

Co-Authorship Networks in Business Ethics: A Longitudinal Study

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ABSTRACT

The primary objective of this study was to identify the evolution of collaboration among researchers in business ethics (BE) studies by employing a co-authorship analysis via a social network analysis. Four leading journals—*Business and Society (BS)*, *Business Ethics: A European Review (BEER)*, *Business Ethics Quarterly (BEQ)* and *the Journal of Business Ethics (JBE)*—were chosen to obtain BE articles that had been published between 1960 and 2015. First, a total of 7289 articles were collected. Then, the attributes of co-authorship networks, which included the assessment of co-authorship networks, a comparison of the attributes of the BE co-authorship network with those of other disciplines, a discussion of whether the small world network theory applied to the BE network and a visualization of critical authors, were explored. As one of the first studies in this field, these research findings provide specific theoretical and practical implications with limitations and the potential for expansion in future studies.

Keywords: Business ethics, Co-authorship, Social network analysis, Small world, Bibliometrics.

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INTRODUCTION

There is a fierce competition among scholars within academia^[1,2] and in universities.^[3,4] Scholars are driven to create high-impact knowledge within the domain of given disciplines and disseminate this knowledge via high-impact journals. This competition forces players, scholars in particular, to collaborate with their academic competitors as they “play” the publication “game”.^[5] Within the business and management literature, this is described as ‘coopetition’ and is defined as “a strategic and dynamic process in which economic actors jointly create value through cooperative interaction, while simultaneously competing to capture part of that value”.^[6] This coopetition shapes the maturity level of disciplines, with the ‘who’s who’ within the disciplines being addressed through a focus on intellectual structure or social structure via citation/co-citation analysis or authorship/co-authorship analysis respectively.^[7,8] Hence, social structure is a significant determinant within this cooperative environment since it generates formal and informal networks that enable the creation and

dissemination of knowledge, often consisting of theory building or hypothesis testing the practices by citing previous studies.

Social structure is defined as a “persisting and bounded pattern of social relationships (or pattern of behavioral interactions) among the units (that is, persons or positions) in a social system”.^[9] There are two components in the social structure of organizations – formal and informal.^[10] Such structures have an impact on information flow or resource allocation in the organizations.^[11,12] Many authors have sought an understanding of this phenomenon by conducting co-authorship analyses.^[13-16] Co-authorship analysis addresses the following questions:^[7] Are authors from different disciplinary backgrounds working together on a new research field, or do they remain within disciplinary boundaries? Which factors determine co-authorship? What is the effect of collaboration on the impact? Are co-authored articles more cited? Do more prolific authors collaborate more frequently? Are internationally co-authored papers more cited? What is the social structure of the field?

In this sense, investigating the connections and/or relationships between and among researchers through co-authorship analysis in a given discipline can help us to understand the social structure and behavior of scientific communities.^[17] Also, we can have a better understanding of large and complex scientific communities and clusters through a visual representation of social networks.^[18] Researchers acknowledge that

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scholarly collaboration ties and networks (e.g. co-authorship ties) indicate stronger social relationships than other relatedness measures (e.g. citations) although they have some similarities to citation and co-citation networks.^[7,19] In particular, coauthorship networks and citation networks are different in the sense that nodes in a citation network are papers and the links between them are citations whereas nodes in a coauthorship network are authors and the links between them are coauthorship.^[20] In other words, co-authorship analysis identifies key researchers, the nature and social structure of formal relationships among members of a research community in a given field.^[21] Therefore, using co-authorship to investigate the evolution of collaboration between researchers and also to analyze the nature and social structure of formal relationships is more relevant than other methods.

Thus, this study aims to identify the evolution of collaboration among researchers in the field of business ethics (BE). To this end, a co-authorship analysis was employed via a social network analysis with articles obtained from the four leading BE journals - *Business and Society (BS)*, *Business Ethics: A European Review (BEER)*, *Business Ethics Quarterly (BEQ)* and *the Journal of Business Ethics (JBE)* - to address following issues:

- explore the evolution of collaborations in BE between journals over the years.
- identify and visualize the topologies of the BE co-authorship network in journals and periodicals.
- determine if the co-authorship network of BE is a small world network.
- compare the BE co-authorship network's attributes with the attributes of other disciplines.
- identify and visualize critical authors in the BE network.

