How is the accounting academy playing the publication game?

Type of authorship and international diversity and networks

Abstract

This study analyses 3,262 papers published in 18 accounting top journals between 2013 and 2017. We have classified these papers based on the type of authorship in Solo (only one author), Homogeneous Multiple (more than one author from the same university), Heterogeneous National (with authors from different universities from the same country) and Heterogeneous International (with authors from universities belonging to different countries). We perform a set of cluster analysis, which suggests a classification of the papers distinguishing between two broad groups of journals: the North American journals, where there is a predominance of national networks and where most authors are affiliated to a North American journal, and the Non-North American journals, where there is a predominance of international networks and a higher level of authors' international diversity. Regarding the heterogeneous international authorship, we perform a social network analysis suggesting that researchers affiliated with North-American universities and their counterparts from European universities seem to ignore each other. Whereas the first have been publishing mainly with co-authors affiliated with universities from Asia, the latter have been publishing articles with one another.

1. Introduction

Empirical literature on diversity in accounting research is scant (Ballas and Theoharakis, 2003; Brinn and Jones, 2008; Dhanani and Jones, 2017). The same is the case regarding literature on co-authorship, which occurs when "two or more authors participate in the production of a study leading to a journal publication" (Tucker et al., 2016, p. 185), in accounting research (Andrikopoulos et al., 2016; Andrikopoulos and Kostaris, 2017; Endenich and Trapp, 2016; Fleischman and Schuele, 2009; Tucker et al., 2016). Our study examines one particular aspect of diversity, that of the levels of internationalization of accounting journals pertaining to the publishing of authors from different countries. This study analyses how internationalized are top accounting journals, exploring the concentration on publishing papers from particular countries and the relationship between the geographical distributions of authors in co-authorships. We do this by distinguishing solo authorship (one author) from multiple authorship (two or more authors), and, within this latter category, between homogeneous multiple authorship (all authors from the same university), heterogeneous national authorship (authors from different universities, but all from the same country) and heterogeneous international authorship (authors from universities belonging to different countries). This allows us to examine also patterns of solo and multiple authorships. The analysis of the levels of internationalization is carried out for each of these categories of authorship. As far as we are aware, this is the first study exploring these aspects in such a way.

In a study comparing levels of internationalization between three natural sciences fields (applied physics, nanoscience and biochemistry) and three social sciences fields (sociology, economics and political science), Dyachenko (2014) presents evidence that academic journals from social sciences are more concentrated on publishing authors from particular countries than their natural sciences counterparts, are less likely to publish papers written in foreign languages,

and present higher degrees of similarity between editors' and authors' geographical distribution. Being a field of the social sciences, there are reasons to expect that accounting journals present a degree of concentration on publishing authors from certain countries. We aim at understanding whether this is so and whether this is the case regarding journals from different geographical locations. We carry out this task examining separately the levels of internationalization for each of the four categories of authorship presented above.

Our empirical analyses is based on a sample of 3,262 papers published between 2013 and 2017 in 18 accounting top journals. We classify each one of these papers according to the four authorship categories mentioned above. To examine the levels of similarity between the journals, a cluster analysis is undertaken. The examination of the levels of internationalization of the journals is carried out by way of a separate analysis of the four categories of co-authorship (a cluster analysis seeking to identify the most similar pairs of journals is undertaken in each category). For the category heterogeneous international (authors from universities belonging to different countries), a social network analysis (SNA) is conducted with the purpose of offering a more detailed understanding of the patterns of geographical co-authorships, the influence (centrality) and diversity of countries in each journal, as well as the density of links between countries.

Regarding the general patterns of authorship, our findings suggest a classification distinguishing three types of journals. The first is that of the North American journals plus the Journal of Business Finance and Accounting (JBFA). In this group there is a predominance of papers authored by researchers from different universities, but mainly universities from the same country (national networks). The second is composed of only the Journal of International Financial Management and Accounting (JIFMA), in which most papers are from authors affiliated with institutions from different countries (international networks). Finally, the third type, which we

label Other Non-North American journals, is characterized by higher diversity in terms of presence of the different categories of authorship, despite predominating the international networks.

The analysis of the papers not included in the category heterogeneous national authorship supports the distinction between two broad groups of journals. The first is composed by the North American journals, in which most of the papers are prepared by authors affiliated to a North American university. The second includes the Non-North American journals. In the journals composing this group there is a greater diversity in terms of nationality of the authors, with most of the papers being authored by researchers from Anglo-Saxon countries.

In the specific case of the papers authored by researchers from different universities from the same country (heterogeneous national authorship), one can distinguish two different subgroups in the case of Non-North American journals: the first includes the Management Accounting Review (MAR), the European Accounting Review (EAR) and the Journal of Business Finance and Accounting (JBFA), where the predominant authors are those affiliated to a university from the USA, although they do not have a dominant position; the second includes journals whose papers are predominantly authored by researchers affiliated with a university from an Anglo Saxon country, but with the authors from the UK and Australia playing a predominant role. In addition, Accounting, Organizations and Society (AOS) in not included in this group of Non-North American journals, given that most of the papers are authored by researchers from the USA.

The social network analysis (SNA) performed on the papers with co-authors affiliated to universities from different countries (heterogeneous international authorship) suggests a classification distinguishing between two broad groups of journals: the North American journals (excluding the Review of Accounting Studies, RAS) plus the Journal of Business Finance and Accounting (JBFA), where the

countries with a higher likelihood of being included in an international partnership are mainly the USA, Canada, UK, Australia, and a set of Asian countries (China, Korea, Taiwan and Singapore); and the Non-North American journals (excluding the Journal of Business Finance and Accounting, JBFA) plus the Review of Accounting Studies (RAS), where the countries with a higher likelihood of being included in an international partnership are mainly the Anglo-Saxon countries, although some european countries also stand out.

Our study contributes to two strands of literature. The first pertains to the examination of diversity in accounting research. Discussing the "US model of doctoral education in accounting", Pelger and Grottke (2015, p. 119) underline some of its deficiencies: first, it "seems to reinforce homogeneity with regard to journals' content and the methods and research topics used in accounting"; second, as a consequence of the "lack of diversity in research topics", there is "an overproduction of PhDs with similar areas of specialization" which leads to the USA academy facing "a serious challenge to represent all areas of accounting relevant to society". Third, the research emanating from accounting academia in the USA "has been increasingly criticized for its lack of innovativeness and progress". The dangers of the lack of diversity are well depicted by these deficiencies. Our study contributes to an understanding of the state of diversity in accounting research in terms of authors' geographical distribution and international collaboration in multi-authored research. Diversity in terms of internationalisation of the authors is likely to offer some sort of antidote to the deficiencies that some believe to characterize USA research.

The second strand of literature to which this study contributes is that of co-authorship in accounting research. Tucker et al. (2016) note that empirical studies focusing on the examination of co-authorship in research published in accounting journal restricted to the identification of an increase in co-authorship in accounting research. We contribute to this literature on co-authorship in accounting research by

examining international collaboration in multi-authored research and its publication in different outlets.

The paper unfolds as follows. Section 2 is devoted to relevant literature. In section 3 we present the research design. In section 4 we present the results of the study. Finally, in section 5 we discuss the findings and offer some concluding remarks.

2. Background

Studies exploring diversity in accounting research in terms of internationalization of authorship are scant (Lukka and Kasanen, 1996; Brinn and Jones, 2008; Dhanani and Jones, 2017; Jones and Roberts, 2005). Based on an analysis of six accounting journals (three from the USA, two British journal and one from Australia) for the period 1984-1993, Lukka and Kasanen (1996) found that in the majority of the situations (77 percent) the nationality of the institution with which the author was affiliated was the same as the one of the empirical evidence used, as well as that of the journal in which it was published. These authors concluded that at the time accounting still was "a rather local discipline by nature", given that "both empirical evidence and authors are significantly clustered along country lines" (p. 755). Moreover, "one could speak of a "powerful U.S. accounting research elite centered around the major journals" (The Accounting Review, the Journal of Accounting Research and the Journal of Accounting and Economics), and an "emerging mostly European elite" centered around Accounting, Organizations and Society (p. 772). More than two decades have elapsed and it is of interest to reassess if accounting still demonstrates to be a local discipline.

Jones and Roberts (2005) analyzed 1,867 articles published in six UK and six USA journals for the period 1996-2000. They found that whereas in the case of UK

journals 59% of articles were from authors based overseas, in the case of USA journals only 13% of articles were from authors based in other countries.

Extending the scope of the analysis from published research to editorial boards, Brinn and Jones (2008) analyzed editorial boards of 60 accounting journals in 1999. They found a "home country bias in board appointments" (p. 25). The strongest bias was that of the USA (with 85.1 per cent). The UK (with 46.3 per cent) and Australia (with 47.8 per cent) had their own nationals as their largest group. In Canada, USA scholars represent the majority (54.9 per cent) and Canadians the second group (43.1 per cent). These authors conclude that whereas "the US academic network was national rather than international", in the cases of the other three countries the networks "looked more international than national".

Dhanani and Jones (2017) looked at the boards of 50 accounting journals and examined two diversity characteristics, female representation and board internationalization. Regarding female representation, they found that it "is broadly consistent across the different journal nationalities; has improved over time; has experienced a convergence in 'gender sensitive' sub-disciplines; and is influenced by female editorship (p. 1008). Regarding internationalization, they found that USA journals' boards included significantly fewer foreign scholars than those of journals form the UK and Australia. They interpreted the marginal changes in the size of boards in USA journals as suggesting "a further commitment to the positivist research tradition of the USA and a shift away from non-positivist research" (p. 1033). On the other hand, a considerable growth occurred in the boards of journals form Australia and the UK, which they attributed to non-positivist research and as serving to fill the void created in the USA.

These results are consistent with the findings of Lohmann a Eulerich (2017), who analysed the publication activity of The Accounting Review in the period 1926-2014 and found that this journal is "more a national, rather than an international

journal" (p. 10), in the sense that most of the authors that had their work accepted by it are (or were) affiliated with an university or institution from the USA. They also found a slight increase in the proportion of articles authored or co-authored by researchers affiliated with foreign institutions. However, upon further analysis, they detected that researchers who were affiliated with a foreign university at the time of the publication of their article had concluded their PhD at an USA university. Hence, the level of internationalization of the journal does not seem to have really increased, but rather than USA universities' doctoral programs have become very influential.

