The determinants of XBRL adoption: a meta-analysis

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Abstract: eXtensible Business Reporting Language (XBRL) is a new technology revolutionising the world of business information. Past studies attempt explaining what are the factors, such as drivers and inhibitors, able to exert influence over the adoption of this technology. To date, findings seem contrasting. This fragmented panorama provides the opportunity to current study, which purpose is to provide a fine-tuned meta-analysis of determinants of XBRL adoption, by cross-checking the results of 18 prior contributions. Originally, we group determinants of XBRL adoption into three main species of factors: the perceived usability related to the technical dimension (perceived ease-of-use and perceived usefulness – technology acceptance model). The second dimension includes environmental factors (normative pressure). The third dimension is formed by the organisational aspect, composed by the managerial attitude and organisational expertise. The output of this study is an original conceptual framework that we will test in the Moroccan context.

Keywords: technology acceptance; business information; XBRL adoption; meta-analysis.

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1 Introduction

The last two decades were characterised by scandals and financial crises, bankruptcy of major US companies, such as Enron, WorldCom, Arthur Andersen in 2001, the financial crisis of 1998 in Asia and the US sub-prime mortgage crisis of 2008. Thus, the transparency of financial information has become a major problem for businesses. Consistently, the scientific research on tools and mechanisms for the governance of financial information has lately intensified.

In this regard, eXtensible Business Reporting Language (XBRL) is a technology aiming to provide answers for improving performance in the chain of financial information by strengthening confidence in the financial markets, the backbone of any economy and any development. So, in the age of digitalisation, business information plays the most significant role for information specialists in the entire world.

The communication of information is a critical success factors for any organisation (Razmerita et al., 2016), it is vital for management decision making and investment attracting. In the last years, the diffusion of internet decreased the costs of information (Landaeta Olivo et al., 2016), thus becoming the principal source for users (Pohjola and Puusa, 2016) searching for corporate financial reporting.

Internet creates a demand for the standardisation of data description format for financial reporting. Hence, the advent and development of XBRL is a key element for increasing both the transparency of financial reports from and within companies and market efficiency (Wagenhofer, 2003; Gräning et al., 2011).

This technology revolutionises the world of business information. It is supported by the most powerful international authorities whether central banks, stock exchanges, regulators and other stakeholders involved in the business world. An increasing incentive explained by the expansion and diffusion of this innovation in more than 60 countries. By examining the trends of research on XBRL we can conclude that there is an evolution of publications on or with this topic. The main research topics are: The development, description and quality assurance, Research on XBRL and its importance for financial reporting, the critical factors of adoption and diffusion, and XBRL impact on the quality of information, on corporate governance, information asymmetry and performance.

Focused on the area that deals with the adoption and diffusion of XBRL, the previous empirical research of our meta-analysis has provided considerable evidence that a wide variety of factors can influence the decision of adoption. So, the purpose of current paper is to synthesise research findings and contribute to the understanding of determinants of XBRL adoption.

2 XBRL: literature review

XBRL is an application of the computer language eXtensible Markup Language (XML), specifically defined for business financial reporting. It is an open international standard that enables the extraction, manipulation, and exchange of Web-based data across a variety of software applications.

2.1 Background of XBRL development

XBRL is a new concept that Charles Hoffman, Certified Public Accountant American, initiated in 1998 by working on XML and the financial statements. Its goal is to produce intelligent information in global open-standard data-tagging protocol for financial information. In parallel, the AICPA came to the same conclusion and subsequently provided seed money to investigate the development of a financial reporting specification based on XML.

The first prototype was completed by the end of December 1998, after that then called eXtensible Financial Reportiong Markup Language (XFRML) Steering committee was established, and the first meeting took place in October 1999. The official name became the XBRL Steering Committee at the April 2000 when public rollout of the first XBRL specification (Debreceny and Gray, 2001).

2.2 Contributions of XBRL

XBRL is an example of information technology that allows financial statements to be transmitted and analysed electronically (Pinsker and Wheeler, 2009). XBRL is a relatively new technology for web based financial reporting. This will revolutionise the business and the financial world (Doolin and Troshani, 2007). It can make a radical change as Alan Benjamin Obe concludes “The annual report of the 21st century will not be annual, and it will not be a report: it will be an up-to-date, informative, permanent dialogue” (Wagenhofer, 2003).

The advantages and the opportunities that XBRL provide to preparers, users, and information intermediaries are presented as follows:

1 Standardisation of information: XBRL reporting provides qualitative financial information and ensures transparency by standardising the structure and content of financial statements. It provides a standard for on-line reporting of financial information (Debreceny and Gray, 2001; Wagenhofer, 2003; Vasarhelyi et al., 2012).

2 Time efficiency: by using XBRL technology, we could obtain higher volume of specific information in a short time, and avoid human errors (Bovee et al., 2002; Doolin and Troshani, 2007).

3 Costs: XBRL reduces the costs associated with obtaining and analysing information from businesses by addressing and eliminating incompatible reporting formats (Weber, 2003).

4 Accuracy and reliability: with XBRL both humans and intelligent software agents could operate on financial information disseminated on the web with a high degree of accuracy and reliability (Debreceny and Gray, 2001).

5 Information accessibility and security: the major benefits of XBRL are the accessibility and Security of information that referred to as the lifeblood of any organisation (Boritz and No, 2005).

6 Qualitative financial reporting: XBRL reporting provides the qualitative financial information by standardising the structure and content of financial statements (Bovee et al., 2002; Pinsker et al., 2005).

