

**Examining the evolution of citations and team composition in  
Industrial Marketing Management (Editorial)**

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**Editorial: Examining the Evolution of Citations and Team Composition in *Industrial Marketing Management***

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## 1. INTRODUCTION

Recent editorials have discussed the maturation of *Industrial Marketing Management*, and its emergence as the leading academic journal devoted to business-to-business marketing (Di Benedetto & Lindgreen, 2018; Lindgreen & Di Benedetto, 2018). From its inaugural issue in 1971, *Industrial Marketing Management* has continuously improved along several important metrics, such as multinationality of authors and editorial board membership, and multidisciplinary scope of articles (Di Benedetto & Lindgreen, 2018; Di Benedetto et al., 2018; Lindgreen & Di Benedetto, 2018). Thanks to this devotion to top-quality scholarship, *Industrial Marketing Management* has showed consistent and impressive growth in academic rankings such as Thomson ISI Impact Factor, and citation counts according to Google Scholar (Baumgartner & Pieters, 2003; Di Benedetto & Lindgreen, 2018; Franke & Schreier, 2008; Guidry, Hollier, Johnson, Tanner, & Veltsos, 2004; Touzani & Moussa, 2010).

As further evidence of the maturation of *Industrial Marketing Management*, it was recently noted that the most-cited articles appearing in this journal have multidisciplinary scope. Many of these articles made significant contributions to research topics such as service-dominant logic, high-technology marketing, product innovation, supply chain management, value creation, and business networks (Lindgreen & Di Benedetto, 2018). A recent study tracking knowledge outflow from *Industrial Marketing Management* showed that the journal is widely cited in technology and innovation management journals such as *Journal of Product Innovation Management* and *IEEE Transactions on Engineering Management*, and operations/supply chain management journals such as *Journal of Operations Management* and *International Journal of Logistics Management*, as well as a variety of marketing journals (Di Benedetto et al., 2018). The citation and knowledge-outflow results provide evidence of the ever-growing impact of *Industrial Marketing Management* on business-to-business marketing research and on related academic research streams as well.

In this editorial, we explore the evolution of *Industrial Marketing Management* in further detail by considering average number of citations per article, the distribution of citations and authors across subject areas, and country affiliation of authors. We also investigate research team characteristics such as team size, and knowledge, geographic, and cultural diversity. We speculate that larger and more diverse teams may be required as a research discipline emerges, as authors take on more challenging research questions which will require a team possessing more varied expertise. We take a 16-year perspective, including all issues of *Industrial Marketing Management* from 1997 through 2012.

## 2. DATA AND METHODOLOGY

We retrieved data from the Clarivate Analytics Web of Science database consisting of 1,005 research articles published in *Industrial Marketing Management* in the 1997–2012 period. The extracted data contains information including author names, author affiliations, article title, year of publication, and number of citations. We standardized the names of all the institutions (i.e., affiliations) and disambiguated (co)authors' names to identify unique scholars. In addition, in order to trace the past publication history of each contributor to *Industrial Marketing Management*, we also used a large database constructed by Belkhouja & Yoon (2018). This database includes 159,169 journal articles published in 320 business and management journals in the 1994–2013 period. Using these two datasets, we were able to conduct a number of analyses that helped us to understand the evolution of citations and team composition in *Industrial Marketing Management*.

First, in order to analyze the outflow and inflow of citations between *Industrial Marketing Management* and different academic disciplines, we traced forward and backward citations of each journal article published in *Industrial Marketing Management* on a yearly basis, respectively. Then, we matched each cited and citing sources (i.e. journals) to the standard 21 subject areas used in the Association of Business Schools' Academic Journal Guide (AJG) list.

Second, to explore the multidisciplinary trend in the *Industrial Marketing Management* community, we assigned the prior publications of each contributing author to the AJG subject areas, and then quantified the distribution of these publications across the AJG subject area on a yearly basis. In other words, we calculated the relative weight of each subject area as reflected in the historical publications of contributing authors to *Industrial Marketing Management* at the focal year. For example, in 1999, we identified 74 unique scholars who published their articles in *Industrial Marketing Management*. Further, 88% of these 74 scholars' prior publications were in Marketing, 7% in General Management, Ethics, and Social Responsibility, 1% in Operations and Technology Management, and so forth.

