Examining the Trend of the Research on eXtensible Business Reporting Language (XBRL): A Bibliometric Review

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XBRL or eXtensible Business Reporting Language is a digital version of business reports that has been widely used in order to replace the traditional paper-based reports, such as PDF and HTML. Reports in XBRL format opens up various capabilities where the users of the reports can use, share, analyse or add meaningful value to the data. Based on the usefulness and benefits of XBRL, there are many kinds of research has been conducted on this topic. Therefore, this paper aims to analyse, and reports published documents related to XBRL based on the data obtained from the Scopus database. As of 15th July 2019, a total of 370 documents are retrieved and analysed. Using standard bibliometric indicators, this article reports the research productivity, documents and source types, language of publications, subject area, most active source title, distribution of publications by countries, most active institutions, authorship, keywords, title and abstract analysis and citation analysis. The results show that there is an increased growth rate of literature on XBRL from 2001 until 2011. However, the number is slightly lower from 2011 till 2019. There are various studies that have been conducted on XBRL involving the collaboration of multi-authors, published in various languages, by a total of 160 authors from 43 different countries and 160 institutions.

Keywords: *XBRL, eXtensible Business Reporting Language, Bibliometric Analysis, Internet Reporting, Accounting Information Systems*

Introduction

eXtensible Business Reporting Language or XBRL is an open international standard language for digital accounting and business reporting (www.xbrl.org). Rather than presenting the business reports using a traditional paper-based format such as PDF or HTML, companies are now moving towards into a more interactive and dynamic way of reporting. According to XBRL International Inc. (www.xbrl.org), XBRL is used in more than 50 countries around the world, and millions of XBRL documents are produced every year. The analogy of XBRL is just like comparing the paper maps and digital maps in which the user can interact with a lot of features and possibility digitally. XBRL open up a wide range of capabilities in the way that the user of the reports can use, share, analyse and add value to the data (XBRL International Inc.).

The history of XBRL began back to 1998 when Charles Hoffman comes out with the prototypes of financial reporting using XML. His work supported by the American Institute of Certified Public Accountants (AICPA). The name of XBRL appears a year later and continues to be developed by involving many parties, including much-leading accounting, technology, and government organisations (Wu & Vasarhelyi, 2004). The acceptance of the XBRL has also expanded from the United States into European countries and Asian-Pacific countries. It is worth to mention that company like Morgan Stanley, and Microsoft became the first company that uses XBRL for financial reporting, Securities and Exchange Commission (SEC) filing and web reporting back to 2001.

Apparently, XBRL gives a new way of financial information treatment by utilising the advancement of technology. It works differently as compared to the commonly used web-based format (Rayner & Chandler, 2008). In XBRL, a unique tag is established based on the accounting standard and kept in the taxonomies (Chen, 2012). Through XBRL, the tags will be identified and matched to financial information in the source documents. Then the data can be identified, sorted and extracted by any analytical software for further analysis and decision-making process (Tohang & Lan, 2017). Additionally, the XBRL technology helps the user in providing the powerful search capabilities based on the use of tags to obtain accurate and efficient information for analysis or decision-making purposes (Yoon, Zo, & Ciganek, 2011; Wang, Wen, & Seng, 2014). The tagging process in XBRL generates the connection among the items in the financial reports and groups the items into a particular category; hence the integration of financial reports can be generated in a real-time (Wang, Wen, & Seng, 2014). As a matter of fact, XBRL has far-reaching repercussions for the business intelligence community in facilitating the process of preparing, presenting, extracting, and analysing financial reports. Consequently, the advancement of XBRL may benefit both preparers and users of financial

reports.

Despite the development of XBRL, the study on the XBRL is also evolved through time from the technicalities of XBRL into the impact of XBRL on the business. For example, the FASB integrated U.S GAAP into XBRL taxonomies in 2011 to ease companies in filing their financial report. A study by Bartley, Al-Chen and Taylor (2010) focuses on the technical development of XBRL taxonomies by investigating the mapping errors in XBRL filings that affect the U.S GAAP taxonomy. The other studies like De Franco, Kothari and Verdi (2011) and Dhole et al. (2015) examine the impact of XBRL adoption on the quality of financial reporting. Their studies focus on the quantitative attribute of comparability as well as the reported numbers of accounting items. Dhole et al. (2015), for example, finds the declining of comparability financial performance towards the economic events to corporate accounting numbers after the adoption of XBRL. The possible reason was XBRL still at the early adoption stage and the use of different accounting principle choices allowed under GAAP. Some studies investigate the data quality of XBRL in term of completeness, relevancy, interoperability, transparency, and efficiency (Zhu & Fu, 2009; Zhu & Wu, 2011; Kim, Lim & No, 2012; Perdana, Robb & Rohde, 2015). It is expected that with more studies, a better understanding of the XBRL can benefit business in providing better financial reporting quality especially on completeness, relevancy, interoperability, transparency, and efficiency and slowly replaced the traditional paper-based reporting format.

