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Invited Editorial

A Descriptive Analysis of Publications in *Marketing Science* Over Its History

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Using the University of Texas at Dallas database on publications in the top 24 business journals, we examine the evolution of *Marketing Science* as reflected by participation of faculty from top ranked business schools on one hand, and diversity on the other hand, as evidenced by contributions from different countries and from faculty of a wider set of schools. We show that faculty from top-ranked business schools have always published in *Marketing Science*, and continue to do so. We also show that the variety of schools with authors who publish in *Marketing Science* has increased, and that much of this expansion has occurred outside of North America. This international expansion appears to be driven by collaborations between authors in North America and those in other areas. One of the factors that may be fueling the increase in the variety of schools with authors publishing in *Marketing Science* is an increased tendency for collaboration by three or more authors. In general, *Marketing Science* has remained an outlet for authors from top schools, and has also become a place where authors from a much broader array of schools, especially those outside the United States, can publish.

Data, as supplemental material, are available at http://dx.doi.org/10.1287/mksc.2015.0957.

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History: Published online in *Articles in Advance* September 29, 2015.

Introduction

Since its first publication in 1982, *Marketing Science* has become one of the premier academic journals in marketing and has attracted publications from researchers all over the world. Our objective is to investigate the evolution of this journal as reflected by the mix of schools, countries, and authors who publish in *Marketing Science*. Specifically, we will show that *Marketing Science* has attracted authors from top ranked business schools throughout its history, and continues to do so. However we will also document that the diversity of schools and authors that publish in *Marketing Science* has increased greatly over time. This is particularly true of the spread of authorship to countries outside of North America, which we investigate in some detail. We will also show that over 1,200 different authors have published in *Marketing Science*, and that the authorship of articles in *Marketing Science* shows a marked trend toward more authors per article. Although our analysis is primarily descriptive, we will discuss the possible causes and implications of this and the other changes in the journal. To examine the evolution of *Marketing Science*, we use the University of Texas at Dallas (UTD) database that tracks publications in the top 24 business journals. We next describe the database.

The database, used in constructing the UTD top 100 research rankings, began in 1990, and much of our analysis covers the 25-year period (1990–2014). We append data on business school (B-school) rankings from Bloomberg *Businessweek* (BW), and *U.S. News and World Report* (USN), which provide general measures of the quality of business schools, and from the UTD data, which provides a measure of research quality of business schools. The unit of analysis is either an "author mention" or a "score." If a faculty from one university writes a paper with a faculty from another university, both faculty members get one mention each, but each one gets a score of 0.50. The UTD database ranks schools based on the total score obtained by a university in a given time period. Note that the total score or mentions for a university are not adjusted for faculty size or department size.

Over the 25-year period, the UTD database has 48,767 articles in the top 24 business journals with contributions from 1,325 universities. Of these there are 2,346 author mentions corresponding to 970 publications in *Marketing Science* from 1990 to 2014. There are 329 universities, companies or other organizations that have one or more publications in *Marketing Science* during this period. As is common in models of

incidence, we find that 30 universities representing 10% of all universities in the database contributed 58% and 50 schools accounted for 71% of all mentions. In other words, the distribution exhibits a long tail.

In evaluating the analyses to be presented below, it is important to note that the number of articles published in *Marketing Science* has increased considerably over time. According to the UTD data, there were 114 articles published in *Marketing Science* in 1990–1994; 142 in 1995–1999; 136 in 2000–2004; 283 in 2005–2009; and 305 in 2010–2014. A combination of an increased supply of manuscripts and relaxation of capacity constraints played a role in the large increase in articles between 2000–2004 and 2005–2009. INFORMS places a limit on the number of pages it will publish without additional outside funding. There was a large increase in submissions, and thus of quality articles. The page limit became a binding constraint that was ultimately resolved through increased funding by the INFORMS Society for Marketing Science (ISMS) and increases in the page limit by INFORMS. Thus part of the increase in publications over 2005–2009 was due to working off an excess backlog of accepted articles. Relaxing the limits on the pages available for publication undoubtedly played a role in enabling many of the changes in *Marketing Science* over the past 10 years that we will document.