Based on a sample of 1,230 accounting researchers, Ballas and Theoharakis (2003) examined how contextual factors such as the author location and research orientation influenced their perceptions of the quality of accounting journals, as well as their readership patterns. Their findings suggest that the perceptions of the quality of accounting journals is significantly different between researchers located in North America when compared to those located in Europe. Ballas and Theoharakis (2003, p. 636) note that Accounting, Organizations and Society "is more favorably perceived by Europeans and Australians/New Zealanders", and that Europeans "have a less favorable view" of The Accounting Review, the Journal of Accounting Research and the Journal of Accounting and Economics. Moreover, they also suggest that North America and Europe appear to act as poles of influence, with Asian researchers ranking journals in a fashion similar to North Americans, and Australian/New Zealand researchers being more in agreement with Europeans.

Empirical literature on co-authorship in accounting research is also relatively scarce. Earlier studies, such as Carnegie and Potter (2000), have been restricted to identifying the incidence of co-authorship. More recent research offers more sophisticated analyses of the topic (Andrikopoulos et al., 2016; Andrikopoulos and Kostaris, 2017; Endenich and Trapp, 2016; Englebrecht et al., 2008; Fleischman and Schuele, 2009; Tucker et al., 2016).

Based on the analysis of 12 top accounting and non-accounting journals for the period 1979-2004, Englebrecht et al. (2008) studied co-authorship practices of academic accountants. They found a significant growth in collaboration and a greater level of co-authorship in top non-accounting journals when compared to accounting journals. Regarding accounting journals, the co-authorship ratio as increased from 43.35% to 75.74% in 2004. Among the accounting journals also considered in our study, The Accounting Review (76.9%), The Journal of Accounting and Economics (91.3%) and the Journal of Accounting Research (100%) were the journals presenting the highest co-authorship ratios. Accounting, Organizations and Society (67.74%) and the Journal of Business, Finance and Accounting (79.07%) presented relatively low levels of co-authorship. They also found that trends of co-authorship between USA accounting academics do not differ significantly from those of their international counterparts.

Based on a sample of of 2,593 papers published in 12 auditing and accounting journals during the period 1997-2014, Andrikopoulos et al. (2016) examined international collaboration between auditing academics. They found that collaboration between researchers affiliated with institutions from different countries has increased over the period. However, they also found that the largest representation of USA affiliations pertained to USA journals, and that USA academics are not prone to collaborate with colleagues from other countries (as evidenced by only 8.83 percent of the articles being the product of a collaboration between USA and non-USA institutions).

Andrikopoulos and Kostaris (2017) examined co-authorship in five accounting journals (five from North America and one from Europe) in the period 1985 and 2014. They found an increase in co-authorship over the period under examination. They also found that USA based institutions are responsible for 78.37 percent of published research in these journals. Endenich and Trapp (2016) examined 7,105 papers

published in 15 accounting journals from North America, Europe, and Australia and New Zealand, and found that the involvement of researchers from Asian countries in international cooperation is higher than that of researchers from the majority of European countries and the USA.

Fleischman and Schuele (2009) conducted an examination of co-authorship patterns in three international specialist accounting history journals and surveyed scholars from around the world (ranging from members of the Academy of Accounting Historians to accounting scholars known by the authors to be interested in accounting history). They found an increase in co-authorship in accounting history journal as well as in the cross-border collaboration in the field. Notwithstanding, the USA and a number of European countries (namely Italy and Spain) are still considered as provincial in comparison to the UK, Australia and New Zealand.

Tucker et al. (2016) conducted face-to-face, telephone, Skype and email interviews with 76 researchers affiliated with 67 universities in the USA, UK, Europe and Australasia, who have published in 2011 papers in seven accounting journals. Their findings suggest that motivations for co-authorship are related to productivity and social considerations, as well as to evaluations of benefits and costs in co-authoring.

From the above, there are reasons to expect that North American journals and European /Oceanian journals will present different patterns of geographical location of the authors and of internationalization of multi-authored research. Based on the literature reviewed, one would expect that North American journals would be more concentrated on publishing authors affiliated with North American institutions than their counterparts, which are more likely to present higher levels of diversity in publishing patterns.

We will analyse these aspects while offering what we think it is the most detailed analysis of authorship in accounting journals offered thus far. The analysis

provided in this paper is based on a relatively comprehensive set of accounting journals. It focuses on four different types of authorship, presented in the introductory section, based on the country of the institution with which the authors are affiliated. Based on the classifications of solo and multiple authorships, an analysis of the levels of internationalization is carried out for each of these categories. A network analysis is also performed for the international authorship. As far as we are aware, this is the first study examining patterns of solo and multiple authorship, levels of internationalization and types of network in accounting research in such a detailed manner.

3. Research design

The empirical study relies on the papers published between 2013 and 2017 in 18 accounting top journals. In order to ensure that we analyze the journals that are arguably considered as top journals, we have selected the journals that are included simultaneously in the ISI Web of Science (WoS), the Scopus, and the Association of Business Schools (ABS) rankings, excluding the lower group (Q4 in the WoS and Scopus rankings and 1 in the ABS ranking). We select the accounting journals included in the following categories: WoS (Business, Finance), ABS (Accounting), and Scopus (Business: Finance, Business, Management and Accounting: accounting).

Table 1 presents the journals included in the analysis and the countries to which they are associated. The country was assessed considering the link between the journal and a specific university/institution and the composition/affiliation of their editors, basically because these two factors determine the mindset followed by each journal. About 45%, 28% and 17% of the journals are associated to North American, European and Australian and/or New Zealand universities or institutions. A small number of journals have a more broad composition of editors (such as AOS, that has

5 editors from Europe, 4 from USA, 2 from Australia and 1 from Singapore, and the CPA, that has 2 editors from Canada and 1 from UK) or are associated with international organizations (such as JIFMA). Due to these characteristics we considered these journals as international.

Almost all the journals with a better ranking (Q1 in the WoS and Scopus and 4* or 4 in the ABS) are associated to North American universities or institutions and they are mainly focused on quantitative research in accounting. The only exception is AOS, which has an international nature and is more focused on qualitative research. Among the other journals, the research is basically quantitative, with an exception for AAAJ, CPA and MAR. Some of these journals (such as Abacus, A&F, and JBFA) publish papers focused not only in accounting but also in finance.

We manually collected the papers published in each one of the 18 journals under analysis totalling 3,262 papers. Table 1 presents the number of papers collected by journal. The journals with a better ranking (Q1 in the WoS and Scopus and 4* or 4 in the ABS) represent about 42% of the papers used in the empirical analysis.

Table 1. Journals and papers used in the analysis

Journals		Country	WoS	ABS	Scopus	Number of papers
AOS	Accounting, Organizations and Society	International	Q1	4*	Q1	195
JAE	Journal of Accounting and Economics	North America	Q1	4*	Q1	185
JAR	Journal of Accounting Research	North America	Q1	4*	Q1	155
AR	The Accounting Review	North America	Q1	4*	Q1	363
CAR	Contemporary Accounting Research	North America	Q1	4	Q1	275
RAS	Review of Accounting Studies	North America	Q1	4	Q1	197
AAAJ	Accounting, Auditing and Accountability Journal	Australia/New Zealand	Q1	3	Q1	271
BAR	British Accounting Review	Europe	Q1	3	Q2	138
EAR	European Accounting Review	Europe	Q1	3	Q1	139
MAR	Management Accounting Research	Europe	Q1	3	Q1	102
ABACUS	Abacus	Australia/New Zealand	Q2	3	Q3	112
AH	Accounting Horizons	North America	Q2	3	Q2	136
CPA	Critical Perspectives on Accounting	International	Q2	3	Q1	234
JAPP	Journal of Accounting and Public Policy	North America	Q2	3	Q1	132
JBFA	Journal of Business Finance and Accounting	Europe	Q2	3	Q1	222
A&F	Accounting & Finance	Australia/New Zealand	Q2	2	Q2	227
ABR	Accounting and Business Research	Europe	Q3	3	Q2	133
JIFMA	Journal of International Financial Management and Accounting	International	Q3	2	Q3	46
						3,262

We started by classifying each one of the papers, based on the type of authorship, in the following categories: Solo (with only one author), Homogeneous Multiple (with more than one author, but all from the same university), Heterogeneous National (with authors from different universities, but all from the same country) and Heterogeneous International (with authors from universities belonging to different countries). To ensure the accuracy and quality of this classification, we created rules of inspection (e.g., Heterogeneous international papers should contain more than one country).

Then, we compute the percentage of papers of each of these categories that were published in each journal in order to compare the type of authorship featuring each of the journals. We analyze the similarity and dissimilarity of the journals by performing a cluster analysis based on the proportions of authorship types aforementioned (solo, homogeneous multiple, heterogeneous national, and heterogeneous international).

Since cluster analysis is a multivariate unsupervised classification method it ensures that no predefined classes are applied. Generally speaking, clustering analysis can be formulated as a multivariate optimization problem that attempts to identify structures within the data, grouping similar data observations (Tryon, 1939; Cattell, 1943; Ward, 1963). As the term cluster analysis is not used to define one specific algorithm but can be achieved by various methods with different underlying assumptions, we first adopted the R package NbClust (Charrad et al., 2014) comparing 30 different algorithms for determining the optional number of clusters. Moreover, a validation of consistency within clusters of data can be obtained by silhouette plots and dendrograms. The silhouette technique provides a measure of cohesion versus separation for each data point (here each journal) (Rousseeuw, 1987). Dendrograms illustrate the arrangement of clusters and sub-clusters produced by hierarchical clustering. Specifically, to our research, it shows how similar a journal is in the vector space to its own cluster (cohesion) compared to other clusters of

journals (separation). Dendrograms and silhouette plots were generated using the R package factoextra (Kassambara & Mundt, 2017), adopting Ward's method (Ward, 1963) as a criterion to form clusters that minimizes the total within-cluster variance.

As a second step, to explore the level of internationalization of the accounting top journal, we analyze separately each one of 4 categories of papers. Regarding the categories Solo, Homogeneous Multiple and Heterogeneous National, we compute the number of papers published in each journal separately for each country based on the authors' affiliation. Considering the percentage of papers from each country, we perform cluster analysis, following the same procedures and algorithms aforementioned (Ward, 1963). Hence, we seek to identify the most similar pairs of journals for each type of authorship.