Despite growing interest toward XBRL research, there have been relatively limited attempts to report the trend of literature, particularly those that used a bibliometric approach. A study by Erkus and Chiu (2014), for example, reports the citation count and co-citation analysis on the documents gathered from four selected databases such as EBSCO Host, ISI Knowledge Web, Science Direct, and Social Science Research Network. Another study conducted by El Ansary and Oubrich (2016), tabled the common bibliometric results for the data gathered from 2000 to 2014. Their study focused on three databases, namely ProQuest ABI/Inform, ScienceDirect and SpringerLink. Another recent study by Uyob, Saad & Ahmi (in press), comprehensively covered both Google Scholar and the Scopus database; however, they specifically focus on the study of the impact of XBRL. While all of these studies provide some meaningful insight on the growth of research on XBRL, two of them are currently a bit outdated. This paper, however, will extend the results based on the availability of current sources and tools.

Methods

This paper aims to examine the trend and productivity of research on XBRL using bibliometric analysis. Some of the bibliometric indicators and network visualisation will be presented in

this paper.

A. Bibliometric Analysis

A bibliometric study gains popularity as one of the methods in revealing the trend of studies (Ahmi & Mohammad, 2019). According to Pritchard (1969), he defines bibliometrics as "the application of mathematics and statistical methods to books and other media of communication". The bibliometric research also refers to a quantitative method that uses statistics to measure text and information and enables an analysis of published documents (Hall, 2011; Daim et al., 2016). Furthermore, it can be used in evaluating the quantity and quality of the published materials to monitor the trends or pattern of a specific research area (Sweileh et al., 2017). According to Ho (2007), the bibliometric analysis could provide descriptive patterns of publications completed based on a domain, field, country, period, or amongst all of the preceding. Moreover, a methodical approach in executing a bibliometric analysis could discover more detailed information related to the publications, including authors, frequency of keywords and citations (Rusly et al., 2019).

There are various indicators that have been used in bibliographic studies. Ahmi & Mohammad (2019) reported that among the most commonly examined aspects include; publication outlet, type of publication, authorship, affiliation, country and h-index. These indicators are some of the descriptive analysis gathered based on the data sets supplied from the chosen databases. Some of the studies also will further investigate the impact of the publications based on the citations such as citation counts, citation per publication (CPP), impact per publications (IPP), the impact factor (IF), and co-citation. With the current accessibility and richness of data available for academic publications, there are various tools being developed to analyse these bibliometric data. The trend of bibliometric research has moved towards visualising the bibliometric networks. VOSviewer, for example, offers a freely available tool for constructing and visualising the networks. VOSviewer also offers text mining features that can be used to construct and visualise co-occurrence networks of crucial terms extracted from a body of scientific literature (www.vosviewer.com).

B. Source and Data Collection

To achieve the objective of this paper, the data source from the Scopus database has been obtained. The database consists of approximately 36,000 titles from almost 11,000 publishers with citation references mainly in peer-reviewed journals across subject fields of social, physical, health and life sciences (Rusly et al., 2019). The search query of XBRL or "extensible business reporting language" was applied to the article title within the Scopus

database on 15th July 2019. This query produced a total of 370 documents for us to further analyse. The data have been exported in CSV and RIS format as part of the data sets. A few tools such as Microsoft Excel, VOSviewer and Harzing's Publish and Perish software, have been utilised in order to analyse the gathered documents.

Results and Findings

To gain an overview of the research related to XBRL, some of the general statistics of the data sets are presented. All the articles that met the search query were evaluated from the following aspects: research productivity, documents and source types, language of publications, subject area, most active source title, distribution of publications by countries, most active institutions, authorship, keywords, title and abstract analysis and citation analyses.

A. Research Productivity

This first analysis will examine research productivity based on the number of documents published per year. Examination of the documents based on year of publication helps the researcher to observe the pattern and popularity of the research subject over time (Ahmi & Mohammad, 2019). The first publication on XBRL was published by Debreceny and Gray (2001). Since then, the growth of publication was a little bit slow until 2007. The numbers increased year by year, and the highest number of publications on XBRL was in 2011. However, the publication activity on XBRL was slightly dropped since 2011 (see Figure 1). Table 1 summarises the details about the total publications on XBRL since 2001. Based on the pattern of the number of publications on XBRL, it seems that it is no longer become the favourite topic among academia.

Table 1: Document by Year

Year	No. of Publications	Percentage (%)	Cumulative Percentage (%)
2001	1	0.27	0.27
2002	2	0.54	0.81
2003	2	0.54	1.35
2004	5	1.35	2.70
2005	3	0.81	3.51
2006	3	0.81	4.32
2007	20	5.41	9.73
2008	16	4.32	14.05
2009	25	6.76	20.81

Year	No. of Publications	Percentage (%)	Cumulative Percentage (%)
2010	36	9.73	30.54
2011	45	12.16	42.70
2012	43	11.62	54.32
2013	27	7.30	61.62
2014	32	8.65	70.27
2015	26	7.03	77.30
2016	19	5.14	82.43
2017	31	8.38	90.81
2018	22	5.95	96.76
2019	12	3.24	100.00
Total	**370**	**100.00**	