Our first task is to provide evidence that *Marketing Science* has always been a top journal. Specifically we will present evidence that authors from top B-schools (as ranked by BW, USN, and UTD) have always published in *Marketing Science*. We will next document that there has been a large increase in the variety of schools and countries that publish in *Marketing Science* over time. We will document that collaborations between authors in North America and other continents appear to be a major source of the international expansion of the journal. We will also provide some very rough evidence that international marketing science conferences may have played a role in these expansions. Finally we will show that there has been a large decline in solely-authored publications in *Marketing Science*, and a large increase in collaborations between three to four authors. We will discuss the implications of these changes.

Business School Rankings and *Marketing Science*

To examine evidence that faculty members from top schools publish in *Marketing Science*, we assembled data on B-school rankings over the period 1990–2014 from BW and USN, two of the prominent sources of B-school rankings.[1] BW publishes B-school rankings every two years based on a survey of students and employers. USN publishes rankings every year based on similar survey-based results. These rankings are based on a weighted score of student responses to surveys, employer evaluations of school quality, and other metrics such as starting salaries, acceptance rates, etc. In recent years, BW has given a small weight (10%) to intellectual contributions of the faculty, but USN continues to provide rankings without considering research of the faculty at these schools. Whereas the rankings are based primarily on student and recruiter opinions, faculty research reputation may indirectly influence these opinions. Of course, schools recognize this and seek to be ranked high by a variety of strategies including having expert faculty. Thus, the rankings can be thought of as a subjective evaluation of the quality of a given business school and of the intellectual strength of that school's faculty.[2] There are well known limitations of the BW and USN rankings since they rely on self-reported metrics, inconsistent definitions, and subjective weighting of factors that determine the quality ranking.

The UTD overall research rankings provide a direct measure of the quality of a school's research output. The rankings are the sum of scores for faculty at a given school over the 24 journals employed in the rankings.[3] These journals are a subset of the 45 journals on a list of top journals used by the *Financial Times* in computing its rankings. We compute the UTD top 20 rankings based on 23 journals after removing *Marketing Science*. Because it depends on the choice of journals, and weights each article and journal equally, this measure is also imperfect. Furthermore, it does not adjust the score for faculty size. In fact there is no perfect measure of research quality.

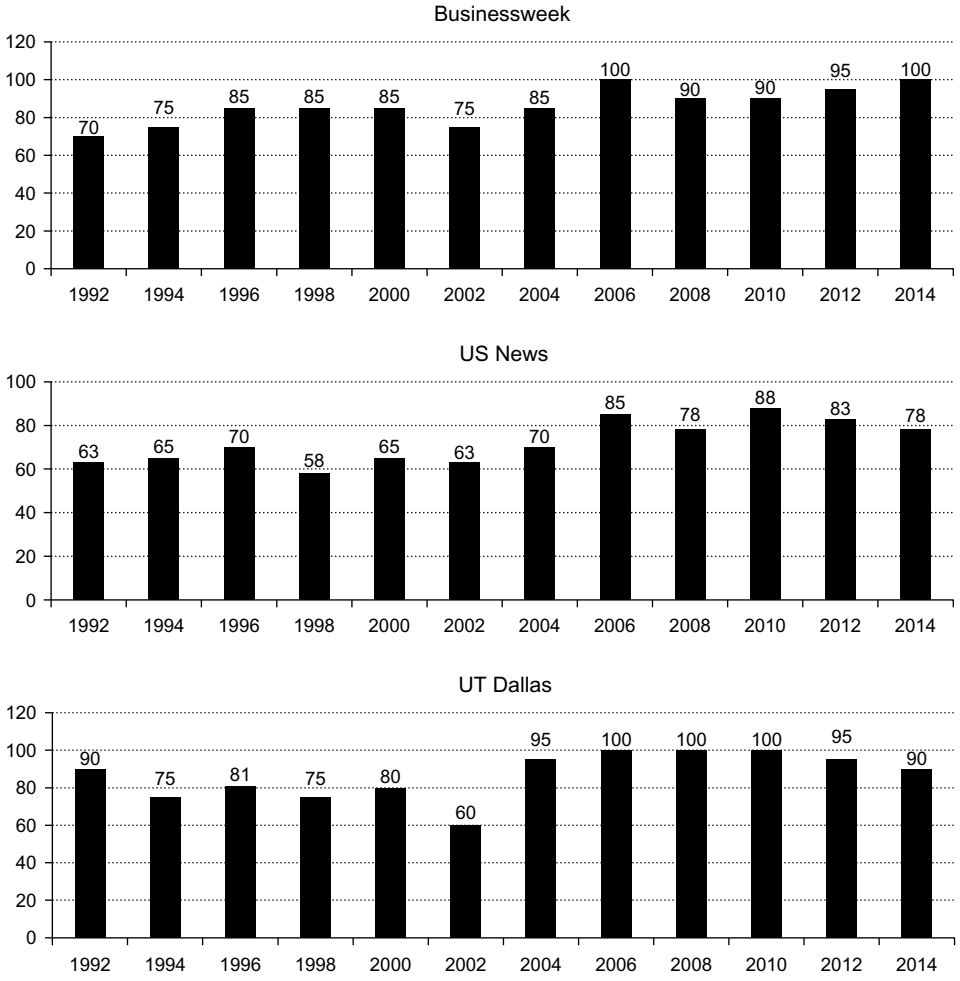
Keeping this in mind, we use rank data on the top 20 schools as this data is available for the entire period from 1990–2014. In Figure 1, we plot the percentage of the top 20 B-schools from the BW, USN, and UTD lists, which have published in *Marketing Science* within the two years preceding the ranking. The top panel of Figure 1 shows that all of the top 20 business schools as ranked by BW are now actively publishing in *Marketing Science* and we may infer that they do so because it is a top journal. Second, we observe that the percentage of top 20 schools publishing in *Marketing Science* has been increasing over time. For BW, the percentage ranged between 70%–85% between 1992 and 2004 with an average of 80%. From 2006 to 2014, the percentage ranged between 90% and 100%, with an average of 95%.