In addition, for the category Heterogeneous International, we conducted social network analysis (SNA) to further understand the patterns of geographical co-authorships, the influence (centrality) and diversity of countries in each journal, as well as the density of links between countries. Social network data consists of measurements on a variety of relations for one or more sets of actors (nodes) and the relationships between actors (lines, ties or edges) (Wasserman & Faust, 2009). For each journal, we created a matrix of all countries involved in the co-authorship, counting the occurrences in which countries (actors) that were connected. The SNA and graphs were conducted using the R packages sna and statnet (Butts, 2008; Butts, 2016; Handcock et al., 2008).

Furthermore, we have implemented the Google's PageRank (PR) algorithm to rank countries in each journal social network. Originally, the Google PR method was created by Lawrence (Larry) Page (Brin & Page, 1998) to measure the importance of website pages in the Internet space. Here the PR method considers each country (node), in terms of its influence in the journal network, both in terms of its numerical occurrence, as well as the linkage to other countries (for an example of use of PR in co-citation networks, see Ding et al., 2010). In that sense, it conveys the probability

that a publication in a given journal would include an international partnership with an author of a given country. Hence, conveniently, it allows us to identify which countries are playing the publication game and in each of the sampled accounting journals.

Finally, we repeated the same procedures to create clusters based on the ranks provided by the PR algorithm. That final step, via cluster analysis, allows us to identify how similar different journals outlets are in terms of international collaboration.

4. Results

4.1. General analysis based on the type of authorship

Table 2 presents the percentage of papers of each one of the authorship categories (Solo, Homogeneous Multiple, Heterogeneous National and Heterogeneous International) that were published in each journal.

In all the journals (except CPA), the percentage of papers with authors from different universities (Heterogeneous National and Heterogeneous International) is higher, when compared to the papers with a single author or with different authors from the same university (Solo and Homogeneous Multiple).

However, in about half of the journals (AAAJ, ABR, AOS, CPA, EAR, JIFMA, MAR and RAS) the percentage of papers with authors from different countries (Heterogeneous International) is higher than the percentage of papers with authors from different universities in the same country (Heterogeneous National). First, half of these 8 journals publish mainly qualitative research. In most of these journals qualitative research is essentially done using international networks (AOS: 35%; MAR: 35%; AAAJ: 30%). In CPA, since the qualitative research published is more introspective, research is done basically with only one author (Solo: 37%). In the EAR and JIFMA research is more quantitative, with authors from different countries, which reveals how international are these journals.

Table 2. Papers distribution based on the type of authorship

Journals	Solo		Homo Multiple		Hetero National		Hetero International		Total
	N	%	N	%	N	%	N	%	
AF	42	19	62	27	77	34	46	20	227
AAAJ	50	18	61	23	79	29	81	30	271
ABACUS	27	24	18	16	35	31	32	29	112
ABR	38	29	23	17	35	26	37	28	133
AH	13	10	18	13	81	60	24	18	136
AOS	48	25	28	14	50	26	69	35	195
AR	58	16	40	11	160	44	105	29	363
BAR	27	20	19	14	47	34	45	33	138
CAR	39	14	23	8	125	45	88	32	275
CPA	87	37	37	16	50	21	60	26	234
EAR	23	17	30	22	34	25	52	37	139
JAE	31	17	25	14	83	45	46	25	185
JAPP	21	16	14	11	49	37	48	36	132
JAR	23	15	18	12	72	46	42	27	155
JBFA	29	13	32	14	86	39	75	34	222
JIFMA	2	4	6	13	13	28	25	54	46
MAR	20	20	19	19	27	26	36	35	102
RAS	34	17	18	9	71	36	74	38	197
Total	**612**	**19**	**491**	**15**	**1174**	**36**	**985**	**30**	**3,262**

Figure 1 presents the cluster and the silhouette plots regarding the journals classification based on the type of authorship. In this analysis, three clusters were identified. JIFMA is represented in isolation, significantly different than the other journals in our sample. A second cluster includes the following eight journals: AH, AR, CAR, JAE, JAPP, JAR, JBFA, and RAS. Lastly, a third cluster combines the following nine journals: A&F, AAAJ, Abacus, ABR, AOS, BAR, CPA, EAR, and MAR.

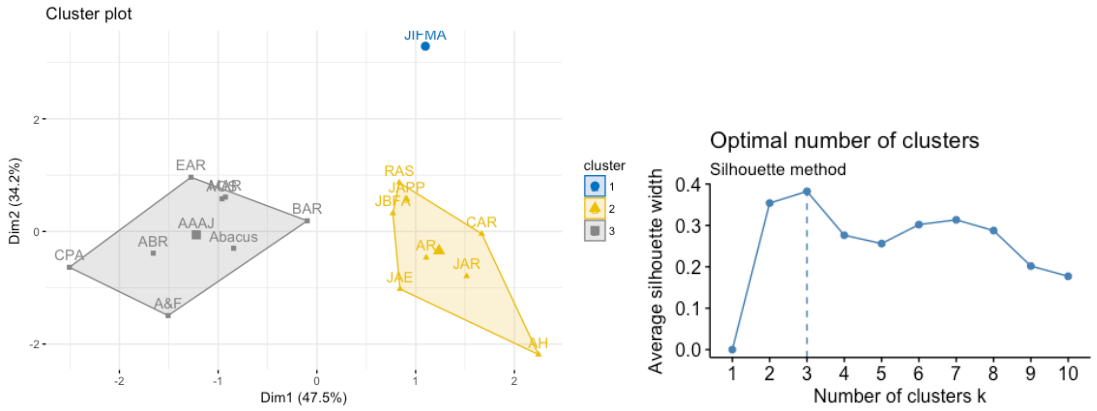


Figure 1. Journals classification based on the type of authorship (cluster and silhouette plots)

Figure 2 presents the dendrogram obtained in the cluster analysis, corroborating with the three clusters presented and portraying the hierarchy of the distance or the (dis)similarity between the observed journals in terms of authorship patterns.

One of the clusters identified in the dendrogram includes all the journals associated to North American Universities or Institutions plus the JBFA, which has a European nature but whose papers are mainly quantitative and in line with those published in the American journals. However, within this cluster, one can identify slight differences in the pattern of authorship between, on the one hand, the CAR, JAE, AR and JAR, and, on the other hand, the JBFA, JAPP and RAS. The AH is the last journal to fuse into this group.

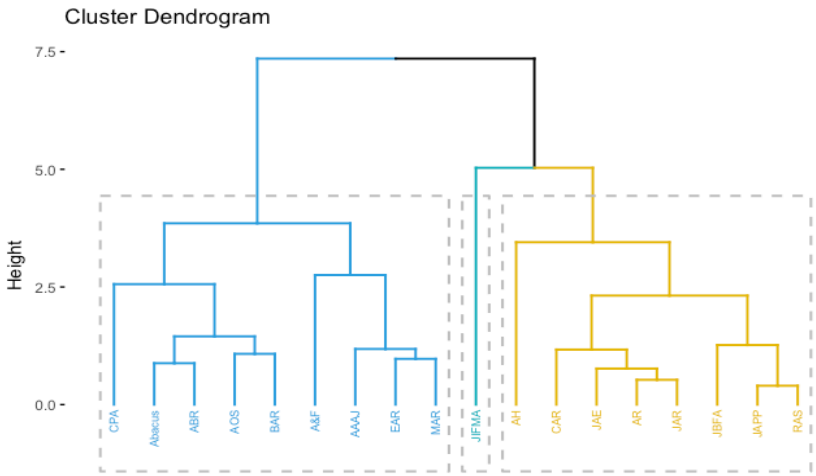


Figure 2. Journals classification based on the type of authorship (cluster dendrogram)

The JIFMA is represented in isolation, suggesting that this journal is significantly different than the other journals in our sample, which is not surprising given the strong international focus of this journal. A third cluster includes journals associated to Universities of Institutions from Europe and from Australia/New Zealand, as well as the AOS and the CPA, which are associated mainly to Universities from both North American and European countries.

Finally, Table 3 presents the percentage of papers of each one of the authorship categories (Solo, Homogeneous Multiple, Heterogeneous National and Heterogeneous International) separately for each one the three clusters that were identified.

Table 3. Papers distribution based on the type of authorship per cluster

Clusters	Solo		Homo Multiple		Hetero National		Hetero International		Total
	N	%	N	%	N	%	N	%	
North American + JBFA	248	15	188	11	727	44	502	30	1,665
JIFMA	2	4	6	13	13	28	25	54	46
Other Non North American	362	23	297	19	434	28	458	30	1,551
Total	612	19	491	15	1,174	36	985	30	3,262

In the North American plus JBFA group, there is a predominance of papers prepared by authors from different universities, but mainly universities from the same country (national networks). In the JIFMA, most papers are from authors affiliated in different countries (international networks). In the other Non North American journals there is a higher distribution of the papers by the different categories of authorship, despite predominating the international networks.

4.2. Solo papers: analysis based on the authors' country of affiliation

Table 4 presents the percentage of Solo papers prepared by authors from each country that were published in each journal. The category "other" was used to report those situations in which we found the publication of only one paper per country.

In the majority of the North American journals, the percentage of papers whose author is affiliated to a North American university is higher than 80% and range between 83,9%, in the JAE, to 100% in the AH. The exceptions are the JAPP and the RAS, where this percentage is lower (about 60%). Also, in this group of journals, only four non North American countries (China, Netherlands, Switzerland and UK) are represented with more than one paper.

In the other journals, there is a greater distribution of the authors by country, although in the majority of the journals there is a predominance of the following Anglo-Saxon countries: USA, Canada, UK and Australia. The percentage of papers whose author is affiliated to a university from one of these four countries range between 68,7%, in the AOS, and 80%, in the AAAJ. The exceptions are the EAR and the MAR, where there is a higher dispersion of the papers by country. Indeed, in these two journals the percentage of countries with only one representation is about 45%.