Third, to analyze the geographic distribution of *Industrial Marketing Management* authors, we identified the country of each author's affiliation. Then we assigned each country to the following regional classifications: US and Canada, UK and Ireland, Nordic countries, Rest of European countries, and Rest of the World countries.

Fourth, as co-authorship has become a prevalent practice across many scientific research areas including business and management (Liu, Olivola, & Kovacs, 2017), we analyze the co-authorship practice in *Industrial Marketing Management* by counting the number of articles published per team size on a yearly basis.

Finally, we generated three team-level indices to understand the evolution of research team characteristics. Specifically, we used the Jaccard index to measure the (a) knowledge, (b) geographic, and (c) cultural dissimilarity among co-authors collaborating on each article. To measure the dissimilarity at the team level, we first calculate the Jaccard index for each dyad of co-authors within a team, and then we average the sum of all indexes. The Jaccard index for each dyad of co-authors  $A_i$  and  $A_j$  with  $N$  binary attributes is computed as follows:

$$J(A_i, A_j) = \frac{b + c}{a + b + c}$$

where

- $a$  is the number of attributes common to both co-authors
- $b$  is the number of attributes present in  $A_i$  but not in  $A_j$
- $c$  is the number of attributes present in  $A_j$  but not in  $A_i$

(a) Knowledge dissimilarity: We computed the knowledge Jaccard dissimilarity coefficient between co-authors for each article published in *Industrial Marketing Management* journal based on the different disciplines they had published in, up to the publication of the corresponding article in *Industrial Marketing Management*. Then we calculate the *Industrial Marketing Management* yearly average of the knowledge dissimilarity.

(b) Geographic dissimilarity: With information on each author's country of affiliation, we computed the geographic Jaccard dissimilarity coefficients between co-authors comprising each article published in *Industrial Marketing Management*. Then we calculate the *Industrial Marketing Management* yearly average of the geographic dissimilarity.

(c) Cultural dissimilarity: We used the IBM GNR (Global Name Recognition) database to identify the cultural origin of each team member, as the Web of Science does not provide information on authors' cultural origins. We first matched each author's surname with a specific national origin as provided by the IBM GNR. Also, we manually standardized and corrected national origins in some cases (e.g., we combined English, Scottish, and Welsh into British). Then, the national origin was assigned to the following cultural groups according to the clustering procedure of Ronen & Shenkar (2013). This procedure clusters 70 countries into 11 cultural groups (Arabic, Anglo, Nordic, Germanic, Latin America, Near East, Latin Europe, East Europe, African, Far East, and Confucian Asia). Although there are some technical limitations to achieve 100% accurate identification of cultural groups of each author, prior studies show that the accuracy of name-ethnicity matching is generally high and acceptable (Breschi et al., 2017; Nathan, 2015). This procedure allowed us to

calculate the cultural Jaccard dissimilarity coefficients based on the differences between the cultural groups of co-authors for each article published in *Industrial Marketing Management*. Then we calculate the *Industrial Marketing Management* yearly average of the cultural dissimilarity.