[1] The *Financial Times* rankings were not included because they only date to 1999.

[2] Of course the school quality that is important for students and employers is not limited to faculty quality only, thus our analysis should be interpreted taking that into account.

[3] Recall that a faculty member's score for an article is 1/Number of authors.

Figure 1 Percentage of Top 20 B-Schools That Published in *Marketing Science* Within the Past Two Years

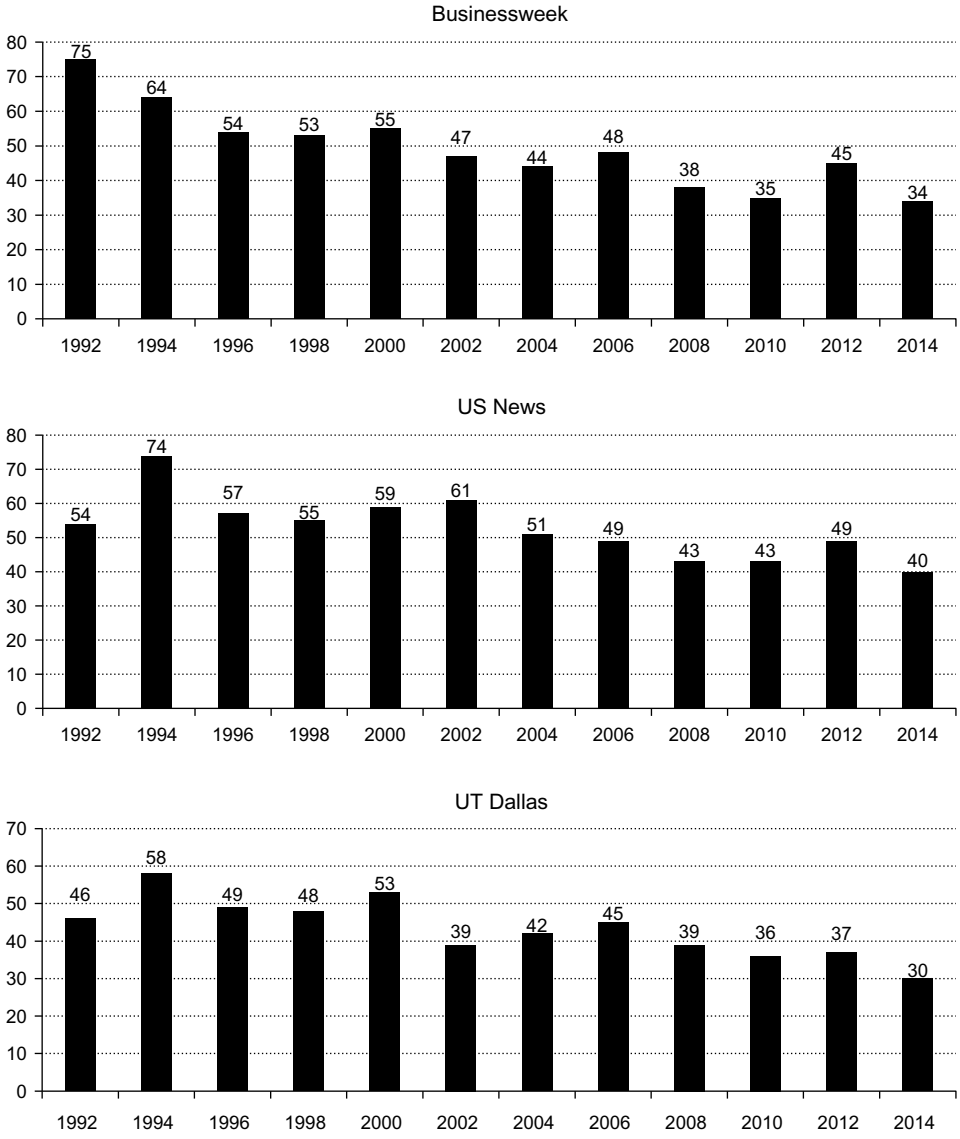


This increased representation may be due in part to an increase in the number of publications discussed earlier. This increased participation from the top 20 business schools suggests that *Marketing Science* is a preferred outlet for marketing academics. For the top 20 schools in the USN ranking, the percentages increase from an average of 65% to 85% in the latter half. Among the research ranked schools from the UTD top 20 list, participation in *Marketing Science* reaches almost 100% in the latter half. Irrespective of the way in which the ranks are computed, a large percentage of the top schools publish in *Marketing Science* and this trend is growing.

Because the UTD database was not available prior to 1990, the analyses presented in Figure 1 do not consider the 1982–1989 period (the first eight years of *Marketing Science*). Also there were no rankings of business schools until the first BW ranking in 1988. To answer the question of whether authors