Table 4. Solo papers distribution based on the authors' country of affiliation

A&F		AAAJ		Abacus		ABR		AH		AOS	
Australia	0,548	UK	0,400	Australia	0,333	UK	0,474	USA	0,846	USA	0,250
USA	0,167	Australia	0,280	USA	0,222	USA	0,237	Canada	0,154	UK	0,229
China	0,048	Canada	0,080	UK	0,185	Germany	0,079	Other	0,000	Australia	0,104
Spain	0,048	Finland	0,060	Germany	0,111	Netherland	0,079			Canada	0,104
NZ	0,048	USA	0,040	Other	0,148	Other	0,132			Austria	0,042
Other	0,143	Other	0,140							Denmark	0,042
										Finland	0,042
										Italy	0,042
										Ireland	0,042
										Other	0,104

AR		BAR		CAR		CPA		EAR		JAE	
USA	0,844	UK	0,630	USA	0,692	UK	0,345	Canada	0,130	USA	0,839
Netherlands	0,034	Australia	0,148	Canada	0,179	Australia	0,195	Austria	0,087	UK	0,097
Other	0,121	Germany	0,074	China	0,077	USA	0,126	Finland	0,087	Other	0,065
		Other	0,148	Other	0,051	Canada	0,115	France	0,087		
						France	0,046	Germany	0,087		
						Finland	0,034	UK	0,087		
						Denmark	0,023	Other	0,435		
						Italy	0,023				
						Germany	0,023				
						Sweden	0,023				
						Other	0,057				

JAPP		JAR		JBFA		JIFMA		MAR		RAS	
USA	0,619	USA	0,913	USA	0,448	Other	1,000	UK	0,250	USA	0,618
China	0,095	Other	0,087	UK	0,172			Austria	0,100	China	0,088
Switzerland	0,095			China	0,103			Australia	0,100	UK	0,088
Other	0,191			Other	0,276			Netherlands	0,100	Canada	0,059
								Other	0,450	Other	0,147

Figure 3 presents the dendrogram obtained in the cluster analysis regarding the country of affiliation of the Solo papers authors.

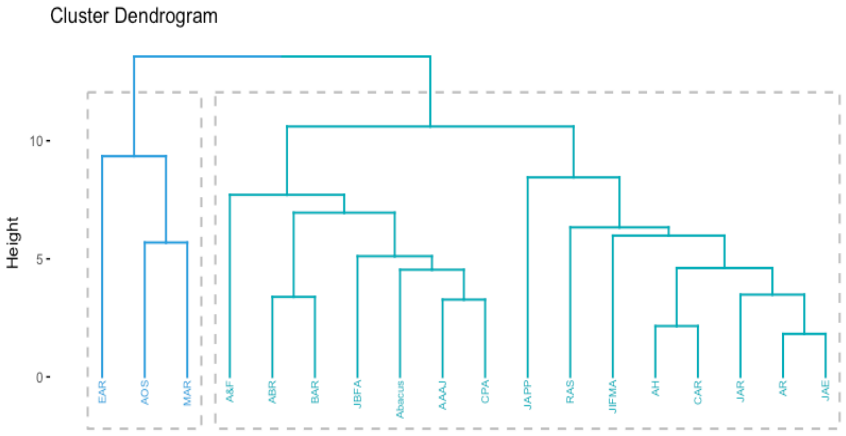


Figure 3. Journals classification based on the country of affiliation of the Solo papers authors (cluster dendrogram)

In this analysis, two clusters were identified as: the EAR, AOS and MAR; and the Other Journals. However, within this last broad cluster, one can identify slight differences in the countries of the authors' affiliation between, on the one hand, the North American journals plus the JIFMA, and, on the other hand, the Other Non American journals. It is important to note that despite the identification of 2 clusters, the largest cluster is further separated in two subgroups, as shown in Figure 3.

Table 5 presents the percentage of Solo papers prepared by authors from each country that were published for each of the two clusters that were identified.

In the EAR, AOS and MAR group, there is a higher dispersion of the papers by country, when compared to the other group of journals.

Table 5. Solo papers distribution based on the authors' country of affiliation per cluster

EAR, AOS and MAR		Other Journals	
UK	0.189	USA	0.474
USA	0.114	UK	0.165
Canada	0.095	Australia	0.111
Australia	0.083	Germany	0.061
Austria	0.076	Canada	0.045
Finland	0.060	China	0.033
France	0.053	Netherlands	0.017
Germany	0.053	Finland	0.010
Netherlands	0.048	New Zealand	0.010
Italy	0.045	France	0.010
Japan	0.031	Singapore	0.008
Denmark	0.031	Switzerland	0.007
Ireland	0.031	Sweden	0.007
Spain	0.021	Spain	0.006
China	0.014	South Korea	0.004
Israel	0.014	Denmark	0.003
Norway	0.014	Japan	0.003
Others	0.028	Italy	0.003
		Austria	0.003
		Israel	0.002
		Others	0.017

4.3. Homogeneous Multiple papers: analysis based on the authors' country of affiliation

Table 6 presents the percentage of Homogeneous Multiple papers prepared by authors from each country that were published in each journal.

The findings regarding the Homogenous Multiple papers published in the North American journals are similar to those of the Solo papers, ie, there is a predominance of papers whose authors are affiliated to a North American university. There are also a small number of non North American countries (Australia, China, Germany, Netherlands, Spain and UK) represented with more than one paper in the North American journals.

Table 6. Homogeneous Multiple papers distribution based on the authors' country of affiliation

A&F		AAAJ		Abacus		ABR		AH		AOS	
Australia	0,613	Australia	0,246	Australia	0,444	UK	0,261	USA	0,889	USA	0,357
NZ	0,129	UK	0,197	UK	0,167	Australia	0,174	Other	0,111	Australia	0,143
USA	0,081	Italy	0,098	Germany	0,111	Germany	0,087			UK	0,143
Canada	0,032	Canada	0,082	Other	0,278	Netherland	0,087			Netherlands	0,107
China	0,032	France	0,066			Sweden	0,087			Canada	0,071
Netherlands	0,032	Finland	0,049			Other	0,304			Ireland	0,071
Spain	0,032	Netherlands	0,049							Other	0,107
Other	0,048	NZ	0,049								
		Spain	0,033								
		Sweden	0,033								
		Other	0,098								

AR		BAR		CAR		CPA		EAR		JAE	
USA	0,800	UK	0,211	USA	0,565	UK	0,270	Germany	0,367	USA	0,960
Australia	0,100	Australia	0,158	Australia	0,087	Australia	0,243	Canada	0,100	Other	0,040
Canada	0,050	Canada	0,105	China	0,087	Canada	0,081	Sweden	0,100		
Other	0,050	Greece	0,105	Netherlands	0,087	Finland	0,054	Austria	0,067		
		Sweden	0,105	Germany	0,087	France	0,054	UK	0,067		
		Other	0,316	Other	0,087	Italy	0,054	USA	0,067		
						NZ	0,054	Other	0,233		
						Other	0,189				

JAPP		JAR		JBFA		JIFMA		MAR		RAS	
USA	0,500	USA	0,722	Australia	0,188	Other	1,000	Germany	0,211	USA	0,778
Spain	0,143	Netherlands	0,111	USA	0,188			Denmark	0,105	Other	0,222
UK	0,143	Other	0,167	UK	0,156			Finland	0,105		
Other	0,214			Spain	0,125			France	0,105		
				Belgium	0,063			Netherlands	0,105		
				China	0,063			Sweden	0,105		
				France	0,063			Other	0,263		
				Other	0,156						

Regarding the other journals, there is also a greater distribution of the authors by country, although in the majority of the journals authors from Anglo-Saxon countries (mainly Australia and UK) prepare most of the papers. The exceptions are, for one hand, the EAR and MAR, where most of the papers are from authors affiliated to universities from Non Anglo Saxon European countries, with a strong

predominance of Germany, and, for the other hand, the AOS and the JBFA, where the USA authors have the most significant contribution.

Once again, we have repeated our procedure to identify the optimal number of clusters to represent the data. Two clusters were identified and confirmed by silhouette plot. Figure 4 presents the dendrogram regarding the country of affiliation of the Homogeneous Multiple papers authors.

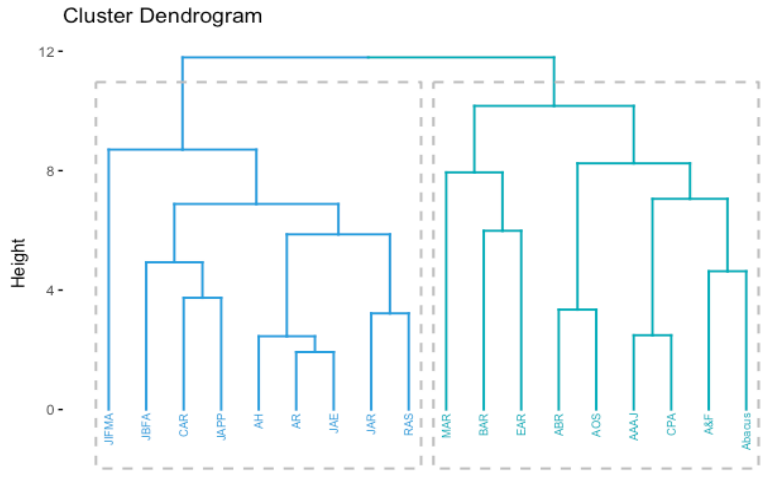


Figure 4. Journals classification based on the country of affiliation of the Homogeneous Multiple papers authors (cluster dendrogram)

In this analysis, two clusters were identified: the North American journals plus the JBFA and the JIFMA, and the Other Non American Journals. However, within the group of Other Non American Journals, one can identify slight differences in the pattern of authorship of the MAR, BAR and EAR, which are the last journals to fuse into this group.

Table 7 presents the percentage of Homogeneous Multiple papers prepared by authors from each country that were published in each journal separately for each one the two clusters that were identified.

Table 7. Homogeneous Multiple papers distribution based on the authors' country of affiliation per cluster

North American Jounals, JBFA and JIFMA		Other Non American journals	
USA	0.619	Australia	0.230
Australia	0.080	UK	0.148
Spain	0.048	Germany	0.095
UK	0.043	USA	0.064
Netherlands	0.031	Canada	0.063
China	0.027	Sweden	0.057
Belgium	0.025	Netherlands	0.055
Canada	0.024	Italy	0.033
Germany	0.019	New Zealand	0.032
Israel	0.016	Denmark	0.026
Austria	0.010	France	0.025
France	0.007	Greece	0.021
Finland	0.006	Finland	0.020
New Zealand	0.003	Finland	0.020
Others	0.041	Spain	0.019
		Austria	0.015
		China	0.015
		Ireland	0.015
		Belgium	0.008
		Others	0.039

In the North American plus JBFA and JIFMA group, most of the papers are prepared by authors from a USA University (61.9%). In the group of Other Non North American journals, there is a higher dispersion of the papers by country. The highest representations are from Australia (23.0%), UK (14.8%), Germany (9.5%), USA (6,4%), and Canada (6.3%), which together represent 60% of published papers.