Figure 1: Document by Year
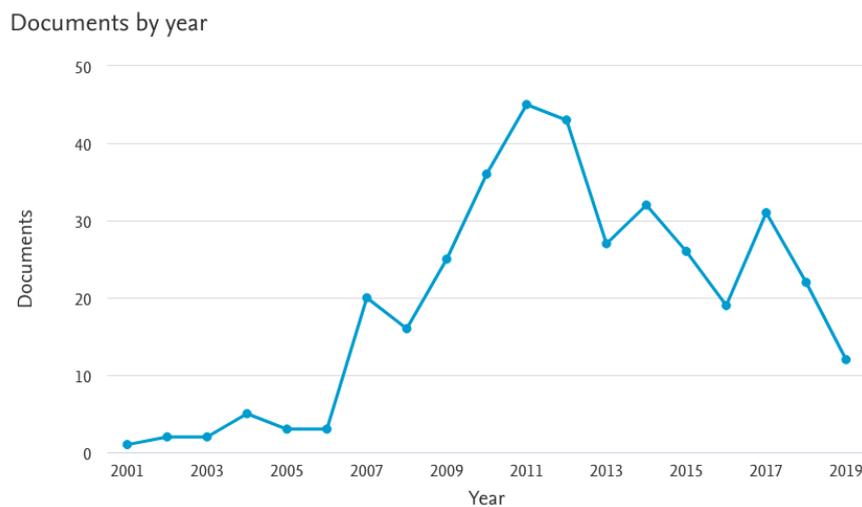
B. Document and Source Type

Published documents from the data sets also have been analysed based on document type and source type. Document types refer to the types of document based on the originality of the documents such as conference proceedings, journal article, or book series, while source type is the type of the source documents weather it is journal, conference paper, book chapter, book or trade publication (Sweileh et al., 2017). The conference papers that emerged under document type were different from those that appeared under source type (Sweileh et al., 2017). In document type, conference paper refers to paper that has been presented in a conference;

however, it probably was published as a journal article. Some conference papers also were published either as conference proceedings or book chapter under source type, although the document type originated from the conference paper. This study found nine types of documents that have been published on XBRL including journal article, conference paper, book chapter, note, review, editorial, book and short survey. One of the publications is undefined by the Scopus.

Table 2: Document Type

Document Type	No. of Publications	Percentage (%)
Article	203	54.86
Conference Paper	118	31.89
Book Chapter	33	8.92
Note	5	1.35
Review	4	1.08
Editorial	3	0.81
Book	2	0.54
Short Survey	1	0.27
Undefined	1	0.27
Total	**370**	**100.00**

Meanwhile, as presented in Table 3, the documents are classified into five different source types, of which journals represent the highest type of source with 212 documents (57.30%) followed by conference proceedings with 104 documents representing 28.11% of the total publications.

Table 3: Source Type

Source Type	No. of Publications	Percentage (%)
Journal	212	57.30
Conference Proceedings	104	28.11
Book Series	27	7.30
Books	22	5.95
Trade Publications	5	1.35
Total	**370**	**100.00**

C. Languages of Documents

As presented in Table 4, English is the common language used from the gathered publications

representing 97.30% of the total documents. Some of the publications also were published in German, Portuguese, Chinese, French and Spanish languages. One of the publications is found to be published in dual languages.

Table 4: Languages Used for Publications

Language	No. of Publications	Percentage (%)
English	361	97.30
German	4	1.08
Portuguese	3	0.81
Chinese	1	0.27
French	1	0.27
Spanish	1	0.27
Total	**99**	**100.00**

*One document has been published in dual languages

D. Subject Area

This paper next categorises the publications based on the subject area as summarised in Table 5. Since XBRL is more focus on studies related to accounting and computer science, it can be found that both subject areas on business, management and accounting and computer science representing 30% and 26% of the total publications respectively. Other significant contributing subject areas include economics, econometrics and finance, decision sciences, social sciences, engineering and mathematics.

Table 5: Subject Area

Subject Area	No. of Publications	Percentage (%)
Business, Management and Accounting	213	30.04
Computer Science	183	25.81
Economics, Econometrics and Finance	95	13.40
Decision Sciences	86	12.13
Social Sciences	42	5.92
Engineering	38	5.36
Mathematics	23	3.24
Environmental Science	6	0.85
Arts and Humanities	5	0.71
Psychology	5	0.71
Energy	3	0.42
Multidisciplinary	3	0.42

Subject Area	No. of Publications	Percentage (%)
Agricultural and Biological Sciences	2	0.28
Biochemistry, Genetics and Molecular Biology	2	0.28
Materials Science	2	0.28
Chemical Engineering	1	0.14

*The publications are classified based on the source title categorisation. Some of the source titles were classified in more than one subject area

E. Most Active Source Title

This paper also presents the most active source title that has five or more publications on XBRL (see Table 6). At the same time, the information about the publisher is reported in Table 6, and the American Accounting Association is among the top publisher contributes to the publications on XBRL.

Table 6: Most Active Source Title

Source Title	Publisher	Source Type	Total	%
Journal of Information Systems	American Accounting Association	Journal	19	5.14
International Journal of Accounting Information Systems	Elsevier B. V.	Journal	17	4.59
New Dimensions of Business Reporting and XBRL	Springer	Book	11	2.97
International Journal of Digital Accounting Research	University of Huelva	Journal	10	2.70
Ceur Workshop Proceedings	Sun SITE Central Europe	Conference Proceeding	9	2.43
International Journal of Disclosure and Governance	Palgrave Macmillan	Journal	8	2.16
Journal of Emerging Technologies in Accounting	American Accounting Association	Journal	8	2.16
Lecture Notes in Computer Science Including Subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics	Springer Nature	Book Series	8	2.16