from top schools were publishing in *Marketing Science* since its inception, we calculated author mentions over 1982–1989 for the schools in the initial top 20 rankings. Every school in the initial top 20 had at least one mention in *Marketing Science* in 1982–1989, and these schools accounted for one-third of the mentions over this period. By this measure, *Marketing Science* was a top journal during its first eight years.

Although the penetration of *Marketing Science* in the set of top ranked business schools is approaching 100%, the top ranked business schools represent only a small fraction of the contributions to the journal over time. This becomes clear in Figure 2 which shows the percentage of author mentions from the top 20 schools over time. In 1992, the percentage of author mentions from the BW top 20 was 75% indicating a concentration of publications in the highest ranked schools. Over time, as other schools also sought to publish in *Marketing Science*, the percentage of author mentions from the top 20 schools shrank to 34% in 2014. Similar trends are seen for USN and UTD lists of top ranked schools. Figures 1 and 2 taken together lead us to the conclusion that while *Marketing Science* is a preferred outlet for publication of all highly ranked

Figure 2 **Percentage of Author Mentions from the Top 20 B-schools Over Time**

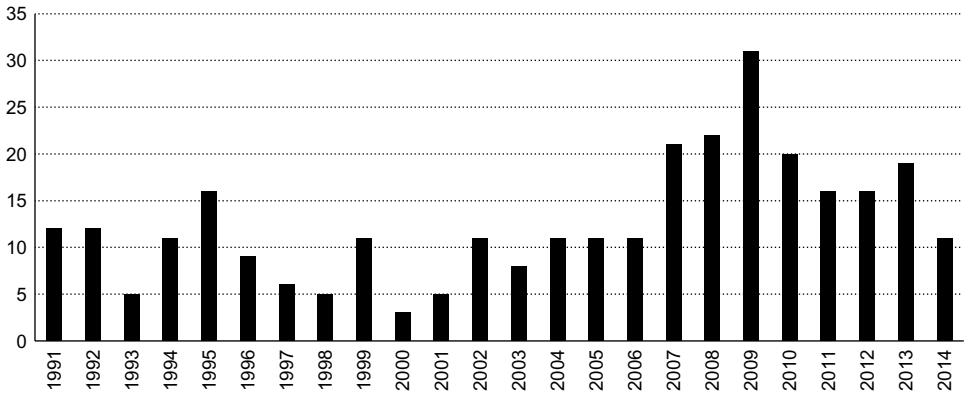


business schools, it has generated a much broader appeal over time.

