adoption and forecast accuracy with empirical data of firms from six nations that have mandated XBRL adoption by 2009. As per the contingency theory, accounting sub-cultural values matter significantly.

Implications for research

The finding that accounting sub-cultural values play a significant role in value realization from XBRL adoption provides empirical support for contingency theory. This finding also evidences the importance of Gray's accounting sub-cultural values. National culture theory is extended in that accounting sub-cultural value differences across nation are found to influence value realization from an innovative accounting information technology.

Implications for practice

The research findings have implications for standard developers, regulators, and taxonomy users. The finding that XBRL adoption in general has positive impact on forecast accuracy is valuable to regulators, developers and users of XBRL. The significant role identified of accounting sub-cultural values indicates that the impact from XBRL mandatory adoption may not be uniform across nations. Nations with high professionalism values may experience greater resistance against regulatory mandate for XBRL adoption. It is critical for regulators of such nations to educate their accounting professionals with a better understanding of XBRL benefits to fully harvest these benefits. With higher perceived benefits from XBRL, the accounting profession in such nations may pull the XBRL adoption into practice voluntarily instead of being pushed into the adoption. Nations with low accounting values for uniformity, conservatism and secrecy may benefit from incentives for training programs for XBRL adoption.

Limitations

The research findings have caveats. First, the impact of XBRL adoption on financial information environment is measured with analyst forecast accuracy due to its attested effectiveness as a proxy for financial information quality. Future studies may investigate if conclusions are still valid and robust when other measurements are used. Second, data are from six countries with complete data for control variables that have mandated XBRL adoption by 2009 and thus limit the generalizability of the research findings. Future study may investigate the impact of national culture on value realization from XBRL adoption with empirical data from other nations that have finished XBRL mandatory adoption since 2009. Third, XBRL is continuously developed and improved. The results uncovered by this study only reflect the situation by 2010. Future studies may investigate the role of national culture with more recent data.

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Further reading

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About the authors

Chunhui Liu is an Associate Professor at the University of Winnipeg. Her research interests include culture and information systems, management information systems, accounting information systems, and international accounting. Dr Liu has published in *International Journal of Accounting Information Systems*, *Information and Management*, *International Journal of Human Computer Studies*, *Electronic Markets*, *Journal of Accounting, Auditing, and Finance*, *Issues in Accounting Education*, among others. Chunhui Liu is the corresponding author and can be contacted at: m.liu@uwinnipeg.ca

Grace O'Farrell is an Associate Professor at the University of Winnipeg. Her research interests include diversity management, person organization fit, work life balance, and international accounting harmonization. She has published in the *International Journal of Business, Accounting and Finance* and the *Journal of Drug Issues*, among others.

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