7 Relevance: An economic decision should be based on complete and relevant information; using enhanced metadata technology and XBRL enhanced search engines, which can assist users in acquiring and integrating financial information for making investment decisions (Hodge et al., 2004; Vasarhelyi et al., 2012).

8 Interoperability and comparability: XBRL provides interoperability through many technologies to any user anywhere in the world; simplifies the comparison and analysis of an entity's operations, with similar information about other entities or similar information for another period or another date. It is fundamental for a transparent and fair reporting (Pinsker 2003; Bonsón et al., 2009).

9 Transparency: The tagging and resulting automation of report generation will make the creation of misleading financial statements by management more difficult improving transparency. XBRL will provide greater transparency of accounting and financial data to investors, analysts, government and other external stakeholders (Hodge et al. 2004; Vasarhelyi et al., 2011).

The most recent initiative is the integrated reporting as explained by La Torre et al. (2018). They argue in this study the potential of XBRL to go beyond corporate reporting, by facilitating the shift from a static and periodic reporting to more relevant and dynamic corporate disclosure for stakeholders (La Torre et al., 2018).

2.3 Theoretical background

XBRL is technology that tags pieces of financial data, with the aim of making the analysis and retrieval of data easier, quicker and more cost-effective (Steenkamp and Nel, 2012). The most important theories used to understand the determinants of XBRL adoption in our corpus are: The technological-organisational-environmental (TOE) framework (two studies), the technology acceptance model (TAM) (nine studies) and the Institutional theory (four studies) as presented in Table 5.

2.3.1 Technology acceptance model

TAM is a valuable tool for predicting intentions to use new Information Technology. It suggests the critical factors involved in users accepting a particular technology and getting used to it. It helps to understand why people accept or reject new information system applications to be able to predict, explain and increase user acceptance (Davis, 1989; Papa et al., 2018). The nine studies of our bases confirmed that the both variables of TAM are confirmed to identify the predictors for attitude formation required for successful adoption of XBRL.

The several studies that use technology acceptance model (TAM) suggest that it is insufficient to explain the decision of XBRL adoption as an inter-organisational technologies, hence the importance of other organisational and environmental factors to explain the decision of XBRL adoption. In this sense, institutional theory seems the most relevant to explain the environmental factors that affect the decision to adopt a new technology.

2.3.2 Institutional theory

A review of the XBRL literature shows that most studies have used the institutional theory to explain the drivers and obstacles of XBRL adoption in different context. DiMaggio and Powell identify three main forms of pressures that organisations face in their institutional environment to explain why organisations and countries adopt similar practices (Dimaggio and Powell 1983; Abdullah et al., 2009):

- The coercive pressures arise from political influence and the problem of legitimacy. These types of pressures are exerted by lobby groups, investors, regulators, accounting standard setters and stock exchanges, among others.
- The Mimetic pressures occur when organisations imitate successful practices as a result of uncertainty in the environment; organisations tend to implement structures and systems of other similar but more successful organisations to improve their chances of survival.
- The third source of isomorphic organisational change is normative and stems primarily from professionalisation; from local and international professional organisations, such as the accounting profession.

So the adoption of new technologies is a complex process influenced by a variety of factors. The use of other theories to further explain the factors that influence the decision to adopt a complex technology like XBRL seems very useful. At the firm level, The TOE framework provides a useful analytical framework that can be used for studding the

adoption of different types of Information Technology Innovation. This framework includes the tree important components; technology, organisation and environment context (Raghunath et al. 2013).

2.3.3 Technological-organisational-environmental framework

The TOE framework is developed in 1990 by DePietro et al. (1990) for analysing Information Technology adoption at the firm level. The TOE framework is an organisation-level theory that explains that three different elements of a firm's context influence adoption decision (Chen, 2012). It posits that technological, organisational, and environmental factors influence a firm's decision to adopt an innovation (DePietro et al., 1990):

- Technology factors focus on how perceived characteristics of the technology influence adoption. Its concern the inherent characteristics of a technology that can influence its adoption within organisations as its advantages over adoption costs (DePietro et al., 1990; Henderson et al., 2012).
- Organisational factors describe those attributes of the firm that may impact adoption decisions. Its include factors that characterise organisations such as size, structure, resources availability, good management support and conducive policies, readiness and infrastructure (DePietro et al., 1990; Henderson et al., 2012).
- Environmental factors include aspects of the surroundings in which the firm conducts business that may affect adoption decision; the environmental context consists of the characteristics of the arena where organisations operate that can have an impact on them. This includes interactions with government and competitors (DePietro et al., 1990; Henderson et al., 2012).

As mentioned by Henderson et al. (2012) the TOE framework has been consistently used by researchers to investigate technology adoption in various organisational contexts such as customer-based inter-organisational systems (Grover, 1993), EDI adoption (Iacovou et al., 1995), adoption of open systems (Chau and Tam, 1997), IS adoption by small businesses (Thong, 1999), EDI adoption (Kuan and Chau, 2001), e-business adoption (Zhu et al., 2003), RFID tag adoption (Sharma and Citurs, 2005), web services adoption (Lippert and Govindarajulu, 2006), electronic signature adoption (Chang et al., 2007) and internet use in the procurement process (Mishra et al., 2007).

In our corpus, Doolin and Troshani (2007) and Henderson et al. (2012) used the TOE framework to investigate XBRL adoption, and they affirm that is an appropriate theoretical foundation for investigating technological innovation adoption.