Another way to examine whether the appeal of *Marketing Science* has broadened over time is to determine the number of new universities whose names have not appeared in previous years. For example, we start with the year 1990 and assign the universities that published in 1990 to be at the base level. In 1991, we compute the new university names that did not appear in 1990. In 1992, we compute the new names that did not appear in 1990 or 1991, and so on. Of course, this is bound to increase in the first few years. Yet, we find that the rise in representation of universities is itself accelerating. Figure 3 displays a plot of the number of new university mentions in each of the subsequent years. We see that on average 12.6 new universities have joined every year. In 2009, a record high of 31 new institutions published in *Marketing Science*. This figure illustrates the trend in the reach of *Marketing Science* across universities over the years. It is heartening to note that more and more universities find it desirable to publish in *Marketing Science*.

While the number of universities with faculty members who publish in *Marketing Science* has increased over time, it appears that non-academic participation has declined since the early years of the journal. Over the period 1982–1989, 10.6% of author mentions came from outside of academia (33/312); in 2010–2014 this percentage had declined to 2.4% (19/724). Whereas a number of the early mentions were from practitioner commentaries, the willingness and abilities of practitioners to comment still signifies their involvement with *Marketing Science*. A similar trend toward declining practitioner involvement seems to be evident for ISMS

Figure 3 **Number of New Institutions that Published in *Marketing Science* Over Time (Total = 329)**



conferences. We leave it to others to judge whether this change in industry participation signifies a problem that needs to be addressed.

Contribution by Country

Given that the above analysis indicates that authorship in *Marketing Science* by faculty that are not from top ranked schools has increased considerably over time, and a large number of schools have had their first publication in *Marketing Science* in recent years, an obvious question is where the increase came from. One possibility is expansion from outside the U.S. or Canada. Looking at the distribution of author mentions by country, we see from Table 1 that the percentage of author mentions from outside the U.S. more than doubled between 1982–1989 and 2010–2014 (27.63/13.14), and increased at an even higher rate since 1990–1994. Thus the participation of non-U.S. scholars in *Marketing Science* has increased markedly. Correspondingly, the share of author mentions from business schools in the United States declined from a high of 92% in 1990–1994 to 72% at the end of the study period. Over this 25-year period, the top contributing countries outside the U.S. were the Netherlands, Canada, China, France, and the United Kingdom. The Netherlands and China, which had no mentions prior to 1995, had a combined 9% in 2010–2014. Contributions from a variety of countries other than those listed in Table 1 (All others) have also increased considerably.

To assess the change in U.S. concentration of author mentions, we also report the Herfindahl index (HI), a commonly used measure of concentration over different time periods in Table 2. We define HI as follows:

$$\mathrm{HI} = \sum s_i^2 = [(s_i)^2 + (1 - s_i)^2],$$

where s_i is the share of author mentions from U.S. based business schools. A smaller HI indicates a greater spread in contribution over a number of countries. For *Marketing Science* we see that the HI decreased from 0.86 to 0.60 over time. A similar HI, based on publications in the UTD top 24 journals also shows a decline from 0.72 to 0.54, indicating that the percentage decline of the HI measure is larger for *Marketing Science*. We observe that the number of participating countries (other than the United States) increased from 5 in 1990–1994 to 24 in 2010–2014. Thus, authorship in *Marketing Science* has changed from being concentrated almost exclusively in the U.S. to having a significant international presence.