This paper is comprised of four sections: an overview of studies related to collaboration in business ethics research, a review of co-authorship analysis, an explanation of the research methodology that was employed in this study, a presentation and discussion of the study's results and finally, a review of the conclusions, study limitations and opportunities for future research.

Literature Review

Overview of studies related to collaboration in research in business ethics

While there has been a significant production of BE literature, studies assessing the intellectual, contextual and social structures of BE have been limited. To explore the structures of BE, researchers are required to employ at least one of the following three analyses: co-word, co-citation, or co-authorship.^[7] Two studies have illustrated the intellectual structure of

BE through co-citation analyses. First, Ma^[22] collected citation data from books, journal articles and other publications within the Social Sciences Citation Index between 1997 and 2006 to investigate the knowledge domain of BE by using citation and co-citation analyses. He discovered a significant shift in how two topics—ethical decision-making and corporate social responsibility—had previously been covered. Second, Calabretta, Durisin^[23] explored the intellectual structure of BE by employing citation and co-citation analyses of articles that had been published in the *JBE*.

By comparison, other studies^[24-31] have used basic or advanced bibliometric analyses to evaluate the knowledge domain of BE. Specifically, Chan, Fung^[25] used citation analysis to rank influential institutions in BE research and to compare them within a specific region. In another study, Chan, Fung^[24] used the citations from articles that had been published in *BEQ*, *BEER* and the *JBE* to investigate influential authors and studies. Chan, Fung^[26] also ranked countries and institutions that had contributed to articles published in the ten leading BE journals between 1999 and 2008. In addition, Talukdar^[27] demonstrated the productivity of authors in two leading BE journals (*BEQ* and the *JBE*) by comparing their work to other disciplines in business management; however, these studies were unable to map the social structure of BE. In other words, while a discipline's level of social structure is a significant indicator of its maturity, no study has focused on the evolution of networks, collaborations, or scientific communities in BE.^[32,33] Therefore, the primary aims of this study address collaboration in BE research.

Co-authorship Analysis and Social Network Analysis

Co-authorship analysis is a tool that is used during relational bibliometric analysis.^[34] Co-authorship analysis allows authors to have a stronger ability to reveal social ties than other tools, such as co-word, co-citation and bibliographic coupling.^[7] When at least two authors publish a paper together, co-authorship occurs.^[35] This method helps researchers to address the following questions: Do authors from different disciplinary backgrounds work together in new fields of research or do they remain within their disciplinary boundaries? Which factors determine co-authorship? What is the effect of collaboration on a study's impact? Are co-authored articles cited more frequently than articles authored by one person? Do more prolific authors collaborate more frequently? Are internationally co-authored papers cited more frequently than articles authored by one person? What is the social structure of a field?^[7]

Researchers use social network analysis to conduct co-authorship analysis, as a social network reveals the relationships among actors in a community or communities.^[36] To measure the strength of these relationships, social network analysis was developed to illustrate why relationships occurred and to determine the outcomes of these relationships within social net-

works.^[37] In recent years, this analysis has gained significant popularity due to its development of knowledge about complexity and systems approaches and its use of co-occurrence analysis to define the social or intellectual structures of various disciplines using available software programs.^[38] Because social network analysis allows researchers the ability to identify the relationships among actors in a community or communities and to highlight their patterns of interaction,^[39] scholars have used and validated this method in a variety of fields.^[40]

MATERIALS AND METHODS

Scope of Data

The data were collected from the earliest issues of four business journals until 2015 (Table 1). A total of 7289 articles were collected from *BS* between 1960 and 2015, *BEER* between 1992 and 2015, *BEQ* between 1991 and 2015 and the *JBE* between 1982 and 2015. These journals were chosen for the following three reasons: they allow for the application of a critical review process for validating scientific outputs,^[41] they have widely been accepted as leading journals in the BE field^[24-26,28] and they are indexed in the SSCI database, which has earned a high reputation among researchers and helps in the direction or creation of policy for multiple disciplines. In addition, the collaboration rate among BE authors, according to years (Figure 1) and journals (Figure 2), experienced an upward trend over the studied period.