However, despite the higher dispersion of papers by country in the group of Other Non North American journals, most of the papers are prepared by authors from an Anglo-Saxon country. The remaining papers are almost all prepared by authors form European countries, being of note the role of Germany.

4.4. Heterogeneous National papers: analysis based on the authors' country of affiliation

Table 8 presents the percentage of Heterogeneous National papers prepared by authors from each country that were published in each journal.

Table 8. Heterogeneous National papers distribution by country of affiliation

A&F		AAAJ		Abacus		ABR		AH		AOS	
Australia	0,558	UK	0,367	Australia	0,457	UK	0,457	USA	0,901	USA	0,640
USA	0,143	Australia	0,266	USA	0,171	Germany	0,086	China	0,025	UK	0,180
China	0,052	Finland	0,051	UK	0,143	USA	0,086	Taiwan	0,025	Germany	0,080
NZ	0,052	Ireland	0,051	China	0,143	Australia	0,057	Other	0,049	France	0,040
Israel	0,039	NZ	0,051	Other	0,086	Finland	0,057			Other	0,060
Spain	0,039	Canada	0,038			Netherlands	0,057				
Taiwan	0,039	Italy	0,038			Other	0,200				
Korea	0,026	Sweden	0,038								
Other	0,052	Denmark	0,033								
		France	0,025								
		South Africa	0,025								
		Other	0,025								

AR		BAR		CAR		CPA		EAR		JAE	
USA	0,956	UK	0,553	USA	0,864	UK	0,500	Germany	0,324	USA	0,928
Canada	0,013	Australia	0,149	Canada	0,032	Canada	0,180	USA	0,176	UK	0,024
China	0,013	USA	0,085	Australia	0,024	Australia	0,060	Australia	0,088	Other	0,048
Other	0,019	Italy	0,043	China	0,016	Finland	0,060	Netherlands	0,088		
		NZ	0,043	Netherlands	0,016	Germany	0,040	Taiwan	0,059		
		Other	0,128	Singapore	0,016	Italy	0,040	UK	0,059		
				UK	0,016	USA	0,040	Other	0,206		
				Other	0,016	Other	0,080				

JAPP		JAR		JBFA		JIFMA		MAR		RAS	
USA	0,714	USA	0,986	USA	0,453	China	0,385	USA	0,186	USA	0,887
China	0,122	Other	0,014	UK	0,116	USA	0,231	Netherlands	0,148	Australia	0,028
Germany	0,061			Australia	0,093	Other	0,385	Belgium	0,111	Other	0,085
Other	0,102			Germany	0,093			Sweden	0,111		
				China	0,081			Australia	0,074		
				Spain	0,047			Finland	0,074		
				Taiwan	0,047			Germany	0,074		
				Canada	0,023			UK	0,074		
				France	0,023			Other	0,148		
				Other	0,023						

The findings regarding the Heterogeneous National papers published in the North American journals are similar to those of the Solo and Homogeneous Multiple papers, ie, there is a predominance of papers whose authors are affiliated to a North American university. There are also a small number of non North American countries (Australia, China, Germany, Netherlands, Singapore, Taiwan and UK) represented with more than one paper in the North American journals.

The findings regarding the Heterogeneous National papers published in the Non North American journals are also similar to those of the Solo and Homogeneous Multiple in so far as there is a greater distribution of the authors by country, when compared to the North American journals. Also, in the majority of the journals, authors from Anglo-Saxon countries (mainly Australia and UK) prepare most of the papers.

However, in the specific case of the Heterogeneous National papers, the authors affiliated to a USA university have a much more active participation in the Non North American journals, especially in the AOS (64%), JBFA (45.3%) and MAR (18.6%), where they are the predominant authors. In the EAR, the authors from the USA, together with the authors from Germany, represent half of the published papers.

Repeating our procedures, we have identified the optimal number of clusters. This time four clusters were identified and confirmed using silhouette plot. Figure 5 presents the dendrogram regarding the country of affiliation of the Heterogeneous National papers authors, conveying these four clusters.

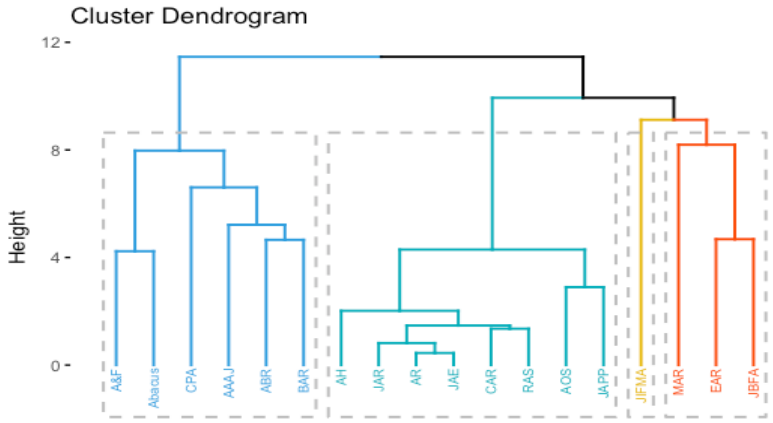


Figure 5. Journals classification based on the country of affiliation of the Heterogeneous National papers authors (cluster dendrogram)

Considering the papers written by authors from different institutions within the same nation (Heterogeneous National), our cluster analysis yielded 4 distinct clusters: the North American journals plus the AOS; the MAR, EAR and JBFA; the JIFMA; and the Other Non North American journals (A&F, Abacus, CPA, AAAJ, ABR, and BAR).

The AOS is now added to the group of North American journals. This finding is not surprising given that most of the papers published in this journal are prepared by authors affiliated to USA universities, which is also the pattern found in the North American journals. The group composed by the MAR, EAR and JBFA also have in common the strong participation of the authors affiliated to USA universities, in addition to authors from a wide range of other countries.

Table 9 presents the percentage of Heterogeneous National papers prepared by authors from each country that were published in each journal separately for each one the four clusters that were identified.

Table 9. Heterogeneous National papers distribution based on the authors' country of affiliation per cluster

Other Non American journals		North American journals plus AOS		JIFMA		MAR, EAR, JBFA	
UK	0.339	USA	0.860	China	0.385	USA	0.272
Australia	0.258	UK	0.033	USA	0.231	Germany	0.164
USA	0.088	China	0.025	Germany	0.077	Australia	0.085
Canada	0.048	Germany	0.021	Netherlands	0.077	UK	0.083
New Zealand	0.037	Australia	0.015	South Korea	0.077	Netherlands	0.079
China	0.035	Canada	0.011	Taiwan	0.077	China	0.037
Finland	0.028	France	0.009	Others	0.077	Taiwan	0.035
Germany	0.021	Taiwan	0.006			France	0.030
Italy	0.020	Netherlands	0.005			Spain	0.025
Ireland	0.017	Italy	0.003			Finland	0.025
Spain	0.017	New Zealand	0.003			Canada	0.020
Japan	0.010	Spain	0.002			Italy	0.012
Netherlands	0.010	South Korea	0.002			South Korea	0.010
France	0.008	Finland	0.002			Japan	0.004
Taiwan	0.006	Others	0.004			Others	0.120
South Korea	0.004						
Taiwan	0.004						
Others	0.052						

In the North American plus AOS group, almost of the papers are prepared by authors from a USA University (86%). In the group consisting of MAR, EAR and JBFA, the predominant authors are those affiliated to a USA university, although they do not have a dominant position. In the group of Other Non American journals, the predominant authors are those affiliated to a university from an Anglo Saxon country, but the authors from the UK and Australia have a predominant role

4.5. Heterogeneous International: network analysis

We conducted social network analysis to understand the patterns of geographical co-authorships, the influence (centrality) and diversity of countries in each journal, as well as the density of links between countries. Table 10 conveys a measure of degree centrality, network density and mean distance for each journal.

Table 10. Social Network Metrics by journal

Journals	Degree Centrality	Network Density	Mean Distance
A&F	0.623	0.19	2.276
AAAJ	0.633	0.195	2.287
Abacus	0.352	0.1	1.897
ABR	0.459	0.142	2.15
AH	0.357	0.103	2.061
AOS	0.382	0.103	2.063
AR	0.623	0.185	2.268
BAR	0.670	0.219	2.362
CAR	0.704	0.256	2.645
CPA	0.638	0.211	2.359
EAR	0.407	0.119	2.095
JAE	0.577	0.16	2.248
JAPP	0.455	0.127	2.105
JAR	0.588	0.176	2.251
JBFA	0.462	0.143	2.21
JIFMA	0.282	0.089	1.779
MAR	0.515	0.157	2.238
RAS	0.492	0.152	2.22

Table 10 reveals that journals such as CAR, BAR, CPA, AAAJ, A&F, AR, JAR, JAE, as denoted by the measures of degree centrality and mean distance, have a concentration of international co-authorship publication in fewer countries. On the other hand, journals such as JIFMA, Abacus, AH, AOS, EAR are less dependent on fewer countries. However, that information should be further explored also in terms of the density of the network, as centrality should be co-analyzed in terms of the density of relationships. Hence, Figure 6 represents the plot of density by centrality for all journals. For the sake of completeness, the red label conveys the two clusters that we further identified and elaborated on it in subsequent analysis.

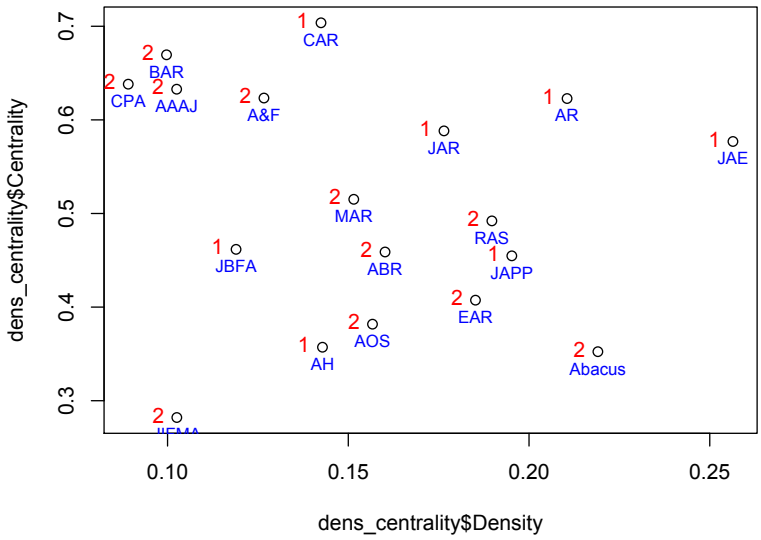


Figure 6. Density by Centrality Plot

Taking in account the results of both measures (network centrality and density), as illustrated on Figure 6, we showcase 4 exemplars on Figure 7. BAR is an example of a network with high centrality, but low density. It conveys a journal in which a small group of countries have high influence on the international co-authorship, however with a low volume of links across the network. In contrast, JAE, also presents high centrality, or in other words, influence of a small number of countries in international co-authorships, but the countries are highly interconnected. In order words, to be part of this publication game, the chance will increase if there is a connection with an author from the USA, China, Singapore, Canada, Australia, UK or Israel. On the other spectrum, JIFMA and Abacus have a low centrality, which means the influence of a given country is smaller and more diffuse in the international co-authorships. The links are yet restricted to more dense and smaller set of countries for Abacus, whereas JIFMA shows a surprisingly diverse array of countries represented. Not only JIFMA seems to be an outlier in other measures, as previously described, but seem to be more inclusive and international.