To further examine the spread of *Marketing Science* from its base in North America, we classified all articles published in *Marketing Science* into three categories: all authors from North America; a combination of North American authors and authors from other regions; and only authors from outside of North America. In

Table 1 **Percentage of Mentions in *Marketing Science* from Different Countries Over Time**

Country	No. mentions	1982–1989	1990–1994	1995–1999	2000–2004	2005–2009	2010–2014	All periods
United States	1,787	86.86	92.38	84.08	79.47	75.64	72.37	77.73
Netherlands	96	0.00	0.00	2.23	5.30	4.27	5.06	4.00
Canada	66	2.89	2.86	3.18	2.98	2.99	2.59	2.87
China	56	0.00	0.00	1.59	2.32	1.85	4.02	2.44
France	42	1.28	1.43	1.91	1.66	2.14	1.69	1.83
United Kingdom	36	1.60	0.48	1.59	0.66	1.71	1.95	1.52
Israel	30	1.92	0.95	1.59	1.99	0.71	1.56	1.30
Australia	30	0.64	0.00	0.00	0.33	1.28	2.59	1.30
All others	150	4.81	1.90	3.82	5.30	9.40	8.17	7.00

Table 2 Change in Concentration of Author Mentions

	1990–1994	1995–1999	2000–2004	2005–2009	2010–2014
No. of other countries	5	12	14	25	24
Herfindahl index (*Marketing Science*)	0.86	0.73	0.67	0.63	0.60
Herfindahl index (top 24 journals)	0.72	0.64	0.64	0.58	0.54

Table 3 Percentage of *Marketing Science* Articles with Authors from Different Regions

Year	North America only (%)	North America and other regions (%)	Other regions only (%)	Total articles
1982–1989	90.34	4.35	5.31	207
1990–1994	90.35	5.26	4.39	114
1995–1999	76.76	19.01	4.23	142
2000–2004	75.00	18.38	6.62	136
2005–2009	67.49	20.85	11.66	283
2010–2014	64.26	24.92	10.82	305

this analysis we combine Canada with the United States because of the close connection between schools in these countries.[4] Since the unit of analysis is the article, rather than author mentions as in Table 1, the percentages in the tables are not directly comparable.

The results, which are presented in Table 3, show a marked increase in articles coauthored by a combination of North American authors and authors from other regions after 1994. In 2010–2014 about 25% of *Marketing Science* articles resulted from collaborations between authors from North America and other regions, and about 89% of *Marketing Science* articles had at least one author from the U.S. or Canada. After 2004 there was a considerable jump in *Marketing Science* articles written solely by authors from outside of North America. These results indicate that the globalization of *Marketing Science* originated primarily through collaborations with North American authors, but that publications not involving North American authors have increased in recent years.

There are many possible reasons for these trends. Certainly the Internet has made long distance communication easier in recent years, and faculty who were trained in North America and returned to their home country may collaborate with people they worked with during their stay in North America. Also, as we will demonstrate, there has been a marked trend toward more authors per article, providing more opportunity for international collaborations.

Another possibility is that international conferences sponsored by ISMS have fostered publications in *Marketing Science* from outside of North America. A full analysis of this question would require detailed data on conference attendees and their subsequent behavior, which is not readily accessible. Given the data at our disposal, we settled on an analysis of the location of international marketing science conferences, and the number of author mentions for authors from the country hosting the conference. We compare the mentions in a four-year period before and after the conference. The results, which are presented in Table 4, indicate an increase in authorship from the host country in most periods, especially in conferences held between 2004 and 2010. This evidence is consistent with a positive effect of the conferences on subsequent authorship. Of course, a causal relationship cannot be inferred from this evidence. In particular, there is a possibility that the observed increases in authorship are because of reverse causation: the country hosts the conference because a critical mass of researchers emerges, and they subsequently publish their work in *Marketing Science*.

In sum, one of the drivers of increases in the diversity of schools with faculty who publish in *Marketing Science* is a trend toward globalization of authorship. Evidence indicates that much of the globalization results from collaborations between authors from North America and elsewhere. In recent years, however, the number of articles authored solely by authors from outside of North America has increased considerably. We present rough evidence that one of the many possible drivers of the globalization is international marketing science conferences.

Table 4 Change in Author Mentions Before and After an International Conference

		No. mentions by authors from that country in four years		
Year	Country	Preconference	Post conference	Result
1987	France	3	6	Increase
1992	United Kingdom	5	2	Decrease
1995	Australia	0	0	No effect
1998	France	4	5	Small increase
2001	Germany	2	3	Small increase
2004	Netherlands	14	20	Increase
2007	Singapore	3	9	Increase
2008	Canada	14	19	Increase
2010	Germany	6	13	Increase
2013	Turkey	2	1	Not enough data

[4] There were no publications involving authors from Mexico and Central America, the other regions of the North American continent.