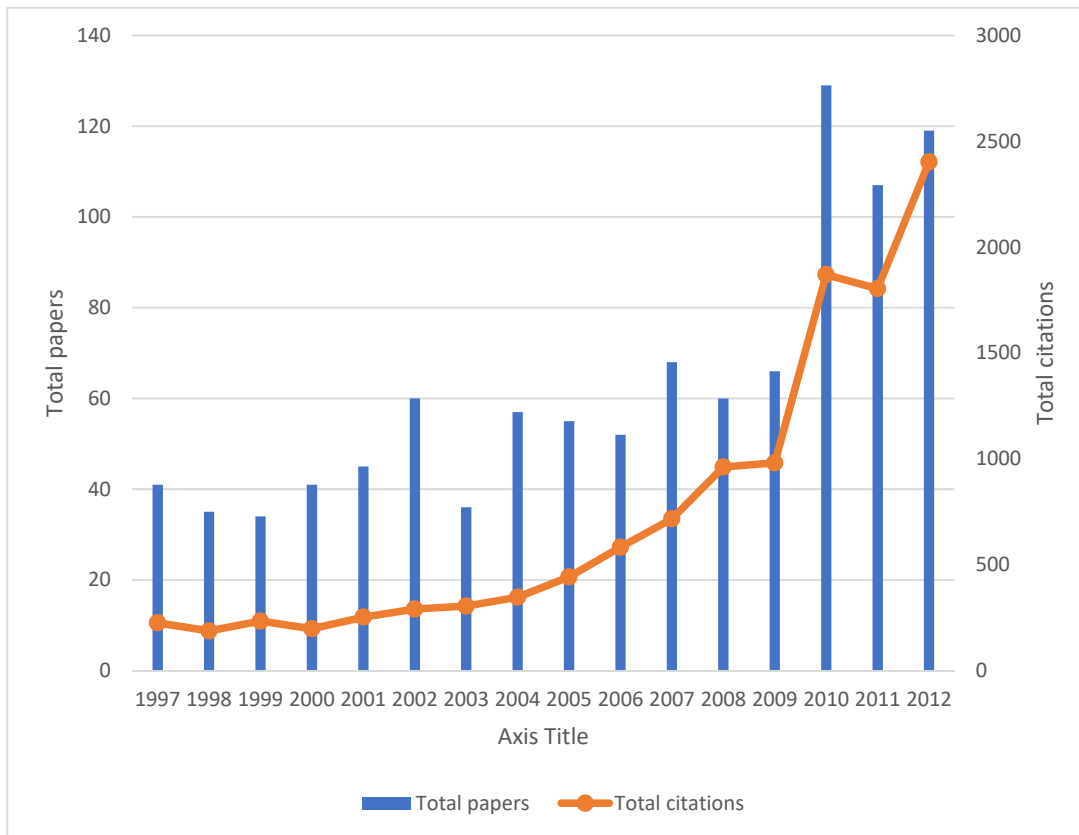
### 3. FINDINGS

#### 3.1 Publications and Citations

We first examine patterns in *Industrial Marketing Management* publications and citations in the 1997–2012 time period. Over this time, a total of 1,005 articles were published; these were cited a total of 11,805 times. As shown in Table 1, there was a marked increase in published articles over this period, from 41 articles in 1997 to 119 articles in 2012; during this period, the number of citations of these articles increased at an even faster rate. Taken together, the number of citations per article increased steadily: using 1997, 2005, and 2012 as benchmark years, the number of citations per article increased from 5.51 in 1997, to 8.05 in 2005, and to 20.19 in 2012. Figure 1 clearly depicts this pattern of evolution in citations. Number of citations per article is a broad measure of the journal’s impact in the research community, and during this critical period, this metric increased by over 350 percent.

**Table 1: *Industrial Marketing Management* publications and citations**

Year	Total articles	Total citations	Number of citations per article
1997	41	226	5.51
1998	35	188	5.37
1999	34	234	6.88
2000	41	198	4.83
2001	45	253	5.62
2002	60	291	4.85
2003	36	305	8.47
2004	57	347	6.09
2005	55	443	8.05
2006	52	583	11.21
2007	68	717	10.54
2008	60	962	16.03
2009	66	981	14.86
2010	129	1870	14.50
2011	107	1804	16.86
2012	119	2403	20.19
<b>Total</b>	1005	11805	11.75



**Figure 1: Articles published in *Industrial Marketing Management* and citations received by *Industrial Marketing Management* per year**

### 3.2 Citation Distribution by AJG Subject Area

Evidence of increasing multidisciplinary scope can be gained by examining incoming yearly citations by subject area, using the standard categorization used by the Association of Business Schools, that is, the Academic Journal Guide (AJG) list. Tables 2 and 3 report trends during the 1997–2012 period, including and excluding self-citations respectively. Looking first at Table 2, most citations in *Industrial Marketing Management* have been from *Marketing* journals (about 60% per year), which is quite understandable given the journal’s aims and scope. Note, however, that there is usually a consistently large percentage of citations from *Operations and Technology Management* journals and *General Management, Ethics, and Social Responsibility* journals (13% and 8% respectively, on average). It is interesting in Table 2 to see that there is a slight decline over this period in incoming citations from *Innovation* journals (10–12% for 1997–2000, 3–6% for 2007–2012), but simultaneous increases in citations from *International Business Studies* journals. Other subject areas were cited at much lower rates. Similar trends can be seen in Table 3 which excludes self-citations.