2.4 XBRL adoption and diffusion

Most of the literature on XBRL adoption had examined XBRL adoption using three main contexts comprises several factors that vary between studies (Ilias et al., 2014). The first study about XBRL adoption was in 2005 by Troshani and Doolin, they examined the drivers and inhibitors impacting Technology Adoption as XBRL in the Australian context. They reported that the low level of adoption could be attributed to a variety of factors.

Troshani and Rao (2007) use the convergent interviews, as an appropriate and efficient method for modelling factors impacting the adoption of emerging innovation like XBRL, for the identification of the environmental, organisational and innovation-related factors as they apply to XBRL adoption and diffusion.

The findings of an exploratory study, limited to chartered accountants, of awareness and understanding of XBRL in South Africa showed that the majority of respondents are unaware of XBRL. Very few people understand this technology; in effect, there is a lack of knowledge among the chartered accountants about this technology and the advantages of XBRL. Nel and Steenkamp (2008) acknowledged the fact that it was necessary to investigate the matter of XBRL in the near future and concluded that it is imperative to learn about the topic.

Premuroso and Bhattacharya examine whether early and voluntary filers of financial information in XBRL format demonstrate superior corporate governance and operating performance as opposed to their non-adopting peers. They find that corporate governance and firm performance factors are positively associated with a firm decision to be an early and voluntary filer of financial information in XBRL (Premuroso and Bhattacharya, 2008).

By comparing the XBRL adoption in the UK and in the USA, A. Abdullah et al.(2009) conclude that the success of XBRL adoption requires XBRL mandates from regulators and increased support from the accounting profession, software developers and other interest groups(Abdullah et al., 2009).

Within the last decade an increasing number of academic studies have been dedicated to the development of this technology innovation. Despite high prospects linked to XBRL adoption, a number of concerns have been raised. By providing a bibliometric analysis of research on XBRL, our study presents indicators that explain the importance of scientific production on this subject, the chronological evolution and the geographic expansion of XBRL, and the trends in research of XBRL. In brief, the paper focuses on the axe that deals with the adoption and diffusion of XBRL, to synthesise research findings and to contribute to identifying main determinants of XBRL adoption by using the meta-analysis approach.

3 Research method

3.1 Data collection

The protocol for the analysis was drawn according to indications provided by prior reviews articles (Manhart and Thalmann, 2015; Girard, 2015; Inkinen, 2016; Mariano and Awazu, 2016, Aljuwaiber, 2016).

The analysis is conducted on scientific articles published in academic journals between 2000 and 2014. Articles were selected from the following databases: ProQuest ABI/Inform, ScienceDirect and SpringerLink.

We use the terms ‘ XBRL’ or ‘eXtensible Business Reporting Language’ to search in the titles or keywords or summaries between 2000 and 2014 to identify articles on this topic during this period. The total number of collected articles is 237: 115 articles from ABI/Inform Global, 45 Base Articles from ScienceDirect, and 77 articles from

SpringerLink. All articles are written in English. After removing duplicates with a free reference manager tool (Mendeley) and eliminating professional articles that are not submitted to a peer review, we kept 113 articles that are the basis of our analysis.

The Bibliometric analysis of keywords used in this paper gives us an easy and useful way to examine the article contents that we can easily understand. And it can be of help to classify the different axes that these articles address. On the ground of the literature review of scientific publications for the last 14 years, we can conclude that there are generally four main research topics on XBRL as shown in the following table.

Table 1 Classification of articles by research areas

Research areas	*Number of articles*
XBRL development description and assurance	25
Research on XBRL and it importance for financial reporting	38
XBRL adoption and diffusion	*25*
The impact of XBRL adoption	25
TOTAL	113

Thus, we focus the review on XBRL adoption and diffusion. As mentioned in the bibliometric analysis, the first research was conducted from 2000 to 2014; initially 25 publications were identified as detailed in Table 2. After refining the search to include the publications of 2015 and 2016, to exclude the theory paper and just keep the papers that used an exploratory or a survey method to examine the adoption of XBRL, the number of publications was reduced to 18 articles that are the basis of our meta-analysis. We assigned an id for each paper in the form of two letters, representing the initials of the author (s) plus the last two digits of the year of publication, in order to be able to designate them simply and quickly in the rest of this article.

3.2 Data coding

The next stage, after selecting studies, consists in establishing a coding grid to select the relevant data and establish a list of the studies characteristics that need to be collected. A coding grid is a meta-analysis tool used to gather all the data from the selected studies (Laroche and Soulez, 2012). In order that the content of a coding grid vary from one meta-analysis to another, the list of characteristics can contain many variables that can be classified in different categories: the publication's characteristics, the methodology used, the experimental conditions of the study, the nature of the variables of interest and the way they are measured and the statistical results obtained (Cooper, 2010).