Source Title	Publisher	Source Type	Total	%
International Journal of Accounting and Information Management	Emerald Publishing Limited	Journal	7	1.89
Lecture Notes in Information Systems and Organization	Springer Nature	Book Series	7	1.89
Issues in Accounting Education	American Accounting Association	Journal	6	1.62
Accounting Horizons	American Accounting Association	Journal	5	1.35
Decision Support Systems	Elsevier B. V.	Journal	5	1.35
International Journal of E Business Research	IGI Global	Journal	5	1.35

F. Distribution of Publications by Countries

This paper also evaluates the number of publications by countries based on the affiliation institution of the author. Overall, a total of 43 identified countries were involved in the publications on XBRL. Table 7 shows the top active countries that contribute the minimum five number of publications on XBRL. The United States contributes the highest number of publication (133) representing 35.95 of the total publications on XBRL followed by China (20.27%), Germany (8.92%), Spain (7.30%), Canada (6.22%), Australia (5.95%) and the United Kingdom (5.68%). This result reveals that developed countries have taken leading positions in XBRL research compared to the developing countries.

Table 7: Most active countries with a minimum of five publications

Country	No. of Publications	Percentage (%)
United States	133	35.95
China	75	20.27
Germany	33	8.92
Spain	27	7.30
Canada	23	6.22
Australia	22	5.95
United Kingdom	21	5.68
Italy	16	4.32
Taiwan	8	2.16
South Korea	7	1.89

Country	No. of Publications	Percentage (%)
Japan	6	1.62
Brazil	5	1.35
Ireland	5	1.35
Malaysia	5	1.35
Netherlands	5	1.35
New Zealand	5	1.35
Romania	5	1.35

G. Most Active Institutions

The participation of the institutions is the research related to XBRL has also been counted in this paper, i.e. based on a minimum of five publications. Table 8 shows that Technische Universität Bergakademie Freiberg has the highest number of publications on XBRL. The University of Hawaii at Manoa and University of Chinese Academy of Sciences become the second highest followed by Old Dominion University and The University of Adelaide.

Table 8: Most active institutions with a minimum of five publications

Institution	No. of Publications	Percentage (%)
Technische Universität Bergakademie Freiberg	14	3.78
University of Hawaii at Manoa	13	3.51
University of Chinese Academy of Sciences	13	3.51
Old Dominion University	12	3.24
The University of Adelaide	12	3.24
Universidad de Huelva	8	2.16
University of Arkansas at Little Rock	7	1.89
University of Winnipeg	7	1.89
Jinan University	7	1.89
Universidad Carlos III de Madrid	6	1.62
University of Waterloo	6	1.62
University of Birmingham	6	1.62
University of International Relations	6	1.62
Rutgers University-Newark Campus	5	1.35
National University of Ireland Galway	5	1.35
Florida Atlantic University	5	1.35
University of Evansville	5	1.35
Università degli Studi di Genova	5	1.35

H. Authorship Analysis

This study also presents the most active authors that published the documents on XBRL. Table 9 listed the most active authors with a minimum of five publications. Based on the table, Felden, C., Troshani, I., Debereceny, R., Piechocki, M. and Wang, Y. are among the most active authors in this field of research that publish more than 10 publications on XBRL.

**Table 9:** Most active authors with a minimum of five publications

Author Name	No. of Publications	Percentage (%)
Felden, C.	13	3.51
Troshani, I.	12	3.24
Debreceny, R.	11	2.97
Piechocki, M.	11	2.97
Wang, Y.	10	2.70
Liu, C.	8	2.16
Wang, D.	8	2.16
Gräning, A.	7	1.89
Huang, M.	7	1.89
Pan, D.	7	1.89
Zhu, H.	7	1.89
Lymer, A.	6	1.62
Wu, H.	6	1.62
Farewell, S.	5	1.35
Mousa, R.	5	1.35
Wang, D.	5	1.35
Wang, T.	5	1.35
Zhang, Y.	5	1.35

There are a total of 160 unique author contributions to a total of 370 publications on XBRL. Table 10 presents the number of publications based on the number of authors for each publication. Based on the table, 18.65% of the publications were single-authored while the rest are multi-authored. Most of the articles on XBRL were co-authored by two (33.51%) and three (31.35%) number of authors. The highest number of authors written the publications on XBRL is seven.

Table 10: Number of Author(s) per Document

No. of Author	No. of Publications	Percentage (%)
1	69	18.65
2	124	33.51
3	116	31.35
4	45	12.16
5	12	3.24
6	2	0.54
7	2	0.54
Total	**370**	**100.00**