Data Preparation and Analysis

The researchers followed three steps to prepare the data for analysis. First, the names of the articles' authors were manually inserted into a spreadsheet to minimize or eliminate possible spelling errors in the database. Second, a frequency analysis was employed to (a) identify authors with the same names or initials, (b) to detect misspellings that occurred during insertion and (c) to check for spelling differences between the authors' names or combinations of authors' names with different initials or initial variations.^[42] Google was then used to correct spelling variations of the same author's name or same authors' names. Finally, a network analysis was performed as a pilot test to increase the study's validity and reliability. All errors, including misspellings, duplications of authors' names and writing errors that had been identified in the network were corrected manually in the data file. Based on the results of the trend analysis, the study's main purpose was achieved through the formation of a linear model that explained the total growth of BE article production within seven sub-periods (before 1980, 1980 – 1985, 1986 – 1991, 1992 – 1997, 1998 – 2003, 2004 – 2009 and 2010 – 2015). This allowed for the identification of unknown trends and patterns. To conduct the network analysis, the number of authors who contributed to the articles was counted to illustrate the characteristics of

co-authorship. Following this, a co-authorship analysis, by means of a network analysis and visualizations, was performed using Pajek, Ucinet 6 and VOS viewer network analyses software packages.

RESULTS AND DISCUSSIONS

Co-authorship Network of BE

Table 2 lists the network's attributes over the examined cumulative periods. The development of BE studies in four leading journals was examined by analyzing how the co-authorship network of BE research changed over the seven cumulative time periods. The results of this examination are covered in Table 2 of Summary of Topology Feature of Co-Authorship Network by Cumulative Periods, which compares several indicators of co-authorship networks over each cumulative period (1960 – 1979, 1960 – 1985, 1960 – 1991, 1960 – 1997, 1960 – 2003, 1960 – 2009 and 1960 – 2015).

The average size of the network increased consistently over each cumulative period, from 1.09, 1.27, 1.30, 1.70, 1.94, 2.13, to 2.31, respectively, which indicates that the average number of co-authors in BE research increased by 111.93%, from 1.09 (1960 – 1979) to 2.31 (1960 – 2015). However, the co-authorship network's degree of centralization, which is defined as "the degree to which the cohesion of a network is organized around a particular actor or a group of actors",^[43] decreased significantly from 2.5% in 1960 – 1985 to 0.6% in 1960 – 2015. A network's degree of centralization is considered highly centralized when it reaches 1%. Regardless, the network of co-authorship in BE research became less centralized in the cumulative period of 1960 – 1985 (Table 2). This decreasing pattern also impacted the co-authorship network's density rate. Defined as "the relationship between the number of real links against all the possible linkages in the network and showing connection level among authors",^[43] the density rate of the co-authorship network decreased in every cumulative period from 0.019 in 1960 – 1979 to 0.000 in 1960 – 2015, indicating that the co-authorship network lost cohesion. Furthermore, due to the low-density rate of the co-authorship network, the connection level among the authors in BE was low. The average distance indicator illustrates the maturity

Table 1: Scope of Data used.

Selected Journals	Earliest issue	Latest issue	# of published studies
BS	1960- v1(1)	2015- v54(6)	641
BEER	1992- v1(1)	2015- v24(4)	755
BEQ	1991- v1(1)	2015- v25(4)	827
JBE	1982- v1(1)	2015- v132(4)	5066
Total			7289

Table 3: Summary of Topology Feature of Co-authorship Network by Journals.