The coding grid that we used presents the characteristics of the 18 studies included in our corpus. A spread sheet contents refer to the following elements:

ID paper	*Authors*	*Title*	*Journal*	*Year*	*Research question*
Theories	methods	Type of study	tools	Population	Sample
Context	Dependent variable	Category of independent construct	Independent variable	Construct after grouping	Sense of relationship or effect

Table 2 18 articles basis of meta-analysis

ID paper	*Authors*	*Title*	*Journal*	*Year*
DOTR07	Doolin and Troshani (2007)	Organizational adoption of XBRL	*Electronic Markets*	2007
TRRA07	Troshani and Rao (2007)	Drivers and inhibitors XBRL adoption : a qualitative approach to build a theory in under-researched areas	*International Journal of E-Business Research*	2007
PRBH08	Premuroso and Bhattacharya (2008)	Do early and voluntary filers of financial information in XBRL format signal superior corporate governance and operating performance?	*International Journal of Accounting Information Systems*	2008
PIR08	Pinsker (2008)	An empirical examination of competing theories to explain continuous disclosure technology adoption intentions using XBRL as the example technology	*The International Journal of Digital Accounting Research*	2008
BOAL09	Bonsón et al. (2009)	A Delphi investigation to explain the voluntary adoption of XBRL	*The International Journal of Digital Accounting Research*	2009
PIWH09	Pinsker and Wheeler (2009)	Non-professional investors' perceptions of the efficiency and effectiveness of XBRL-enabled financial statement analysis and of firms providing XBRL-formatted information	*International Journal of Disclosure and Governance*	2009
JAMA10	Janvrin and Mascha (2010)	The process of creating XBRL instance documents: a research framework	*The Review of Business Information Systems*	2010
CAF11	Felden (2011)	Characteristics of XBRL adoption in Germany	*Journal of Management Control*	2011
HEAL11	Henderson et al. (2011)	Understanding the intention to Adopt XBRL: an environmental perspective	*Journal Of Emerging Technologies In Accounting*	2011
HEAL12	Henderson et al. (2012)	The determinants of inter-organizational and internal in-house adoption of XBRL: a structural equation model	*International Journal of Accounting Information Systems*	2012
YUC12	Chen (2012)	A comparative study of e-government XBRL implementations: the potential of improving information transparency and efficiency	*Government Information Quarterly*	2012
STNE12	Steenkamp and Nel (2012)	The adoption of XBRL in South Africa: an empirical study	*The Electronic Library + Emerald Group Publishing Limited*	2012
ESGA12	Escobar-Rodríguez and Gago-Rodríguez (2012)	"We were the first to support a major is innovation". Research into the motivations of Spanish pioneers in XBRL	*Revista de Contabilidad*	2012
ELAL13	Elissavet et al. (2013)	Acceptance and usage of extensible business reporting language: an empirical review	*Journal of Social Sciences*	2013
RASE13	Rawashdeh and Selamat (2013)	Critical success factors relating to the adoption of XBRL in Saudi Arabia	*Journal of International Technology and Information Management*	2013
JAAL13	Janvrin et al (2013)	XBRL-enabled, spreadsheet, or PDF? Factors influencing exclusive user choice of reporting technology	*Journal of Information Systems*	2013
CHGO15	Chouhan and Goswami (2015)	An analysis of XBRL adoption in India using technology acceptance model	*IUP Journal of Information Technology*	2015
RONA15	Rostami and Nayeri (2015)	Affecting factors on Xbrl adoption	*Journal of Global Economics, Management and Business Research*	2015

In order to obtain a sufficient number of estimates for statistical testing, the explanatory variables were aggregated into representative categories sufficiently large when encoding the data. This aggregation was carried out with more attention so that these variables remain relevant and do not lose meaning. This operation was done because from one study to another, one finds that a single variable can take more or less different appellations. Similarly, it was considered useful to do a grouping work of close concepts, not entirely identical, due to the small number of studies constituting our corpus.

Table 3 The explanatory variables after the grouping operation

Category of construct	*Independent variable*	*Number of estimates*
Environmental constructs		
10	Mimetic pressure	7
	Normative pressure	7
	Coercive pressure	5
	Network externalities	4
	Regulatory mandate	3
	Related technologies	3
	Culture	2
	Social influence	2
	Available information	1
	Market conditions	1
Organisational constructs		
8	Organisational expertise	9
	Management attitudes	8
	Innovation champion	4
	Learning from external sources	3
	Resources	2
	Absorptive capacity	1
	Corporate governance	1
	Organisational readiness	1
Technological constructs		
8	Relative advantage	13
	Perceived usefulness	11
	Perceived ease of use	10
	Compatibility	5
	Complexity	5
	Stability	3
	Training costs	2
	Trialability observability	2

This process of aggregating the explanatory variables was done in collaboration with our research team to minimise the risk of having two different variables or opposing in the same more general category. The objective of this operation as previously reported is to reach a significant number of studies for the same category.

For example, the explanatory variable category 'perceived usefulness', which we called in our article, brings together variables called (perceived IT effectiveness) in the study of Pinsker and Wheeler (2009), 'performance expectancy' in the study by Felden (2011) etc.

Table 4 Estimates of the effect of the explanatory variables intended for the meta-analysis