**Table 2: Distribution of incoming yearly citations on AJG categories (with self-citations)**

AJG categories	Year	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	Total
Marketing		64%	71%	67%	61%	65%	59%	54%	54%	54%	57%	70%	57%	54%	61%	58%	58%	59%
Operations and Technology Management		6%	3%	6%	9%	11%	8%	11%	16%	16%	12%	9%	18%	17%	15%	13%	10%	13%
General Management, Ethics and Social Responsibility		8%	7%	9%	11%	6%	16%	13%	12%	10%	10%	6%	5%	5%	7%	7%	10%	8%
Innovation		13%	12%	10%	12%	7%	7%	7%	6%	10%	9%	5%	6%	6%	3%	4%	6%	6%
International Business Studies		2%	1%	2%	2%	0%	0%	1%	3%	1%	1%	1%	4%	6%	3%	4%	3%	3%
Sector Studies		3%	1%	0%	0%	0%	1%	0%	0%	0%	1%	1%	1%	4%	5%	3%	3%	3%
Entrepreneurship and Small Business Management		1%	1%	1%	1%	0%	3%	8%	3%	1%	1%	1%	3%	1%	1%	1%	2%	2%
Operations Research and Management Science		1%	4%	1%	3%	2%	1%	1%	2%	1%	1%	1%	2%	2%	1%	0%	0%	1%

Note: We kept only subject areas that show at least 3%

**Table 3: Distribution of incoming yearly citations on the AJG categories (without self-citations)**

ABS categories	Year	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	Total
Marketing		38%	28%	32%	14%	33%	17%	23%	20%	33%	46%	49%	36%	40%	34%	32%	31%	34%
Operations and Technology Management		10%	7%	11%	19%	20%	17%	19%	28%	24%	15%	16%	26%	22%	24%	21%	17%	20%
General Management, Ethics and Social Responsibility		15%	17%	18%	23%	11%	33%	23%	21%	14%	13%	11%	7%	6%	12%	11%	17%	13%
Innovation		23%	31%	20%	25%	13%	13%	12%	10%	14%	12%	8%	9%	7%	6%	7%	10%	10%
International Business Studies		4%	1%	4%	4%	1%	0%	1%	5%	2%	2%	2%	6%	8%	5%	7%	4%	5%
Sector Studies		5%	1%	0%	0%	0%	3%	1%	0%	1%	1%	2%	1%	5%	9%	4%	5%	4%
Information Management		1%	0%	1%	2%	4%	4%	2%	5%	3%	3%	2%	4%	3%	2%	3%	3%	3%
Entrepreneurship and Small Business Management		2%	1%	3%	1%	1%	7%	13%	5%	2%	2%	1%	4%	2%	2%	2%	3%	3%
Organisation Studies		0%	0%	2%	1%	3%	1%	2%	2%	1%	2%	2%	1%	1%	2%	3%	4%	2%
Operations Research and Management Science		2%	11%	3%	7%	5%	2%	2%	4%	2%	2%	2%	3%	2%	1%	1%	1%	2%
Human Resource Management and Employment Studies		0%	0%	0%	1%	3%	0%	2%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Strategy		0%	1%	3%	2%	3%	1%	1%	2%	0%	1%	1%	0%	0%	1%	1%	1%	1%

Note: We kept only subject areas that show at least 3%.

### 3.3 Subject Area Interests within the Community of Authors

To explore further the emerging multidisciplinary trend, we assess the primary subject areas of contributing authors and how this has evolved over time. The results for the 1997–2012 time period are shown in Table 4.