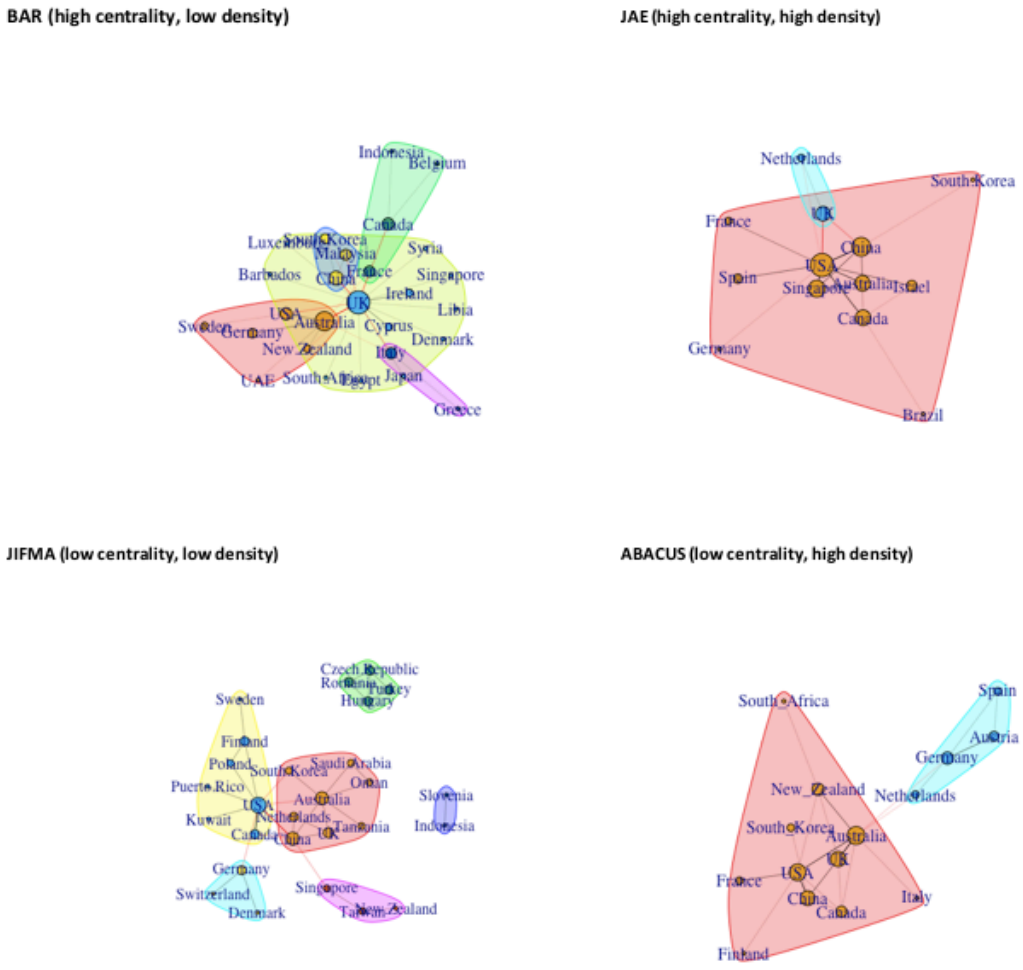


Figure 7. Centrality and Density Exemplars

In appendix, we provide the social network diagrams for each of the 18 journals. Similarly to the diagrams represented in Figure 7, these network diagrams convey visually the influence of each country, the density of the network of international co-authorships, as well as the diversity of countries represented. The size of the circles and the strength of the lines are proportional and representative of the influence of that country and strength of connectivity between countries. This representation allows us to clearly perceive that journals such as JIFMA have diffuse participation between many countries, showing diverse lines intermingled, and that on the other hand journals such as AH is less diverse and strongly dependent on

links of Canada, China, South Korea and Taiwan with the USA. Furthermore, we could see a triangular (or quadrangular) co-authorship pattern between USA, China and Singapore (or USA, China and Canada) on JAE, RAS, JAR, JAPP, and CAR.

Lastly, we have implemented a Google's PageRank (PR) algorithm to rank countries in our social networks. The underlying assumption is that more important countries are likely to be linked with other countries. An advantage of the PR algorithm is that it outputs a probability distribution, as denoted on Table 11. Therefore, here we can represent the likelihood that an author from a given country randomly will be connected with an author of another country. In other words, it also conveys the probability that a publication in a given journal would include an international partnership with an author of a certain country. For example, if we take the AAAJ, the likelihood that an international partnership will include an author from the UK is of 23.8%. We provide, in Table 11, the seven most influential countries for each journal. This number ensures that we are representing countries with at least 5% of participation for all cases.

The findings presented in Table 11 show that in the North American journals, the countries with a higher likelihood of being included in an international partnership are mainly the USA, but also Canada, UK, Australia, and a set of Asian countries (China, Korea, Taiwan and Singapore).

In the Non North American journals, the countries with a higher likelihood of being included in an international partnership are mainly the Anglo-Saxon countries, but also some Non Anglo-Saxon European countries. In a few number of Non North American journals, there is also some likelihood of establishing international partnerships with authors from Asian countries (BAR, EAR, JBFA and JIFMA).

Table 11. Seven top ranked countries (PR) by journal

AAAJ		Abacus		ABR		A&F		AH		AOS	
UK	0.238	Australia	0.186	UK	0.198	Australia	0.251	USA	0.314	USA	0.141
Australia	0.138	USA	0.150	Australia	0.097	New Zealand	0.099	China	0.143	UK	0.115
USA	0.077	UK	0.106	Germany	0.081	USA	0.096	Canada	0.105	Australia	0.103
New Zealand	0.060	China	0.097	USA	0.080	China	0.072	South Korea	0.076	Canada	0.091
Italy	0.038	Germany	0.084	Italy	0.070	South Korea	0.040	Australia	0.074	Netherlands	0.073
Canada	0.035	New Zealand	0.070	Switzerland	0.058	Belgium	0.037	Taiwan	0.068	France	0.072
France	0.035	Austria	0.055	New Zealand	0.043	Finland	0.034	UK	0.042	Finland	0.034

AR		BAR		CAR		CPA		EAR		JAE	
USA	0.316	UK	0.322	USA	0.312	UK	0.253	USA	0.131	USA	0.343
China	0.135	Australia	0.140	Canada	0.106	Canada	0.073	UK	0.123	China	0.148
Canada	0.105	China	0.053	China	0.096	USA	0.073	Germany	0.068	Singapore	0.098
Singapore	0.091	Canada	0.050	Singapore	0.067	Australia	0.065	Australia	0.063	Canada	0.089
UK	0.048	USA	0.040	Australia	0.058	France	0.061	China	0.056	Australia	0.078
Australia	0.047	Italy	0.037	UK	0.046	Italy	0.047	France	0.054	UK	0.069
Germany	0.041	France	0.034	South Korea	0.031	New Zealand	0.042	Canada	0.046	Israel	0.039

JAPP		JAR		JBFA		JIFMA		MAR		RAS	
USA	0.218	USA	0.315	USA	0.169	USA	0.133	UK	0.221	USA	0.263
China	0.110	China	0.149	UK	0.143	Australia	0.075	USA	0.107	China	0.105
Canada	0.088	Canada	0.082	China	0.102	China	0.074	Australia	0.066	Canada	0.084
Singapore	0.071	Singapore	0.077	Canada	0.084	Germany	0.047	Germany	0.060	UK	0.078
UK	0.070	Australia	0.069	Australia	0.073	UK	0.043	France	0.056	Singapore	0.067
Netherlands	0.062	Germany	0.053	South Korea	0.042	Finland	0.041	Netherlands	0.053	France	0.046
France	0.047	UK	0.051	France	0.041	Turkey	0.037	Switzerland	0.044	Israel	0.041

Using the PR proportions, we followed our method to first identify the optimal number of clusters that best represent the data. We have obtained two clusters on our analysis, also in agreement with the silhouette plot. Figure 8 presents the dendrogram obtained in this cluster analysis using PR probabilities.

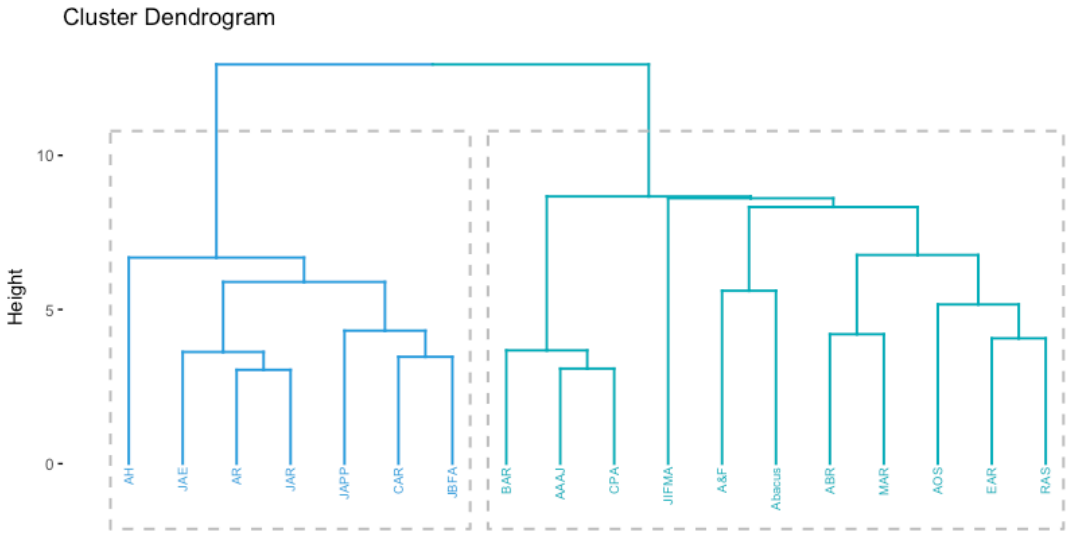


Figure 8. Cluster Dendrogram based on the PR probabilities (Heterogeneous International Classification)

The two clusters were identified as: the North American journals (excluding the RAS) plus the JBFA, and the Other Non American Journals (excluding the JBFA) plus the RAS.