Figure 2: Network visualisation map of the co-authorship based on authors that have a minimum of five citations (fractional counting)
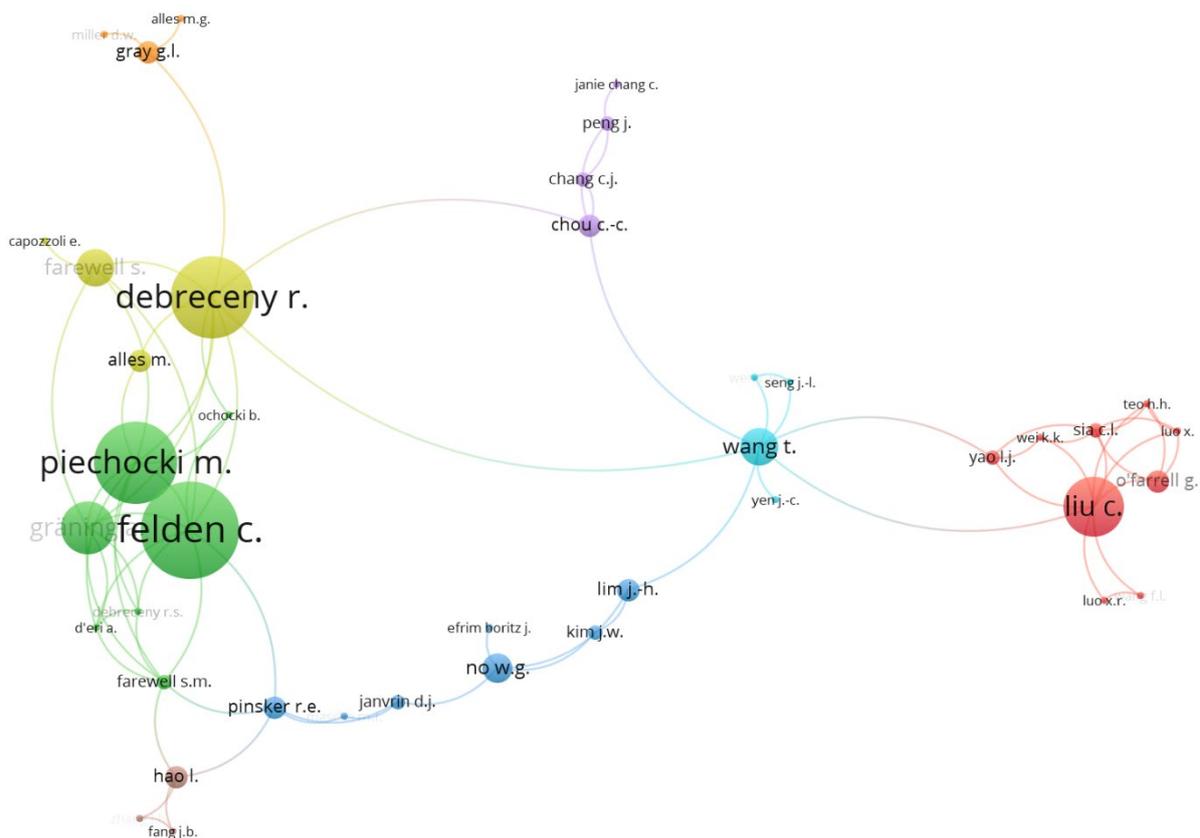

This study further analyses the collaboration of the authors by conducting the co-authorship analysis using VOSviewer. The analysis is based on the influential authors that have more than

five citations and calculated using fractional counting method. The colour, circle size, font size and thickness of connecting lines indicates the strength of the relationship amongst the authors. Connected authors, as indicated by the same colour, are commonly grouped together. For example, the diagram suggests that Piechocki, M, Felden, and Gräning were collaborating closely and usually conduct research together (see Figure 2). Figure 2 also shows that Liu C. has a group of authors (which is coloured in red) that he collaborates with.

Figure 3 further shows the network visualisation map of the authors based on the countries they are affiliated with. Only countries with more than three articles and more than five citations were considered in this analysis. Based on the fractional counting method, findings show that the United States plays a very prominent role in collaborating with other countries. The United States has worked closely with South Korea and the Netherlands, while China seems collaborates with Canada.

Figure 3: Network visualisation map of the co-authorship based on countries that have a minimum of five citations and three documents (fractional counting)
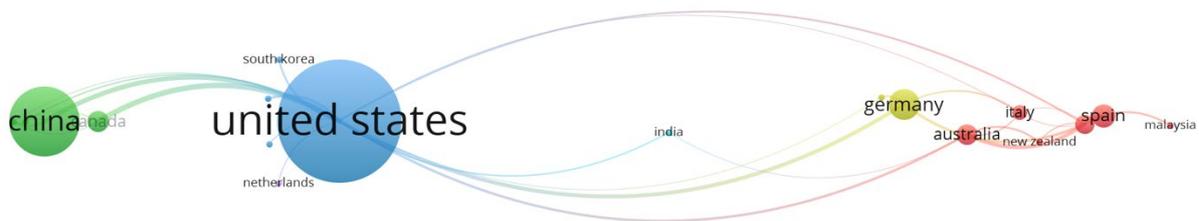
I. Keywords Analysis

The author keywords also have been mapped with VOSviewer. Figure 4 presents a network visualisation of the author keywords in which colour, circle size, font size, and thickness of connecting lines were used to present the relationship with other keywords (Sweileh et al., 2017). Based on the analysis, there are six clusters in XBRL research developed based on the author keywords. The first cluster, which is coloured in green, is related to XBRL, financial reporting, extensible business reporting, regulation, metadata, internet institutional theory and adoption. The second cluster, which is coloured in red include the keywords of accounting finance, ontology, semantic web, comparability, interoperability and data quality.