Periods	BS	BEER	BEQ	JBE
Avg Degree	1.785	1.877	2.071	2.263
Degree Centralization	0.014	0.013	0.021	0.006
Density	0.003	0.003	0.005	0.000
Avg Distance	4.285	1.335	3.348	10.781
Components	190	197	113	1340
Clustering Coefficient	0.569	0.785	0.510	0.523

Table 2: Summary of Topology Feature of Co-authorship Network by Cumulative Periods.

Periods	1960-1979	1960-1985	1960-1991	1960-1997	1960-2003	1960-2009	1960-2015
Avg Degree	1.085	1.268	1.304	1.744	1.935	2.129	2.312
Degree Centralization	1.6%	2.5%	1.3%	1.2%	1.2%	0.8%	0.6%
Density	0.019	0.008	0.006	0.002	0.001	0.001	0.000
Avg Distance	1.059	1.085	1.205	2.780	7.412	10.781	8.865
Components	28	69	87	383	632	960	1485
Clustering Coefficient	0.6	0.81	0.62	0.547	0.458	0.469	0.458

Table 4: Comparison of Co-Authorship Data: General View.

	Business Ethics (Our study)	Strategic Management (Koseoglu, 2016)	Management and Organization (Acedo et al. 2006)	Biomedical (Newman 2001)	Tourism and Hospitality (Ye et al. 2013)	Computer Science (Newman, 2001)
Papers per Author	0.94	0.88	2.04	6.40	1.10	2.60
Authors per paper	1.06	1.13	1.88	3.75	1.87	2.22
Clustering Coefficient	0.458	0.13	0.68	0.066	0.748	0.496
Main component Size	1485	296	4625	1395693	1376	6396
Main component %	23.9	69.0	45.40	92.6	59.30	57.2
Mean Distance	8.87	5.05	-	4.6	7.20	9.7

level of a network's collaboration with the distances between its authors. To clarify, a shorter distance between authors indicates a higher level of maturity in a collaborative network.^[44-46] Because the average distance between the authors in this study increased significantly from 1.059 in 1960–1979 to 8.865 in 1960–2015, the flow of information between any pair of authors became longer over time and needed to pass through an average of 8.865 individuals overall.

Main component size is an indicator of a large group of individuals who are all connected to one another by pathways between intermediate acquaintances.^[44,47] To clarify, it explains how intimate and extensive a collaborative network can be in a field that typically includes the most productive authors.^[46] The value of the examined group's main component size increased significantly from 28 in 1960–1979 to 1485 in 1960–2015 (Table 2). In other words, the collaborative network in the field of BE became more intimate and extensive over time.

The last indicator, clustering coefficients, illustrates the closeness of a community in a certain field of a study.^[43,44] According to this study's analyses, the closeness of the BE community decreased since the first period of 1960–1979. It can therefore be concluded that the BE community grew more expansive over time. Despite this and similar findings in Koseoglu^[44] and Ye, Li^[46] studies, most new authors in the BE community have acted as secondary researchers.

Table 3 lists the network's attributes according to each journal. In this study, the development of BE in four leading journals was examined by comparing each journal using several co-authorship network indicators. According to findings on the average degree of co-authorship within each network, the *JBE* ranked highest at 2.26, which indicates that the BE papers that were submitted to this journal were co-authored by an average of 2.26 authors. Regardless, because the *JBE*'s density rate and degree of centralization were lowest among the four examined journals, it is likely that the BE network in the *JBE*

was less cohesive and less organized around a particular actor or a group of actors than the other journals.^[43] Furthermore, the average distance indicator, which explains a network's collaborative maturity level by distance between its authors,^[44,46] revealed that the average flow of information between any pair of authors in the *JBE* was longer than the other three journals and that its authors needed to pass through an average of 10.781 individuals. Among the examined journals, the *JBE* had the largest main component size, which is an indicator of a large group of individuals who are all connected to one another by pathways between intermediate acquaintances.^[44,47] This means that the *JBE*'s collaborative network in the field of BE was more intimate and extensive than the collaborative networks of the other journals. By contrast, *BEER* received the highest rating for community closeness (0.785), which indicates that the journal's BE community expanded over time.