Table 4 shows a noticeable trend among the community of contributing authors in terms of size and multidisciplinary. We identified 83 unique authors in 1997 who published in *Industrial Marketing Management* and almost 300 in 2012. In the earliest years, *Marketing* represented at least 80% of authors' publications who published in *Industrial Marketing Management*. By 2012, this percentage had reduced to below 50%, with corresponding increases in *General Management, Ethics, and Social Responsibility* (13% increase from 1997 to 2012), *Operations and Technology Management* (6% increase from 1997 to 2012), and *Innovation* (4% increase from 1997 to 2012), as alternative subject area interests for *Industrial Marketing Management* contributors. This trend shows evidence that *Industrial Marketing Management* has attracted greater numbers of scholars over the

years, whose backgrounds are complementary to business-to-business marketing. Overall, we conclude that as *Industrial Marketing Management* has consistently increased in relevance to scholars outside the original business-to-business marketing research community, has become a target journal of interest to these scholars, and provides increasing value to academics in related subject areas as noted above.

**Table 4: Distribution of IMM authors according to subject area interests**

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
<b>Number of unique authors</b>	83	66	74	84	93	122	79	121	122	120	151	145	154	296	266	297
<b>ABS categories</b>																
<b>Marketing</b>	99%	96%	88%	79%	80%	73%	77%	64%	71%	66%	60%	54%	55%	53%	49%	47%
<b>General Management, Ethics and Social Responsibility</b>	1%	0%	7%	7%	9%	11%	6%	12%	12%	13%	12%	13%	13%	15%	10%	14%
<b>Operations and Technology Management</b>	0%	0%	1%	1%	0%	2%	2%	3%	2%	1%	4%	5%	5%	5%	6%	6%
<b>Innovation</b>	0%	0%	0%	4%	0%	3%	3%	6%	3%	5%	5%	4%	5%	5%	4%	4%
<b>Operations Research and Management Science</b>	0%	0%	1%	2%	3%	3%	0%	6%	2%	1%	3%	4%	3%	4%	5%	3%
<b>International Business Studies</b>	0%	1%	1%	2%	2%	3%	3%	2%	2%	4%	2%	3%	3%	4%	4%	2%
<b>Strategy</b>	0%	0%	1%	3%	3%	1%	1%	2%	2%	1%	4%	4%	2%	2%	2%	3%
<b>Finance</b>	0%	0%	0%	0%	0%	0%	1%	1%	1%	2%	1%	1%	2%	2%	4%	2%
<b>Sector Studies</b>	0%	0%	1%	0%	0%	1%	0%	1%	0%	1%	1%	2%	2%	2%	3%	2%
<b>Organisation Studies</b>	0%	0%	0%	0%	0%	1%	0%	2%	1%	1%	0%	2%	1%	2%	1%	3%
<b>Entrepreneurship and Small Business Management</b>	0%	1%	0%	1%	0%	0%	3%	2%	1%	3%	2%	1%	1%	1%	2%	1%
<b>Human Resource Management and Employment Studies</b>	0%	0%	0%	0%	0%	0%	3%	0%	0%	0%	1%	1%	1%	1%	2%	2%

Note: We kept only subject areas that show at least 3%.

### 3.4 Community of Authors and Country Affiliation

It has been previously noted that the community of *Industrial Marketing Management* authors has become truly international in scope (Di Benedetto & Lindgreen, 2018). Our results here corroborate this finding. As shown in Table 5, the community of authors was primarily from North America (U.S. and Canada) in the earliest years, perhaps not surprising as *Industrial Marketing Management* was founded in the United States, but this percentage has consistently decreased, from 74% in 1997 to 20% in 2012. During this period, U.K. and Ireland-based authors consistently accounted for between 9% and 22% except for 2005 and 2009; and surpassed U.S. and Canada-based authors for the first time in 2012 (22% compared to 20%). Substantial increases during this time period were evident for authors based in Nordic countries, the rest of Europe, and the rest of the world. In fact, in 2012, both rest-of-Europe and rest-of-world authors tied or surpassed U.S. and Canada-based authors. We can conclude that *Industrial Marketing Management* has become internationally recognized as a high-quality target journal for academic researchers in business-to-business marketing and related disciplines.