Variables tested	*Effect*	*No. estimates*	*Papers (the same study may offer several estimates)*
Relative advantage	+	9	HEAL12; STNE12 (3); ESGA12; RASE13; DOTR07; TRRA07(2)
	0	4	TRRA07; BOAL09; HEAL12; RONA15
	Σ	13	
Perceived usefulness	+	9	PIR08; PIWH09 (2); JAMA10; CAF11; JAAL13; CHGO15; ELAL13 (2)
	0	2	RASE13; JAAL13
	Σ	11	
Perceived ease of use	+	9	ELAL13(2); JAMA10; CAF11(2); ESGA12; RASE13; CHGO15; RONA15
	0	1	JAAL13
	Σ	10	
Organisational expertise	+	7	STNE12 ; RASE13(2); RONA15; TRRA07; BOAL09; JAAL13;
	0	2	HEAL12 (2)
	Σ	9	
Management attitudes	+	7	PIR08; CAF11; YUC12; STNE12; ESGA12; CHGO15; RONA15
	0	1	TRRA07
	Σ	8	
Mimetic pressure	+	5	TRRA07 ; BOAL09; CAF11; HEAL11; RONA15
	0	2	HEAL12; HEAL12
	Σ	7	
Normative pressure	+	6	CAF11 ; HEAL12 (2) ; YUC12; RONA15; TRRA07
	0	1	HEAL11
	Σ	7	
Compatibility	+	3	HEAL12 ; RASE13; RONA15
	0	2	TRRA07 ; HEAL12
	Σ	5	
Complexity	+	3	DOTR07 ; TRRA07 ; HEAL12
	0	2	HEAL12 ; RASE13
	Σ	5	
Coercive pressure	+	3	DOTR07 ; TRRA07; CAF11
	0	2	HEAL12 ; HEAL12
	Σ	5	

This grouping effort has allowed us to reduce the total number of categories of XBRL adoption determinants to 26 variables, while indicating that the effect of a number of explanatory variables has been estimated only once.

This discrepancy in the results obtained supports our study and reinforces the need to carry out a meta-analysis of this literature in order to get closer to reality. In order to implement a meta-analysis, it may be considered that at least five estimates of the effect of a determinant on the adoption of XBRL are required. Of the 26 categories of determinants identified in the literature composing our corpus, only ten meet this criterion as shown in Table 4.

The subject of XBRL is relatively new and the number of studies that deals with this subject is relatively poor, our corpus is composed of 18 articles. By regarding the profile and characteristics of studies, we acknowledge the heterogeneity of approach and statistics method used to estimate the relationship between the variable; twelve quantitative studies with survey, three qualitative studies with survey and two exploratory studies with interview. Referring to the number of estimates of each variable as presented in Table 3 which is relatively low. These elements justify the choice of a qualitative meta-analysis namely the vote counting.

3.3 Meta-analysis methodology: the vote counting

Meta-analysis technique is a useful approach to synthesising research findings generated by prior studies addressing the same question. The objective is to determine whether a body of literature has found significant results related to the research issue of interest.

Most researchers believe that the goal of cumulative research is to produce better answers than that which can be obtained in isolated studies. Since the findings of these studies were sometimes contradictory or inconclusive, meta-analyses could be helpful in summarising and clarifying the inconsistent finding (Khlif and Souissi, 2010).

The growing trend of the use of meta-analysis in research has been encouraged and argued (Hunt, 1997; Lyons, 1998). It could be argued that traditional research reviews have been unable to provide definite answers in many circumstances, and meta-analysis has been successfully employed in the fields of medicine, education and psychology (Hunt, 1997). Management Information Systems researchers have also been using it to integrate previous research findings (Pettingell et al., 1988; Pervan, 1994; Gelderman, 1997; Bokhari 2005).

By cumulating results of various studies into a larger data base, this current method, Meta-analysis, provides an opportunity to identify the different factors in the literature that have the strength relationship with the adoption of XBRL. As such, it helps to select the significant drivers and inhibitors that affect the decision of adoption and in fine to develop an integrator model of the determinant of XBRL adoption.

Regarding to the profile and characteristics of studies and our purpose to understand whether a relationship exists between variables, we can affirm that our method was limited to qualitative meta-analyses as named the vote-counting method.

As mentioned by HUNTER and CHMIDT, the traditional vote-counting method is statistically and logically deficient. There are methods of cumulating research findings across studies based on vote counting that are statistically correct, the first that yields only a statistical significance level for the body of studies and the second that provides a quantitative estimate of the mean effect size (Hunter and Schmidt, 2004).The first one is appropriate for our study to determine the significance level of the relationship.

This method stipule that the reviewer can use a count to determine the proportion of studies reporting statistically significant findings supporting the theory (positive significant results) and test this proportion against the proportion expected under the null hypothesis (typically, .05 or .01) by using the binomial test (Hunter and Schmidt, 2004).

Unlike quantitative meta-analysis techniques that are sensitive to magnitude, the voting method is sensitive to directionality and seems appropriate to the conceptual issues raised concerning our study. For each relationship studied between the adoption of XBRL and each explanatory variable k, we codified the existence of the effect in two modalities or effects: significant positive relationship (+), no significant relationship (0) as detailed in Table 3.

The next steps is the sign test, it can be used to test the hypothesis that the effect sizes from a collection of k independent studies are all zero, the null (H0)« no relationship between the dependent variable 'XBRL adoption' and the independent variable k ».The sign test is the binomial test with probability $\pi = 0.5$.If the best estimate for each effect size is zero, the probability of getting a positive result from a binomial test of sampled effect size estimates equals 0.5.If the effect size is expected to be greater than zero, the probability of getting a binomial test result is greater than 0.5 (Bushman, and Wang 2009). The sign test is an application of the following non-parametric binomial test. Thus, the null and alternative hypotheses are:

$$\begin{cases} Ho : \pi = 0.5 \\ Ha : \pi > 0.5 \end{cases}$$

where π is the proportion of positive results in the population. If U equals the number of positive results in n independent studies, then an estimate of π is $p = U/k$.