Comparing the BE Co-authorship Network with Other Disciplinary Networks

Table 4 provides results on several characteristics of the BE network. These results were compared with findings from co-authorship network studies that evaluated various disciplines, such as computer science,^[47] biomedical science,^[47] strategic management^[44] and management and organization.^[43] While these studies examined different databases under different

timeframes, it was necessary to compare their results with the results of this study to assess the significant indicators of co-authorship.

BE ranked slightly higher (0.94) in papers per author than strategic management (0.88), but lower than the remaining four disciplines (1.10, 2.04, 2.60 and 6.40) (Table 4). By comparison, BE ranked lower in authors per paper than the other five disciplines. While BE had a higher cluster coefficient value (0.458) than biomedical science (0.066) and strategic management (0.13), its coefficient value was lower than tourism and hospitality (0.748), management and organization (0.68) and computer science (0.496). As an indicator of a network's trend

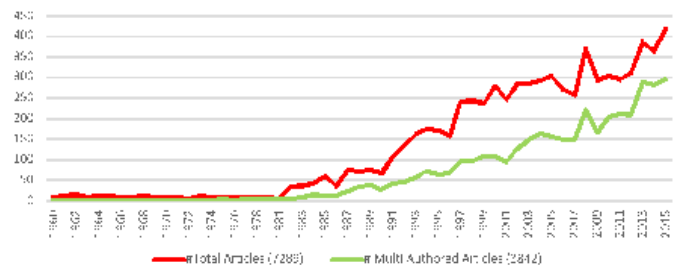


Figure 1: Total versus Multi-Authoried Articles by Year.