**Table 5: Distribution of IMM authors according to their country affiliations**

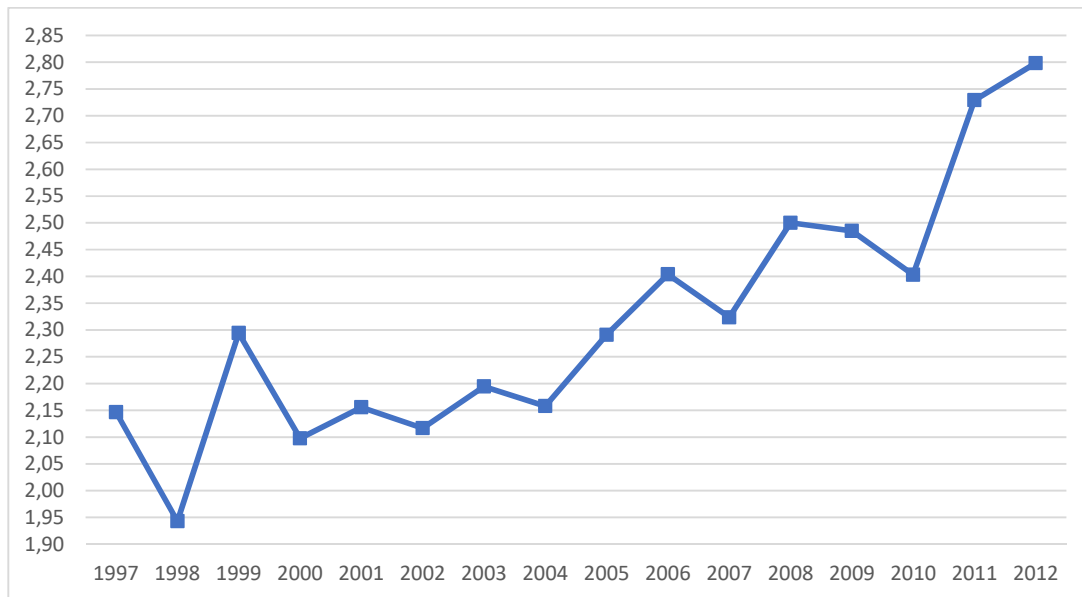
Number of authors	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
<b>Country</b>	83	66	74	84	93	122	79	121	122	120	151	145	154	296	266	297
<b>US and Canada</b>	74%	64%	65%	45%	55%	72%	58%	51%	62%	32%	29%	35%	40%	27%	22%	20%
<b>UK and Ireland</b>	8%	19%	10%	21%	16%	9%	9%	17%	3%	9%	21%	10%	6%	18%	17%	22%
<b>Nordic countries</b>	3%	0%	13%	8%	8%	2%	1%	6%	4%	7%	15%	15%	11%	13%	5%	15%
<b>Rest of European countries</b>	9%	5%	6%	17%	17%	2%	18%	15%	13%	25%	13%	14%	18%	20%	15%	20%
<b>Rest of the World countries</b>	7%	12%	7%	10%	4%	16%	13%	11%	17%	27%	22%	26%	25%	22%	41%	22%

### 3.4 Community of Authors: Team Size

Another noticeable trend has been in author team size, which has increased since 1997. This trend has been noted across academic journals in general, and several underlying reasons have been proposed (*The Economist*, 2016). Table 6 shows that during the 1997–2012 period, team size has shown a modest increase. Between 1997 and 2005, very few articles had more than three authors, and average number of authors per article fluctuated very little, rarely exceeding 2.2. From 2006 to 2012, the number of four-authored articles increased, the first five- and six-authored articles appeared, and the average number of authors per article reached 2.4 or more in almost every year. By 2012, only 8 of the 119 published articles were single-authored, and there were an average of 2.80 authors per article. Figure 2 graphically shows the modest but steady increase in average authorship during this period.