Figure 4: Network visualisation map of the author keywords
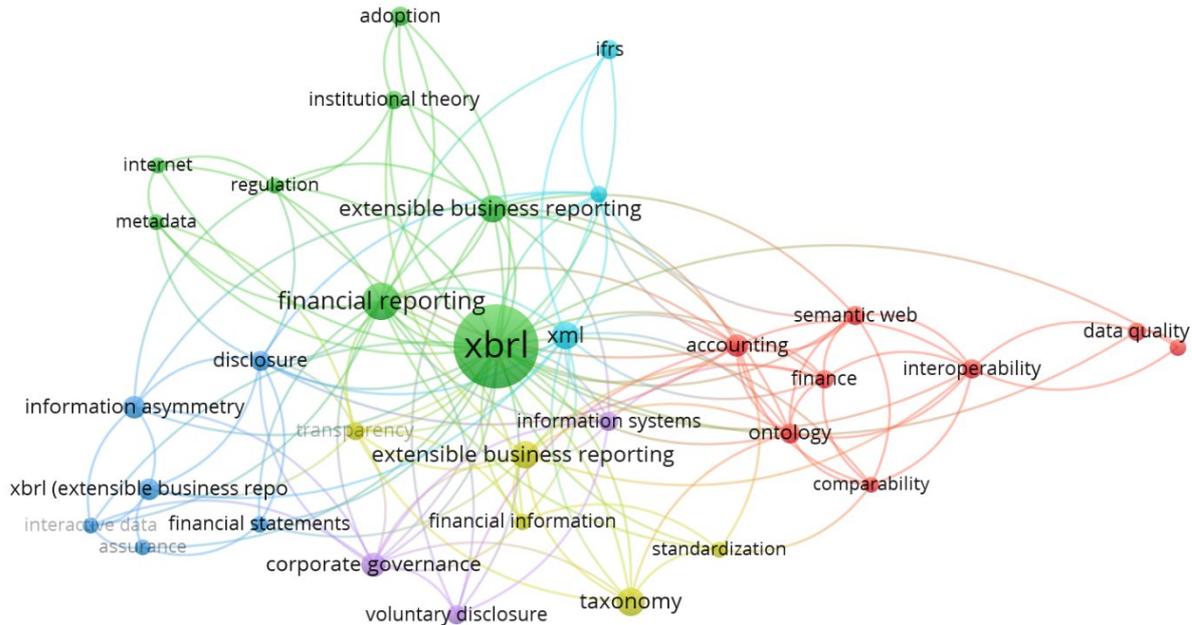
Keywords such as financial reporting, administrative data processing, finance, taxonomies, financial information, information systems and XML were among the most encountered author keywords after exclusion of the core keywords related to a search query (see Table 11).

Table 11: Top 20 Keywords

Author Keywords	Total	Percentage (%)
XBRL	215	58.11
Financial Reporting	68	18.38
Administrative Data Processing	56	15.14
Finance	49	13.24
Taxonomies	39	10.54
Financial Information	38	10.27
Information Systems	32	8.65
XML	31	8.38
Financial Statements	21	5.68
Semantics	20	5.41
Taxonomy	19	5.14
Information Management	18	4.86
Industry	17	4.59

Author Keywords	Total	Percentage (%)
Ontology	17	4.59
Information Technology	16	4.32
Financial Data	15	4.05
Standards	15	4.05
Interoperability	14	3.78
Corporate Governance	13	3.51
Semantic Web	13	3.51

J. Title and Abstract Analysis

This study examines the title and abstract from the documents gathered based on the number of occurrences and co-occurrences using VOSviewer. Specifically, this analysis used a binary counting method in the constructions of the co-occurrence network. According to the creator of VOSviewer, Van Eck and Waltman (2014) the use of a binary counting methodology means, the number of times a noun phrase occurs in the title and abstract of a publication plays no role. A noun phrase that occurs only once in the title and abstract of a publication is treated in the same way as a noun phrase that occurs, for instance, ten times (Van Eck & Waltman, 2014).

Figure 5 shows the visualisation of a term co-occurrence network based on title and abstract fields with ten minimum numbers of occurrences of a term. Figure 5 exposed "language" as the main term acting as the central nodes of the whole network (Verk, Golog & Podar, 2019) in XBRL research. The size of the nodes indicates the weight of the occurrence of the terms while the thickness of joining lines indicates the strength of the relationship amongst the terms. Related words, as indicated by the same colour are frequently co-occurred together. For instance, the diagram suggests that financial statement, experience, manager, auditor, security, year, effect, interest and all other terms which are coloured in green are closely related and usually co-occur together. Specifically, VOSviewer has generated four different colours representing four clusters with 105 terms from the title of the publications.