This test amounts to calculating, under H0, the probability pk of obtaining a number of estimates showing a significant positive relationship at least equal to that which has been observed. This probability is equal to the probability that the random variable Uk 'number of estimates showing a positive significant relationship' is greater than the observed value uk. Uk follows under the hypothesis H0 a binomial distribution of parameter 50% and nk.

$$So\ Uk \sim B(50\%; nk),\ pk = p(Uk \geq uk)$$

The number of estimates nk for each variable is less than 25. So, based on the table of critical values of the binomial test according to Siegel (1956, p.250), the results are presented in Table 5 in the next section.

4 Result and discussion

4.1 Summary finding

Table 5 summarised the methodological profiles and the characteristics of the studies that composed our corpus. It presents an overview of the deferent method and theories mobilised to examine this subject. The dependent variable used by any study in different context:

Table 5 Profile and characteristics of studies

Design attribute	*Studies characteristics*				
Design methodology	Quantitative study with survey	Qualitative study with survey	exploratory study with interview	Delphi study	
	12	3	2	1	
Population	Decision makers' companies	Experts and academics	Supply chain business information actors	Accountants and analysts	
	5	4	5	4	
Context	Australia	Americas	Europe	Africa	Asia
	2	9	3	1	3
Theories	Cadre technological-organisational-environmental (TOE).	TAM	Institutional theory	Signalling theory	DOI ROGERS
	2	9	4	1	2
Dependents variables	XBRL adoption	Intent to adopt XBRL	Acceptance and use of XBRL	technology choice	XBRL implementation
	9	5	2	1	1

4.2 Significant factors of XBRL adoption

The results of the voting method applied to the analysis of the relations between the explanatory variables selected and the adoption of XBRL is presented in Table 6; n represents the total number of estimates, u the number of estimates where the link is significantly positive and p the p-value of the binomial test. P-value is the probability of getting an observation at least as extreme as we got. The variable *perceived usefulness* for example, if 9 of 11 observations favour H1, then p-value =P(x ≥ 9)=0,033[1]; if $\alpha = 0.05$, then reject H0 since P-value ≤ α (Siegel, 1956).

Table 6 Results of the voting method

Variables tested	*N*	*U*	*P*	*SIGNIFICT*
Relative advantage	13	9	0,133	NS
Perceived usefulness	11	9	0,033	S
Perceived ease of use	10	9	0,011	S
Organisational expertise	9	7	0,090	S
Management attitudes	8	7	0,035	S
Mimetic pressure	7	5	0,227	NS
Normative pressure	7	6	0,062	S
Compatibility	5	3	0,500	NS
Complexity	5	3	0,500	NS
Coercive pressure	5	3	0,500	NS

Note: NS: non-significant link to risk of 10%. S: Significant link to risk of 5%.
s: Significant link to risk of 10%.

Referring to Tornatzky and Klein (1982) study, we retained $\alpha = 10\%$ as the minimum significance level from which an estimate was considered to have a significant relationship. As shown in the table, the existence of a positive and significant relationship concerns the following factors: perceived ease of use (PEOU) with P-value = 0.011; perceived usefulness with P-value = 0.033, Management attitudes with P-value = 0.035, normative pressure with P-value = 0.062 and Organisational expertise with P-value = 0.090.

- Perceived ease of use

  PEOU is defined as the degree to which a person believes that using a particular system would be free of effort. It is key factor that affects IS acceptance, either directly through behavioural intention or indirectly through Perceived usefulness (Davis, 1989; Elissavet et al., 2013). So, if XBRL is easy to use, users are more likely to have higher intention to accept it. Of the ten studies that tested the perceived ease of use, nine found this construct to be positively related to XBRL adoption. The binomial probability associated with these finding is significant (p = 0,011)

- Perceived usefulness

  Perceived usefulness is the degree to which a person believes that using a technology could enhance performance, Davis states that perceived usefulness is the most influential determinant of IT acceptance (Pinsker and Wheeler, 2009). The similar attribute in the diffusion of innovation theory (DOI) of Roger is the relative advantage that refers to the expected advantages, or perceived benefits, an innovation can provide to an organisation (Henderson et al., 2012). Of the twelve studies that tested the Perceived Usefulness, nine found this construct to be positively related to XBRL adoption. The binomial probability associated with these finding is significant (p = 0.011).

So, both variables of TAM are confirmed to identify the predictors for attitude formation required for successful adoption of XBRL. But they are insufficient to explain the decision of adoption especially for inter-organisational technologies as XBRL, hence the importance of other organisational and environmental factors.

- Top management attitude

  The importance of top management attitude in leading the technology adoption and implementation processes are confirmed by several studies (Reich and Benbasat, 1990; Beath, 1991; Grover, 1993, Premkumar and Ramamurthy, 1995; Thong and Yap, 1995; Fink, 1998; Wang and Forsgren, 2015). As instance, the implementation of IT-based knowledge management system has proved its effectiveness, directly impacting corporate performances through innovativeness and internal venturing (Del Giudice and Della Peruta, 2016).

The commitment of top management to an IT project helps to ensure its success through the allocation of the necessary resources (Felden, 2011). With regard to the inter-organisational technology, Seyal et al. (2007) found that top management leadership is the significant factor in predicting Bruneian SMEs' EDI adoption. As signalled by Pinsker (2007) and Iskoujina and Roberts (2015) if the individual making the adoption

decision has a favourable attitude toward technology, that individual's firm will be likely to adopt XBRL (Pinsker 2008).