**Table 6: Team size of IMM co-authors**

Team size	Article count per number of authors						Total
	1	2	3	4	5	6	
<b>1997</b>	8	19	14				41
<b>1998</b>	11	15	9				35
<b>1999</b>	7	14	9	4			34
<b>2000</b>	11	16	13	1			41
<b>2001</b>	9	22	12	2			45
<b>2002</b>	19	18	20	3			60
<b>2003</b>	6	18	11	1			36
<b>2004</b>	13	24	18	2			57
<b>2005</b>	12	19	20	4			55
<b>2006</b>	11	15	21	4	1		52
<b>2007</b>	9	32	23	4			68
<b>2008</b>	11	19	21	7	2		60
<b>2009</b>	7	29	21	9			66
<b>2010</b>	21	50	47	8	2	1	129
<b>2011</b>	15	30	39	15	8		107
<b>2012</b>	8	42	46	13	9	1	119
<b>Total</b>	178	382	344	77	22	2	1,005



**Figure 2: Average number of authors per article published in *Industrial Marketing Management* per Year**

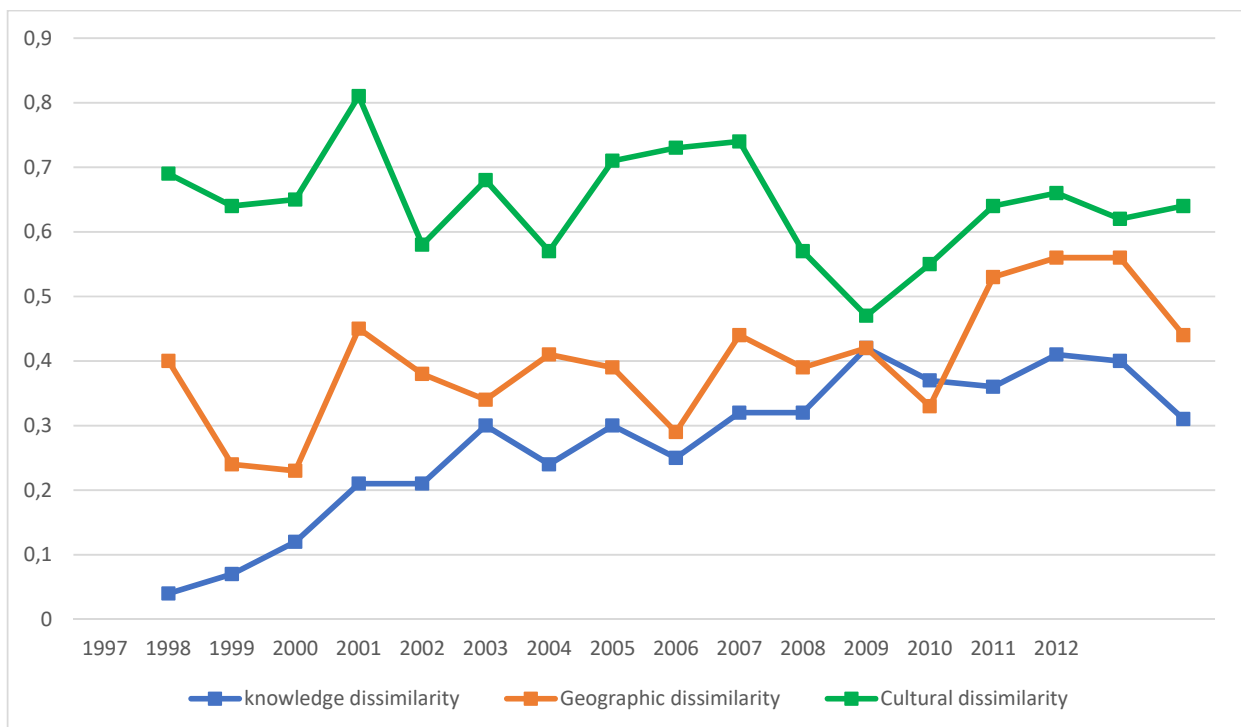
### 3.5 Community of Authors: Composition and Dissimilarities

To gain further insights on the trend toward increasing average author team size, one can also investigate the composition of these teams. Table 7 provides trends in team composition during the years 1997–2012, focusing on three measures of dissimilarity: knowledge, geographic, and cultural dissimilarity.