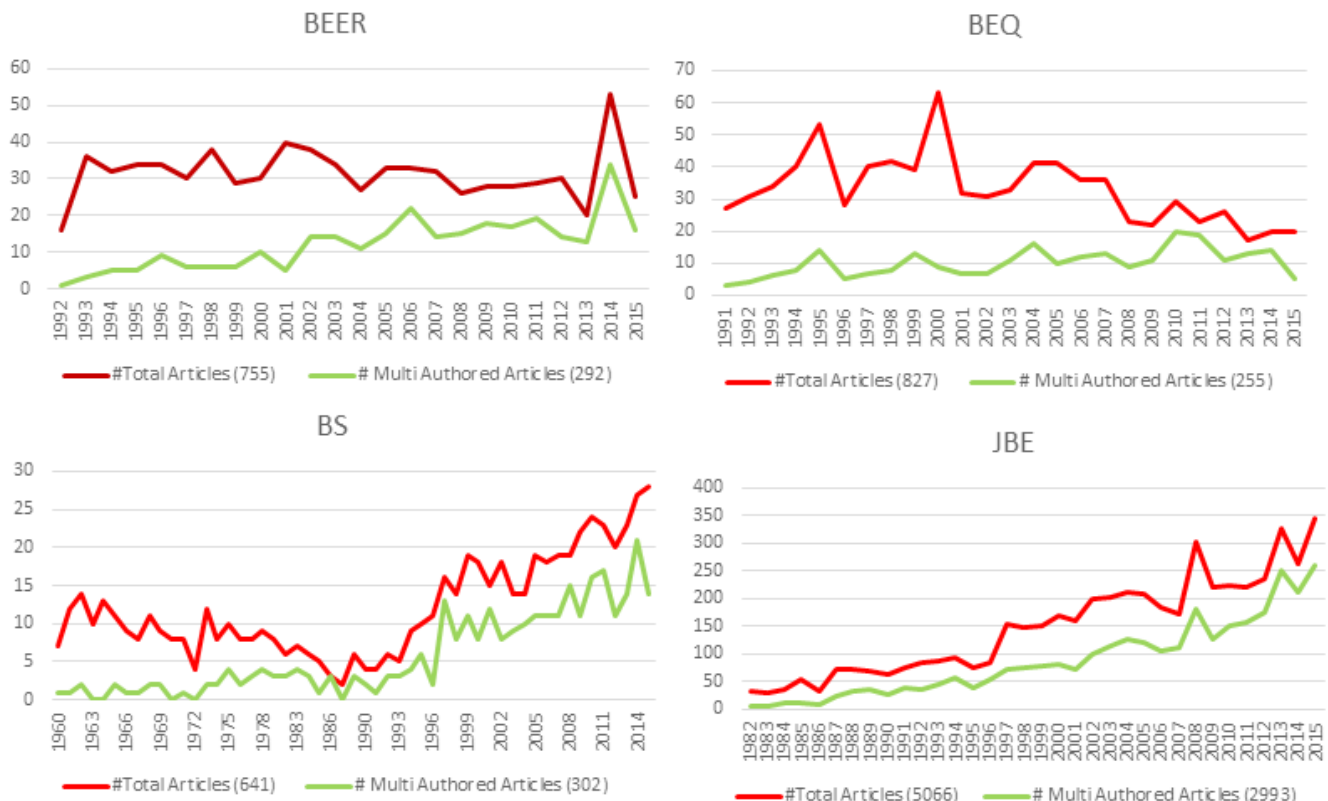


Figure 2: Total versus Multi-Authoried Articles by Journal and Year.

towards small groups or clusters,^[43] the results of the clustering coefficient revealed that the BE scientific community scored similarly to the biomedical science (0.066) and strategic management (0.13) scientific communities.^[44] In addition, the main component size of the BE network was greater than the tourism, hospitality and strategic management networks, but smaller than the remaining disciplinary networks. The mean distance between authors was also higher in the BE network than all disciplinary networks except for computer science. Finally, the BE network's main component percentage was significantly lower than it was in the other disciplinary networks. Therefore and in confirmation of Koseoglu^[44] and Ye^[46] studies, it can be concluded that the BE network's maturation and consolidation processes have proceeded similarly to those of other networks.

BE Co-authorship Network as a Small World Network

A small world network is a phenomenon that is sometimes known as six degrees of separation, which states that any single person in the world is connected through no more than five connections. It was not until the 20th century that a technique for simulating complex real-world systems with the complex network model was developed by scientists.^[46] In 1998, Watts and Strogatz presented the small world theory by establishing both a short path length between any two vertices (authors) and a large clustering coefficient. These properties have since been confirmed by many networks, such as the experimental and social sciences disciplinary networks.^[48] Furthermore, several studies^[42,46,49-52] have demonstrated the small world network structure in a variety of disciplines.

Due to the wide use of network theory, several indicators of collaboration, such as co-citation, co-authorship, acknowledgment, physical proximity and electronic communication, have been identified. Among these indicators, co-authorship has been considered to be the most significant indicator of collaboration, as it represents the direct, formal and tangible connections that exist between researchers.^[46] Kronegger, Mali^[49] stated that the small world network structure is formed within co-authorship networks as follows:

... [the] network forms where the level of local clustering (one's collaborators are also collaborators with each other) is high and the average number of steps between clusters is small. In these small world networks, internal ties of clusters tend to form and make the clusters of scientists more cohesive clusters. In contrast, ties between clusters are fewer and the network is less cohesive overall. However, paths between actors in different clusters tend to be short.

Small world networks also share many of the same characteristics as scale-free networks, which follow a power law distribution ($p(x) = cx^{-\alpha}$). Most of these networks have many relatively low degree nodes and very few high degree nodes.

^[53] To clarify, the power law distribution indicates that most authors demonstrate low performance and that a small number of authors demonstrate high performance. In addition, the power law distribution's power exponent (α) is generally negative, with the range of the exponent value that is based on the degree distribution of collaborative networks resting somewhere between 2 and 3.^[46] As a result, the degree distribution of the BE network corresponds with the properties of the small world theory because it has a power exponent (α) of negative 2.75, which is inside the range and the constant (c) of 9408.9, indicating a good fit ($R^2 = 0.9398$) (Figure 3). In other words, only a small number of the authors in the BE network performed at a high level (i.e., Patricia H. Werhane, Scott J. Vitell and R. Edward Freeman) (Figure 3).