Of the eight estimates that tested the attitude of managers, seven found this construct to be positively related to XBRL adoption and implementation. The binomial probability associated with these finding is significant (p = 0,090).

- Normative pressure

  The Institutional theory of (Dimaggio and Powell, 1983) identified three specific types of pressures that lead to institutional isomorphism: coercive pressures, mimetic pressures, and normative pressures. Normative pressures originate from professionalisation and the sharing of knowledge, norms and values among members of a network.

It can stem from professional organisations (XBRL International) that can disseminate norms about organisational behaviour and can significantly influence IT adoption decisions. And Its can stem via relationships with other organisations (external auditors) that can help their clients improve their accounting practices (Henderson et al. 2011).

In the last study that deal with The determinants of inter-organisational and internal in-house adoption of XBRL, Henderson et al. (2012) claim that normative pressures have a significant positive influence on XBRL adoption for inter-organisational purposes, but not for internal purposes(Henderson et al., 2012).

Of the nine estimates that tested the organisational expertise, seven found this construct to be positively related to XBRL adoption and implementation. The binomial probability associated with these finding is significant at $\alpha = 10\%$ (p = 0.062).

- Organisational expertise

  The second organisational factor that may impact the XBRL adoption decision is the organisational expertise. The investigation and how organisational learning affect the technology diffusion and adoption decisions has been initiated by Attewell (1992) this author suggested that complex technologies can be difficult for organisations to learn how to use, thereby creating an organisational learning burden that can inhibit the adoption of these technologies (Attewell, 1992). In fact, the organisations may suspend the technology adoption until they obtain sufficient expertise to implement it successfully (Henderson et al., 2012). Consistently, sharing expertise might foster or hinder adoptions (Stenius et al., 2016).

Six of the seven studies in our corpus confirmed the relationship between the Organisational expertise and XBRL adoption. So, the only study that disabled the relationship is the Henderson et al. (2012) that indicate that organisational expertise does not have a significant influence on XBRL adoption for either internal or inter-organisational adoption(Henderson et al., 2012).

Of the nine estimates that tested the organisational expertise, seven found this construct to be positively related to XBRL adoption and implementation. The binomial probability associated with these finding is significant at $\alpha = 10\%$ (p = 0.090).

Based on the result of the voting method, we cannot conclude that there is a significant effect on the adoption of XBRL for the other five determinants studied and presented below, tree technological factors derived from DOI theory and two environmental factors derived from institutional theory:

- Relative advantage

  Rogers (1983) defined the relative advantage as the degree to which an innovation is perceived as better than the idea it supersedes. The greater the perceived relative advantage of an innovation, the more rapid its rate of adoption is going to be (Rogers 1983). Relative advantage refers to the expected advantages, or perceived benefits, an innovation can provide to an organisation, the degree to which an innovation provides benefits over the existing (Henderson et al., 2012). So, the relative advantage is commonly expressed in terms of a perceived cost/benefit analysis. As explained by Doolin and Troshani (2007), XBRL offered potential sources of additional revenue for the software vendors and professional accounting firms, it created the opportunity to provide advisory and consulting services to corporate clients (Doolin and Troshani 2007).

  Of the 13 estimates that tested the relationship between the relative advantage of XBRL and its adoption, just nine found this construct to be positively related to XBRL adoption and implementation. The binomial probability associated with these finding is no significant at $\alpha = 10\%$ ($p = 0.133$). So the hypothesis Ho is accepted and therefore this variable will be removed from the determinations of XBRL adoption.

- Compatibility

- Rogers (1983) defined the compatibility as the degree to which an innovation is perceived as being consistent with the existing values, past experiences, and needs of potential adopters. An idea that is not compatible with the prevalent values and norms of a social system will not be adopted as rapidly as an innovation that is compatible (Rogers, 1983). As mentioned by Henderson et al. (2012) the compatibility of XBRL refers to the degree to which it is compatible with the existing organisational practices and procedures. The prior studies such as Schultz and Slevin (1975) and Premkumar and Potter (1995) found that compatibility has a significant positive effect on adoption of other technologies similar to XBRL(Henderson et al. 2012). But, in our study of the five estimates that tested the compatibility, three found this construct to be positively related to XBRL adoption and implementation. The binomial probability associated with these finding is no significant at $\alpha = 10\%$ ($p = 0.500$).

- Complexity

  Complexity refers to the degree to which an innovation is perceived as difficult to understand and use. So the innovation that is simpler to understand will be adopted more rapidly than other more complicated and that require the adopter to develop new skills and understandings (Rogers, 1983). It is the similar attribute of the perceived ease of use in TAM of Davis (1983). Doolin and Troshani (2007) explain that the complexity of XBRL originates from systems integration issues and the difficulty of the tagging process.

  The two studies of Doolin and Troshani (2007) and Troshani and Rao (2007) have found that complexity has a negative influence on the adoption of XBRL. The other two estimates in the research of Rawashdeh and Selamat (2013) and Henderson et al. (2012) show that there is no relationship between the complexity and the adoption of

XBRL. The one estimate that confirmed this relationship is the result of Henderson et al. (2012), it suggests that complexity has a stronger influence on XBRL adoption for internal purposes than for inter-organisational purposes(Henderson et al. 2012). The binomial probability associated with these finding is no significant at $\alpha = 10\%$ ($p = 0.500$).