**Table 7: Team composition of *Industrial Marketing Management* co-authors**

Year	Knowledge dissimilarity	Geographic dissimilarity	Cultural dissimilarity
1997	0.04	0.40	0.69
1998	0.07	0.24	0.64
1999	0.12	0.23	0.65
2000	0.21	0.45	0.81
2001	0.21	0.38	0.58
2002	0.30	0.34	0.68
2003	0.24	0.41	0.57
2004	0.30	0.39	0.71
2005	0.25	0.29	0.73
2006	0.32	0.44	0.74
2007	0.32	0.39	0.57
2008	0.42	0.42	0.47
2009	0.37	0.33	0.55
2010	0.36	0.53	0.64
2011	0.41	0.56	0.66
2012	0.40	0.56	0.62
<b>Average</b>	0.27	0.40	0.64

Figure 3 graphically illustrates the trends in knowledge, geographical, and cultural dissimilarity among *Industrial Marketing Management* author team composition, from 1997 to 2012. It is noticeable that knowledge dissimilarity increases substantially over this time period. Looking specifically at benchmark years, the knowledge dissimilarity score increased from 0.04 in 1997 to 0.25 in 2005, and 0.40 in 2012. This finding is consistent with the fact that there has been a notable increase in the scope of research interests; consequently, there are substantially more authors working with collaborators with different, complementary research backgrounds. At the same time, we observe a less pronounced increase in the geographic diversity of teams' composition over time which is also consistent with our observations in Table 5 showing that the distribution of *Industrial Marketing Management* contributors over the five regions is more balanced in 2012. However, *Industrial Marketing Management* shows a roughly steady cultural diversity in teams' composition, which remains relatively high compared to knowledge and geographic dissimilarity indexes. One possible explanation for cultural diversity scores generally exceeding geographic dissimilarity scores is relocation of research faculty: a three-author team might comprise researchers from three diverse cultural origins all working at a single institution in Europe or the U.S., for example. Supporting this contention, research has shown that the percentage of foreign-born professors in U.S. universities has been increasing, particularly in technical research areas (Marvasti, 2005).



**Figure 3: Knowledge, geographic and cultural dissimilarity indexes for team composition of co-authors publishing in *Industrial Marketing Management* per year**

#### 4. CONCLUSIONS

Starting with the earliest publication of *Industrial Marketing Management* in 1971, business-to-business marketing management has emerged as a full-fledged, mature research stream within marketing. Previous editorials have discussed key metrics, which provide evidence of this maturing process, such as multinationality of authors, multidisciplinary of research topics, and rank improvements among business and marketing journals. *Industrial Marketing Management* has become a desirable target for authors working in research fields as diverse as supply chain management, value creation, and business networks (Lindgreen & Di Benedetto, 2018). Its articles are cited in leading innovation, engineering, operations, and logistics journals, as well as marketing journals (Di Benedetto et al., 2018).

This editorial has put *Industrial Marketing Management* under the magnifying glass, evaluating the journal over a recent 16-year time frame, on a wide variety of metrics. In particular, we have found much evidence supporting a healthy research discipline, having experienced growth and maturity: the average article's citation count has been increasing, there are more citations and authors across a wider range of subject areas, and published authors increasingly represent all parts of the globe. We assessed research team size, and team diversity characteristics including knowledge, geographic, and cultural diversity. We found team size has been increasing as well as team knowledge diversity. Authors are taking on increasingly complex and advanced research problems; the requirement for larger and more diverse teams increases, as the research team requires a wider range of expertise. We also noted more modest increases in geographic and cultural diversity, but recognized that cultural diversity tended to be higher than other diversity measures. Thus, author teams have a good likelihood of being culturally heterogeneous. In sum, the findings are further evidence of the maturation of the business-to-business marketing research discipline. This is encouraging news for researchers in this area, as they undertake more novel and challenging research studies, and as their research is increasingly recognized within both marketing and non-marketing academic circles.

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