Visualization of Critical Authors in the Network

Figure 4 provides a density visualization of the BE network. While the red color indicates that the number of authors in the area of a point is larger and the weights of the neighboring authors are higher, the blue color indicates that the number of authors in the area of a point is smaller and the weights of the neighboring authors are lower.^[54] The results of this study indicate that while many authors are in the BE network, some authors, such as Patricia H. Werhane and Norman E. Bowie, were considered to be critical authors in the BE network.



Figure 3: Degree Distribution of Business Ethics Network by year.

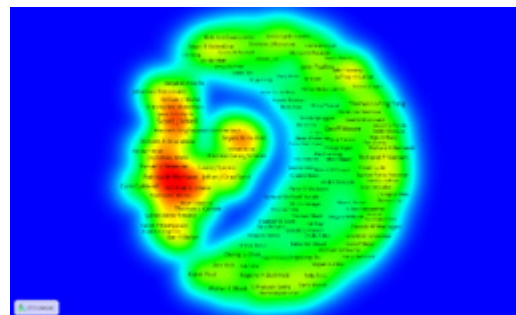


Figure 4: Density Visualization of critical authors in the network.

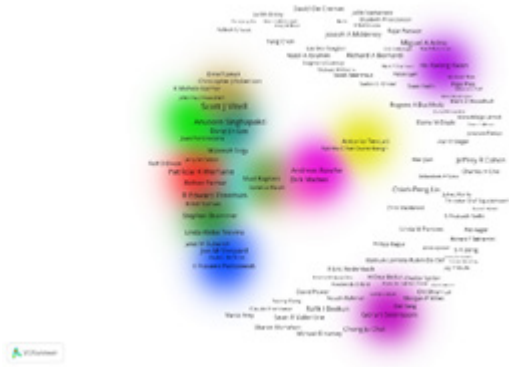


Figure 5: Cluster visualization of critical authors in the network.

Figure 5 provides a visualization of clusters in the BE network. To generate clusters, the names of authors with several publications are placed within several circles of different color. The circles' colors indicate that a cluster of researchers was strongly linked to another cluster of researchers.^[55] These clusters help researchers identify research teams in BE. In this respect, the main concepts and relationships among concepts may also be identified to see the conceptual structure of BE literature.

CONCLUSION

Limitations and Future Research

This study aimed to identify the evolution of collaboration among researchers in BE studies by employing a co-authorship analysis via a social network analysis. Four leading journals—*BS*, *BEER*, *BEQ* and the *JBE*—were chosen to obtain BE articles that had been published between 1960 and 2015. A total of 7289 articles were collected. Following this, assessments of co-authorship networks, comparisons between the attributes of the BE co-authorship network with the co-authorships networks of other disciplines, discussions of whether the small world network applies to the BE network and visualizations of the critical authors in the BE co-authorship network were obtained. As one of the first studies in this field, these research findings provide specific theoretical and managerial implications that will be discussed in further detail below.

Theoretical implications

This study contributes two theoretical implications. First, the results of its analyses show that the collaboration rate in both years and in journals increased among BE authors during the examined periods. The average level of the network's co-authorship also increased consistently over every cumulative period. By contrast, while the BE co-authorship network lost strength and the connection rate among its authors was low, the degree distribution of the BE network corresponded strongly with the properties of the small world theory. Due to its high clustering, in addition to the close relationships

between its authors, the BE network matured over time. The significant increase in the size of the BE network's main components also contributed to the strength of the collaboration rate among authors in the network. Moreover, while the number of papers per author was slightly higher in BE than in strategic management, the number of papers per author was lower in BE than in the remaining disciplines. In terms of authors per paper, BE was lower than all the other disciplines. Regardless, the BE scientific community was found to be closely comparable to the four other examined fields. In sum, while the results for indicators of co-authorship in BE were mixed, they remain important due to their incorporation, dissemination and transformation of knowledge in the BE network.^[44]