Table 12 presents the top ranked countries (PR) separately for each one the two clusters that were identified.

5. Conclusion

The literature on the authorship diversity in accounting research is scarce. This study examines one particular aspect of diversity, that of the levels of internationalization of accounting journals pertaining to the publishing of authors from different countries.

This study analyses how internationalized are top accounting journals, exploring the concentration on publishing papers from particular countries and the relationship between the geographical distributions of authors in co-authorships. We do this by distinguishing solo authorship (one author) from multiple authorship (two or more authors), and, within this latter category, between homogeneous multiple authorship (all authors from the same university), heterogeneous national authorship

(authors from different universities, but all from the same country) and heterogeneous international authorship (authors from universities belonging to different countries). This allows us to examine also patterns of solo and multiple authorships. The analysis of the levels of internationalization is carried out for each of these categories of authorship.

Table 12. Top ranked countries (PR) by journal per cluster

North American journals (except RAS) plus JBFA		Non North American journals (except JBFA) plus RAS	
USA	0.284	UK	0.157
China	0.126	USA	0.117
Canada	0.094	Australia	0.110
UK	0.067	China	0.053
Australia	0.064	Canada	0.049
Singapore	0.061	Germany	0.045
South Korea	0.031	New Zealand	0.041
Netherlands	0.030	France	0.040
France	0.029	Netherlands	0.033
Germany	0.028	Italy	0.030
Taiwan	0.026	Finland	0.022
Israel	0.011	Switzerland	0.021
Switzerland	0.011	Singapore	0.020
Belgium	0.010	Austria	0.019
Italy	0.010	South Korea	0.014
Austria	0.008	Belgium	0.014
New Zealand	0.007	Taiwan	0.006
Finland	0.007	Israel	0.005
Turkey	0.002	Turkey	0.004
Others	0.094	Others	0.198

Based on a set of 3,262 papers published in 18 accounting top journals between 2013 and 2017, we perform cluster analysis, which suggests a classification of the papers distinguishing between two broad groups of journals: the North American journals, where there is a predominance of national networks and where most authors are affiliated to a North American journal, and the Non-North American

journals, where there is a predominance of international networks and a higher level of authors' international diversity. Regarding the heterogeneous international authorship, we perform a network analysis suggesting that researchers affiliated with North-American universities and their counterparts from European universities seem to ignore each other. Whereas the first have been publishing mainly with co-authors affiliated with universities from Asia, the latter have been publishing articles with one another.

References

Andrikopoulos, A., Bekiaris, M., Vadasi, C., & Zounta, S. (2016), International Collaboration in Auditing Research: A Note, *International Journal of Auditing*, 20, 66-71.

Andrikopoulos, A., & Kostaris, K. (2017), Collaboration networks in accounting research, *Journal of International Accounting, Auditing and Taxation*, 28, 1-9.

Ballas, A., & Theoharakis, V. (2003), Exploring Diversity in Accounting Through Faculty Journal Perceptions. *Contemporary Accounting Research*, 20(4), 619-644.

Brin, S., & Page, L. (1998). The anatomy of a large-scale hypertextual Web search engine. *Proceedings of the seventh international conference on World Wide Web*, 107-117.

Brinn, T., & Jones, M. J. (2008), The composition of editorial boards in accounting: a UK perspective, *Accounting, Auditing and Accountability Journal*, 21(1), 5-35.

Butts, Carter T. (2008). Social Network Analysis with sna. *Journal of Statistical Software*, 24(6).

Butts, Carter T. (2016). sna: Tools for Social Network Analysis. R package version 2.4.

Carnegie, G., & Potter, B. (2000), Publishing patterns in specialist accounting history journals in the English language, 1996-1999, *Accounting Historians Journal*, 27(2), 177-199.

Cattell, R. B. (1943). The description of personality: basic traits resolved into clusters. *Journal of Abnormal and Social Psychology, 38*(4), 476-506.

Charrad, M., Ghazzali, N., Boiteau, V., & Niknafs, A. (2014). NbClust: an R package for determining the relevant number of clusters in a data set. *Journal of Statistical Software, 61*(6), 1-36.

Dhanani, A., & Jones, M. J. (2017), Editorial boards of accounting journals: gender diversity and internationalisation, *Accounting, Auditing & Accountability Journal*, 30(5), 1008-1040.

Ding, Y., Yan, E., Frazho, A., & Caverlee, J. (2009). PageRank for ranking authors in co-citation networks. *Journal of the Association for Information Science and Technology*, 60 (11), 2229-2243.

Dyachenko, E. L. (2014), Internationalization of academic journals: Is there still a gap between social and natural sciences?, *Scientometrics*, 101(1), 241-255.

Endenich, C., & Trapp, R. (2016), Cooperation for Publication? An Analysis of Co-authorship Patterns in Leading Accounting Journals, *European Accounting Review*, 25(3), 613-633.

Englebrecht, T. D., Hanke, S. A., Kuang, Y. (2008), An assessment of patterns of co-authorship for academic accountants within premier journals: Evidence from 1979-2004, *Advances in Accounting*, 24(2), 172-181.

Fleischman, R. K., Schuele, K. (2009), Co-authorship in accounting history: Advantages and pitfalls, *Accounting, Business and Financial History*, 19(3), 287-303.

Handcock M, Hunter D, Butts C, Goodreau S., & Morris M (2008). "statnet: Software Tools for the Representation, Visualization, Analysis and Simulation of Network Data. *Journal of Statistical Software*, *24*(1), 1-11.

Jones, M. J., Roberts, R. (2005), International publishing patterns: an investigation of leading UK and US accounting and finance journals, *Journal of Business Finance and Accounting*, 32(5), 1107-1140.

Kassambara, A., & Mundt, F. (2017). factoextra: Extract and Visualize the Results of Multivariate Data Analyses. R package version 1.0.5. https://CRAN.R-project.org/package=factoextra

Lohmann, C., & Eulerich, M. (2017), Publication trends and the network of publishing institutions in accounting: data on The Accounting Review, 1926-2014, *Accounting History Review*, 27(1), 1-25.

Lukka, K., & Kasanen, E. (1996), Is Accounting a Global or a Local Discipline? Evidence from Major Research Journals, *Accounting, Organizations and Society*, 21(7/8), 755-773.

Pelger, C., & Grottke, M. (2015), What about the future of the academy? Some remarks on the looming colonisation of doctoral education, *Critical Perspectives on Accounting*, 26, 117-129.

Rousseeuw, P. J. (1987). Silhouettes: a graphical aid to interpretation and validation of cluster analysis. *Computational and Applied Mathematics, 20*, 53-65.

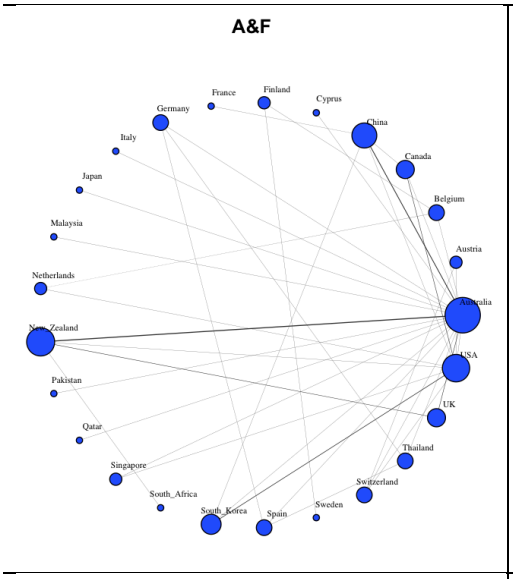
Tryon, R. C. (1939). *Cluster analysis: correlation profile and orthometric (factor) analysis for the isolation of unities in mind and personality*. Edwards Brothers.

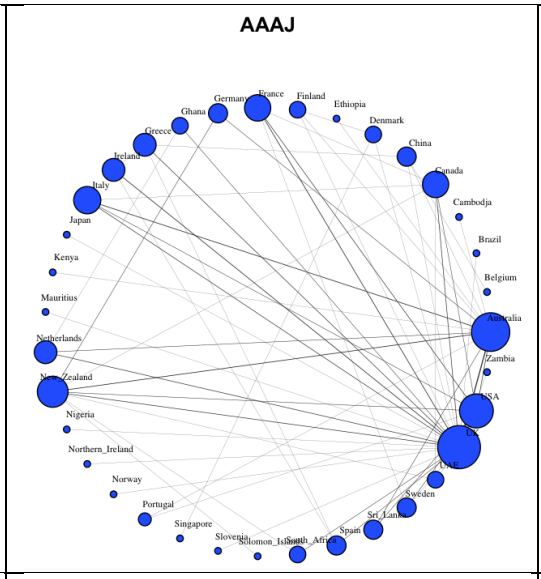
Tucker, B. P., Parker, L. D., & Merchant, K. A. (2016), With a little help from our friends: An empirical investigation of co-authoring in accounting research, *British Accounting Review*, 48(2), 185-205.

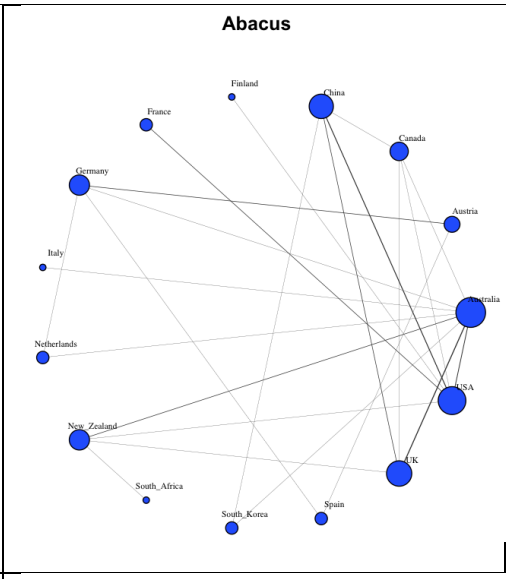
Ward, J. H., Jr. (1963). Hierarchical grouping to optimize an objective function. *Journal of the American Statistical Association, 58*, 236-244.