- Mimetic pressure

  One of the three specific types of pressures that lead to institutional isomorphism as identified by (DiMaggio and Powell, 1983): Mimetic pressures arise from other organisations in the same industry and lead organisations to imitate their competition (Henderson et al., 2011). It's measured by the degree to which the organisation feels pressure to mimic competitors and adopt XBRL. Five of the six studies confirmed the relationship between the mimetic pressure and XBRL adoption in our corpus. So, the only study that disabled the relationship is the Henderson et al. (2012) that indicates that mimetic pressure does not have a significant influence on XBRL adoption for either internal or inter-organisational adoption(Henderson et al., 2012).

  Of the seven estimates that tested the Mimetic pressure, five found this construct to be positively related to XBRL adoption and implementation. The binomial probability associated with these finding is no significant at $\alpha = 10\%$ ($p = 0.090$).

- Coercive pressure

  Coercive isomorphism is defined as forces exerted on organisations by other organisations upon which they are dependent. it results from both formal and informal pressures and by cultural expectations in the society within which organisations function (Dimaggio and Powell, 1983). Coercive pressures on organisations may stem from a variety of sources including resource-dominant organisations, regulatory bodies, and parent corporations, and are built into exchange relationship (Teo et al., 2003).Concerning coercive pressures, Teo et al. (2003) suggest that organisational decision makers have a greater tendency to comply with the policies and the practices of their parent corporation than their trading partner (Teo et al., 2003).

  With respect to XBRL adoption, Felden (2011) concluded by questioning business representatives, that auditing companies are the main drivers behind the distribution of XBRL (Felden, 2011). When to Hendersen et al (2012) they measured this variable by the degree to which the organisation feels pressure from trading partners to adopt XBRL (Henderson et al. 2012).

  Of the five estimates that tested the coercive pressures, tree found this construct to be positively related to XBRL adoption and implementation. The binomial probability associated with these finding is no significant at $\alpha = 10\%$ ($p = 0.500$).

  These results can be explained either by the fact that the number of estimates is too low or the estimate of the effect is false, or there is really no link between these factors and the adoption of XBRL.

5 Conclusions

The purpose of this study is to identify the factors related to the XBRL adoption process among the finding of individual research on XBRL adoption in different context. This study found that the findings seem contrasting and the factors involved in each individual research differ based on the context and the objectives of adopting XBRL. This study confirms one of the three main forms of pressures of Institutional theory that organisations face in their institutional environment (normative) and rejects the two others (coercive and mimetic). It confirms the both variables of Technology Acceptance Model (TAM) of (Davis, 1989) for successful adoption of XBRL. The results of this study also confirm the importance of top management attitude and the organisational expertise in leading the technology adoption processes.

So, this paper provides a systematic literature review of XBRL research, a synthetic of finding of individual research on XBRL adoption in different context, and a primary model of the factors that influence the decision of XBRL adoption that we can test in the Moroccan context. Although, XBRL can be viewed as revolutionising technology of business information management, and its importance is becoming rapidly more evident, so the investigation about the determinants of XBRL adoption is necessary to clarify the policy actor strategy and to help company for better decision, and propose an integrated model of the determinants of XBRL adoption.

This is the gap this research attempts to bridge. So, the contribution of this paper, on the theoretical side is to present an overview of the different theories mobilised by different studies to examine this subject. And, by using the scientific technique: meta-analysis, to provide the conceptual framework and the significant factors that affect the process of XBRL adoption and the integrated model to be tested in the future research.

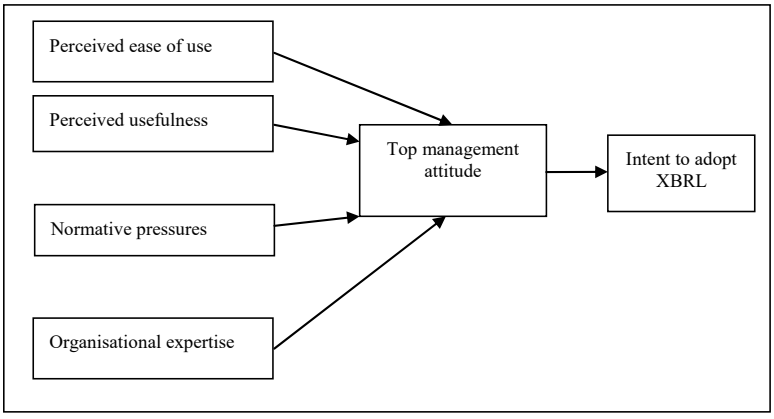
For the managerial side, the finding of this study can contribute insights about the drivers and obstacles of XBRL adoption in different context in the world. So the study may enable the different actors to view the technology XBRL as the core competency in business reporting. It also might inform the Moroccan regulatory agencies in their decisions on how to more effectively motivate stakeholders (central bank, stock exchange, companies…) to voluntary adopt XBRL.

However, this study is not without limitations. The number of publications that are the basis of our meta- analysis is 18 articles. And, it might be early to use this method for a similar size.

Based on the theoretical notions and the results of this paper mentioned above, we will develop several hypotheses that will be tested in the Moroccan context in the next paper. Inspired by the TAM of Davis (1989) that discusses adoption factors at the individual level, we are selected the ‘top management attitude’ as the mediator variable that affect directly the dependent variable ‘intent to adopt XBRL’ and affected by the others independents variables selected in the result of this research.

In conclusion, our research model that will be tested at the organisational level is presented.

Figure 1 Research model



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Notes

1 Result from the table of critical values of the binomial test according to Siegel (1956, p.250).