Second, in the comparison of the attributes that each journal brought to the network, the data for each journal revealed several interesting implications. For instance, the *JBE* had the highest rate of production. Regardless, although the *JBE* had the highest degree, as the BE papers published in the *JBE* were co-authored by an average of 2.26 authors, the journal's density rate and degree of centralization were the lowest among the four examined journals. This indicates that the *JBE*'s BE network was less cohesive and less organized around a particular actor or group of actors than the three remaining journals.^[43] Because the *JBE* also had the largest main component size among the examined journals, its collaboration network in the field of BE was also more extensive and intimate than the other journals. In addition, the strength of the *JBE*'s co-authorship network was low. To conclude, when journals produce too much and fail to target a particular subject in a given field, the strength of their collaboration networks can diminish and division in that field can increase.

As the newest of the four examined journals, *BEER* had the lowest impact factor (1.386). During the evaluated periods, the scopes of *BS* and *BEER* were more specific than *BEQ* and the *JBE*. In regard to community closeness (the clustering coefficient), *BEER* ranked highest, followed by *BS*, the *JBE* and *BEQ*. When a journal's scope is focused on a particular subject or aspect of a certain field of study, its collaboration network's closeness may be higher. However, a journal's age is more likely to impact the production and dissemination of knowledge than the attributes of its collaboration network. In sum, a network's attributes are unrelated to a journal's age. The position of *BS* confirms this inference, as it had the lowest average degree of collaboration. As the journal with the lowest average degree of collaboration (followed by *BEER*), *BS*'s scope was highly specific. As the oldest journal among the four examined journals, *BS* had the highest impact factor (2.135) by 2015, but had published the fewest number of articles. Finally, *BEQ* and *BS*, which are currently owned by associations named the Society for Business Ethics and Interna-

tional Association for Business and Society respectively, have not had strong network ties although they have the highest impact factors. This reflects that a journal's ownership can affect the strength of its collaboration network and impact factors.

Practical Implications

Because this study's main purpose was to identify the evolution of collaboration among researchers in BE studies by employing a co-authorship analysis via a social network analysis, its findings will benefit professionals, organization literature and academics in both BE and fields of study that are ancillary to BE. To clarify, by identifying and working closely with critical authors in the BE field, practitioners can better understand the field from an academic perspective, as it is not typically used as a resource within scientific literature.^[56] In addition, the identification of critical authors and their article output could help professionals in their policymaking decisions. This study's findings will also help journal editors to better understand the need for BE research and to consider new studies with the field in mind. Finally, this study's results will benefit graduate students, in addition to junior and senior faculty, who wish to identify the evolution of BE research and strengthen BE research networks by encouraging researchers to collaborate with the critical authors who have been identified in this study.

Limitations and Future Research

There are several limitations with this study. First, it examined only four of the leading BE journals, excluding other researchers who may have been published and academic disciplines that may have been explored in different BE journals. Therefore, future research might include a greater number of journals, in addition to other important types of research outputs, such as books, citations and dissertations.^[34] Some of the study's other limitations include aspects of its methodology, such as the subjective interpretation of the visualization,^[41] the use of a cumulative seven-year period time frame and the subjective interpretations in reflection of this timeframe and spelling errors and/or disambiguation of the authors' names. Finally, while this study focused solely on a co-authorship network that formed from articles that had been published in four BE journals, it did not assess the topics or research groups that appeared within the network, which could be another possible avenue for future researchers to pursue. In summary, although this study contains certain limitations, these limitations could foster opportunities for future research, such as an investigation of the relationship between social network analysis results and other research performance indicators, in addition to an analysis of the relationship between citation numbers and co-authorship.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

ABBREVIATIONS

BEQ: Business Ethics Quarterly; **BEER:** Business Ethics: A European Review; **BS:** Business and Society; **JBE:** Journal of Business Ethics; **SSCI:** Social Sciences Citation Index.

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