Figure 5: VOSviewer visualisation of a term co-occurrence network based on title and abstract fields.
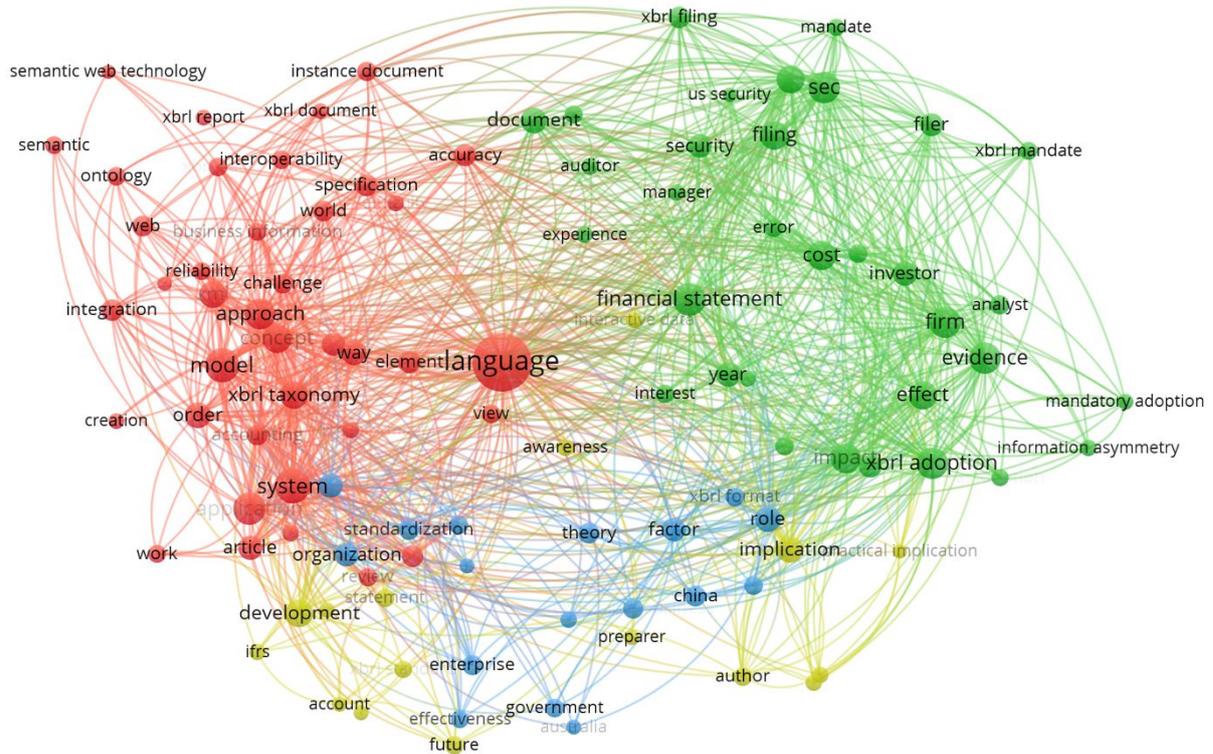
Instead of combining both the title and the abstract of the documents, this paper also analyses the co-occurrences analysis based on the title of the documents (see Figure 6). The result reveals the different perspectives of research in XBRL, specifically in the form where this particular research is grouped with. There are six clusters, and 22 items have been generated from the VOSviewer based on the five-minimum number of occurrences. Cluster 1 includes financial statement, framework, ontology, XBRL data, XBRL filing, XBRL taxonomy, and XBRL technology. Cluster 2 consists of assurance, conceptual framework, extension, implementation and SEC. Cluster 3 includes business, extensible business and XBRL mandate. Cluster 5 and cluster 6 have two items, i.e. impact and XBRL implementation and case and XBRL adoption respectively.

Figure 6: VOSviewer visualisation of a term co-occurrence network based on title fields (Binary Counting)
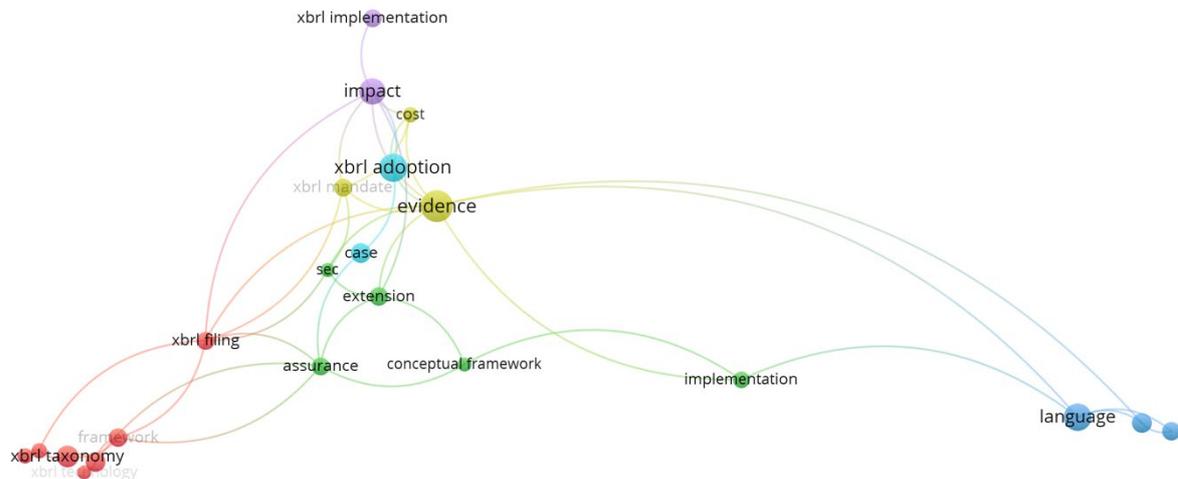
K. Citation Analysis

Table 12 summarises the citation metrics for the retrieved documents as of 15th July 2019. As indicated, there are 3011 citations reported in 18 years (2001 – 2019) of XBRL publications. This citation metric has been generated by Harzing's Publish and Perish software by importing RIS formatted file from Scopus database to the said software to present the raw citations metrics.

Table 12: Citations Metrics

Metrics	Data
Publication years	2001-2019
Citation years	18
Papers	370
Citations	3011
Citations/year	167.28
Citations/paper	8.14
Authors/paper	2.51
Hirsch h-index	28
Egghe g-index	43
PoP hI,norm	18
PoP hI,annual	1.00

Meanwhile, Table 13 below discloses the top 10 most cited articles (based on the number of times the document is cited) as per the Scopus database. The document entitled "The production and use of semantically rich accounting reports on the Internet: XML and XBRL" by Debreceny and Gray (2001) has received the highest number of citations (145 citations or an average of 8.06 citations per year).