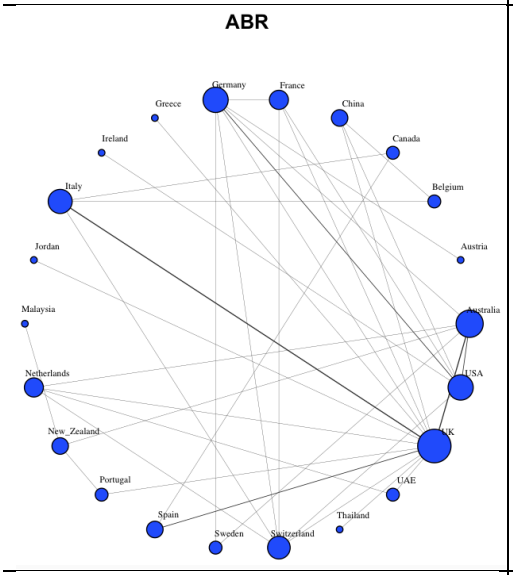
Wasserman, S., & Faust, K. (2009). *Social Network Analysis: Methods and Applications*. Cambridge: Cambridge University Press.

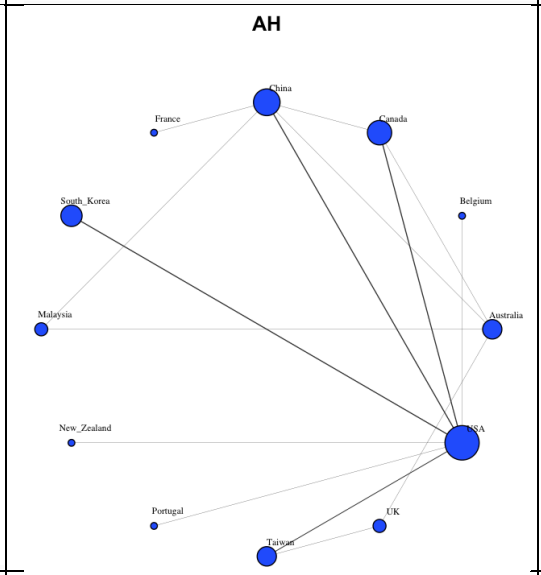
Appendix 1 – Networks per journal

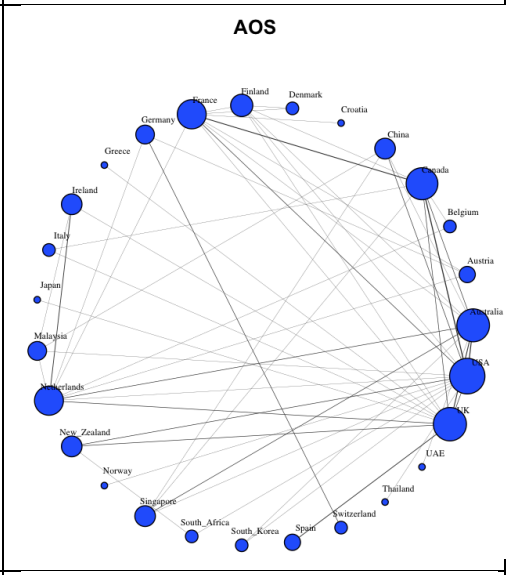


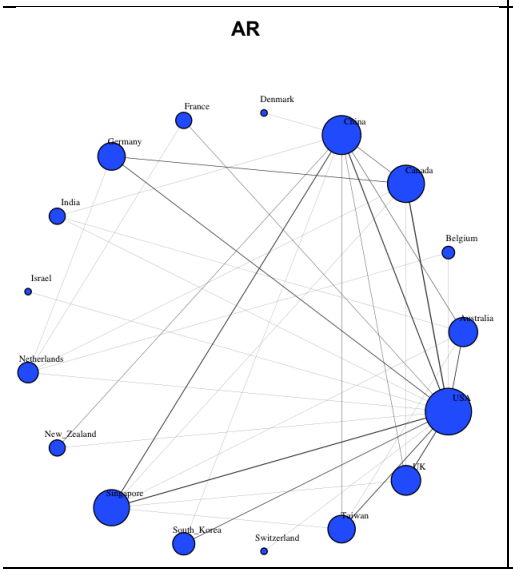


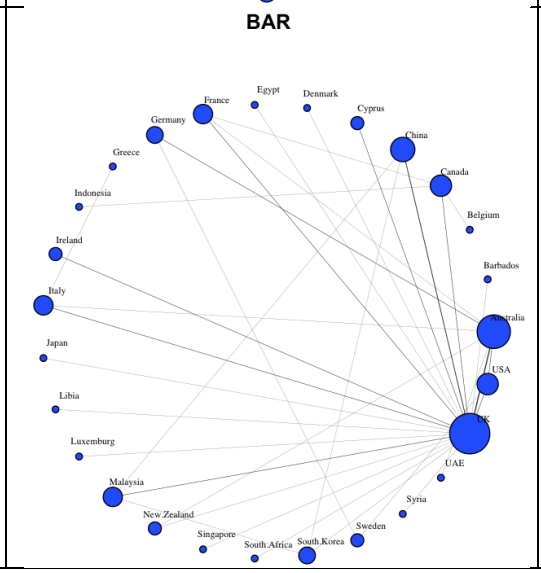


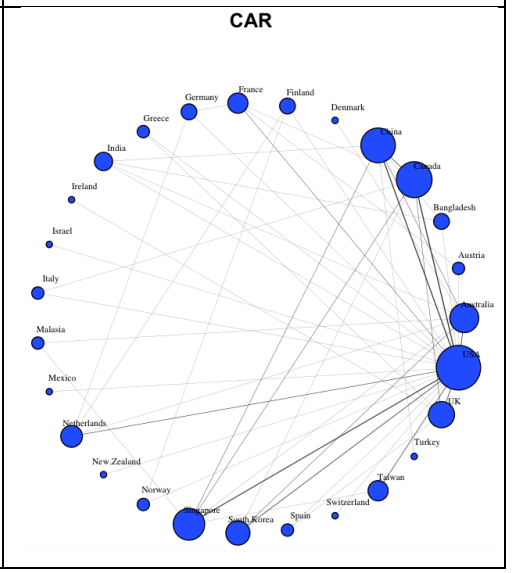


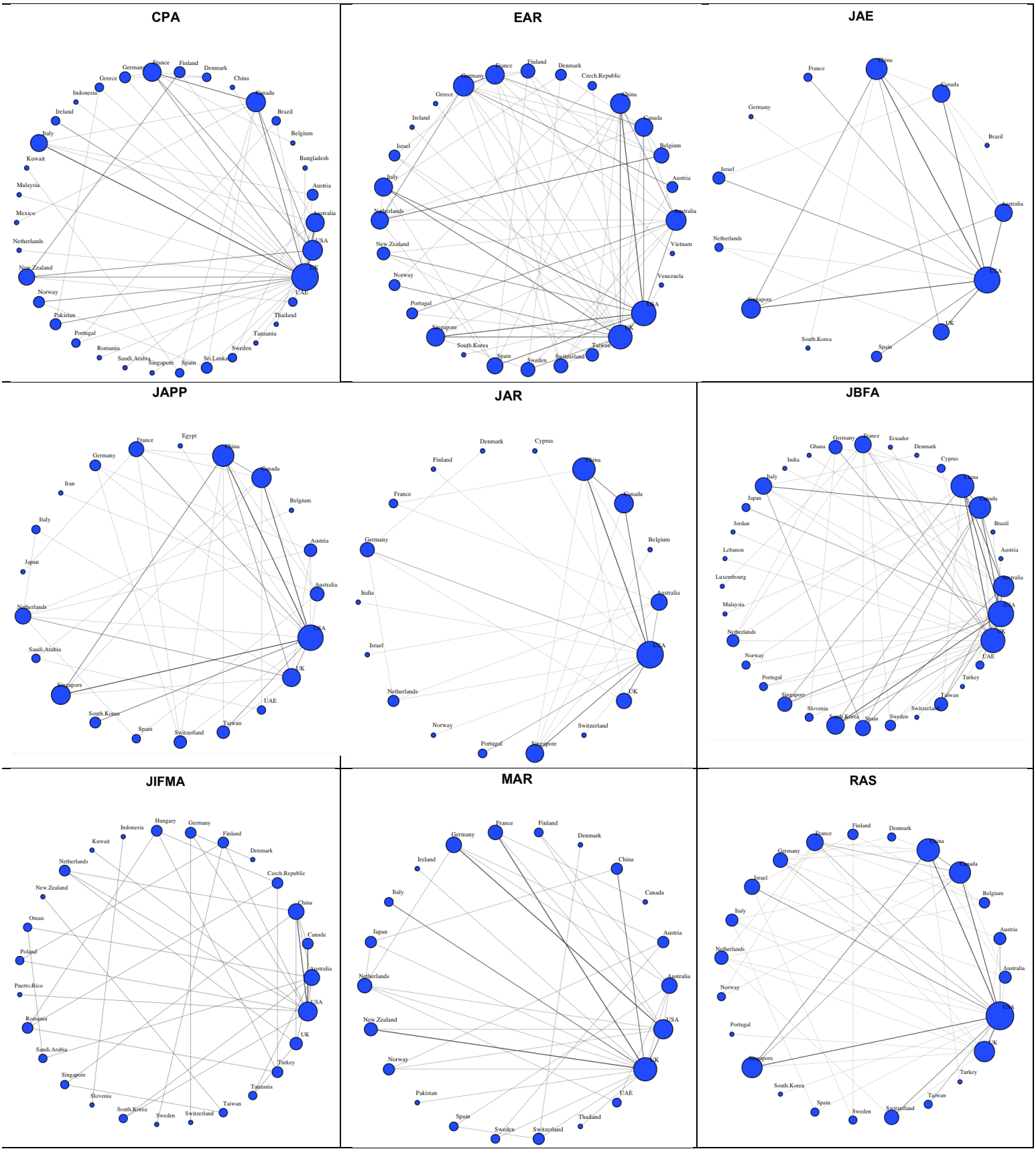








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