Table 13: Top 10 Cited Articles

Authors	Title	Source	Cites	Cites/ Year
Debreceny & Gray (2001)	The production and use of semantically rich accounting reports on the Internet: XML and XBRL	International Journal of Accounting Information Systems	145	8.06
Debreceny, Farewell, Piechocki, Felden & Gräning (2010)	Does it add up? Early evidence on the data quality of XBRL filings to the SEC	Journal of Accounting and Public Policy	95	10.56
Pinsker & Li (2008)	Costs and benefits of XBRL adoption: Early evidence	Communications of the ACM	85	7.73
Yoon, Zo & Ciganek (2011)	Does XBRL adoption reduce information asymmetry?	Journal of Business Research	83	10.38
Premuroso & 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	79	7.18
Plumlee & Plumlee (2008)	Assurance on XBRL for financial reporting	Accounting Horizons	70	6.36
Kim, Lim & No (2012)	The effect of first wave mandatory XBRL reporting across the financial information environment	Journal of Information Systems	62	8.86
O'Riain, Curry & Harth (2012)	XBRL and open data for global financial ecosystems: A linked data approach	International Journal of Accounting Information Systems	58	8.29
Bonsón, Cortijo & Escobar (2009)	Towards the global adoption of XBRL using International Financial Reporting Standards (IFRS)	International Journal of Accounting Information Systems	57	5.7
Debreceny, Felden, Ochocki, Piechocki & Piechocki (2009)	XBRL for interactive data: Engineering the information value chain	XBRL for Interactive Data: Engineering the Information Value Chain	48	4.8

Discussion and Conclusion

This study aims to examine the trend of research on XBRL using bibliometric analysis. By adopting this bibliometric analysis, it can evaluate the productivity of research (Moed, Luwei, & Nederhof, 2002) and publications in the specific research domain. According to Gu (2014), the information provided from the bibliometric data can be used to evaluate the performance of a particular research domain and is beneficial for research-related agencies to regulate some of the policies related to the allocation of funding and comparing the scientific input and output. Furthermore, the results of the bibliometric analysis can explain factors that support the contribution of studies in a research area and guide scholars towards producing impactful studies (Akhavan et al., 2016).

Accordingly, this study focuses on the publications on XBRL gathered from the Scopus database. This study found 370 documents from the stated database using the defined search query. The study on XBRL (based on the documents gathered from the Scopus database) was initiated by Debreceny and Gray (2001) with the title "The production and use of semantically rich accounting reports on the Internet: XML and XBRL" which at the same time has received the highest number of citations. Since then, the number of publications on XBRL has increased from year to year until 2011. The number of publications has slightly declined after that until now. While there is slow progress on the topic, it is believed that there are still some opportunities for research related to XBRL that can be conducted in the future.

More than 50% of the documents were published as journal articles compared to other types of documents. Almost all publications were written in English and originated from 43 identified countries. The United States and China are two top countries contributing to the publication of XBRL. The research on XBRL is commonly published in the publications that group under business, management and accounting and the computer science subject area. Rather than focusing on the social science area of research, such as financial reporting, internet disclosure, adoption research, regulation and governance, the research on XBRL also performed in the technical area that focuses on the development on the XBRL related area such as semantic web technology, XML, and taxonomy development. This focus of area can be seen from the results gathered from VOSviewer in the keywords analysis and title and abstract analysis. For example, the keywords of financial reporting and taxonomy are the most common keywords found in the gathered documents.

The impact of publications on XBRL can be seen from the citation metric disclosed in this paper. Based on the 18 years of publications (2001-2019), there are 370 documents that have been published with a total of 3011 citations. Overall, there are 167.28 citations per year, 8.14

citations per paper and 2.51 authors per paper, for documents gathered from the Scopus database on XBRL.

Despite the specific nature of the bibliometric analysis, this study also has limitations that should be addressed in order to give a clear understanding to the readers of the paper and to improve future research. First, the results only emerged from the specific keyword, i.e. XBRL or "extensible business reporting language" based on the title of the document. Thus, the results of the search query on the other fields such as in abstract and keyword have not been included in this analysis. The main reason is that most of the research that focuses on the specific area will put it in the title of the documents. Some probably put the term related to the search query in the abstract or the keyword field; however, their focus of research probably was not specifically relating to what the researcher is looking for. Thus, a lot of filtering and cleaning needs to be done before the analysis can be conducted. Future research can probably be expanded.

It is also worth to note that there is no search query, which is 100% perfect; thus, false positive and negative results should be anticipated (Sweileh et al. 2017). Thirdly, this study is only focused on the Scopus database as the main source of the documents. Although Scopus is among the most extensive databases, that index all scholarly works (Sweileh et al., 2017; Ahmi & Mohamad, 2019), it does not effortlessly cover all available sources. Other available databases probably can be included in future research such as Web of Science, Google Scholar and Dimensions. Combining all of these databases also will contribute to more interesting and valuable results. Despite these limitations, this study has contributed to the knowledge by presenting the current trend of research on XBRL. This study also extends and complements previous findings on XBRL literature by using the bibliometric approach and providing meaningful insights on the trend of previous literature.

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