Table 5 Number of Mentions per Author in *Marketing Science*

N (number of papers)	Number of authors with "*N*" papers	Percentage of authors having "*N*" papers
1	830	64.79
2	229	17.87
3	85	6.63
4	53	4.14
5	35	2.73
6 or more	49	3.82

Analysis of Authors

To this point we have concentrated on changes in the mix of schools publishing in *Marketing Science*, and on the spread of authorship in *Marketing Science* to outside of North America, as drivers of diversity. Another indicator of diversity is the variety of authors who publish in the journal. Repeated publication by only a few authors would be an indicator of dominance by a small group, whereas publication by a wide range of authors would be an indicator of broader attraction to publishing in *Marketing Science*.

Authorship in *Marketing Science* appears to be quite widely distributed. In the data, there are a total of 1,281 authors that had one or more publications in *Marketing Science* during 1990–2014. Table 5 shows the frequency of authors with one or more papers (mentions) in *Marketing Science*. Approximately 65% of the authors have one publication, while 18% have two. Only 3.8% have more than five papers published in this journal.

Figure 4 shows the distribution of the number of papers per author. The relationship between the number of authors and the number of papers per author can be summarized by a power law given by the following equation:

$$Y = 1{,}125.5x^{-2.45}.$$

This power law provides an excellent fit to the data with an *R*-square value of 0.95. Thus the distribution of authorship in *Marketing Science* is characterized by a long tail. While very few authors have published more than five articles in *Marketing Science*, and most have published only one or two, there are a handful of prolific contributors.

Figure 4 (Color online) Distribution of the Number of Mentions per Author

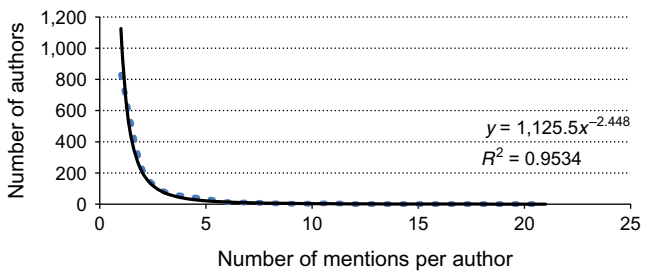


Table 6 Solely-Authored Articles

Year	Percentage of solely-authored articles in *Marketing Science* (%)
1990–1994	35.09
1995–1999	18.31
2000–2004	21.32
2005–2009	14.84
2010–2014	9.00

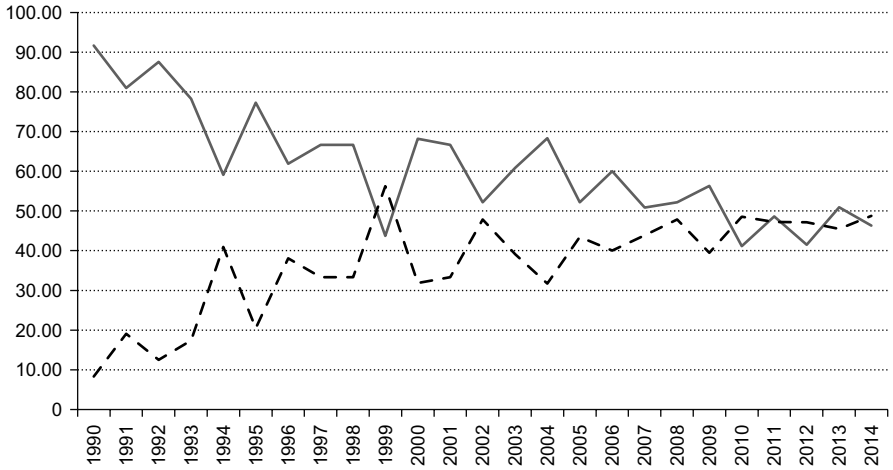
We noted above that one of the drivers of the globalization of *Marketing Science* is collaboration between authors from North America and other countries. If collaboration has increased in general, this could be one of the drivers of the increased diversity of authorship in *Marketing Science*, both internationally and inside the U.S. To examine this, we studied changes in the number of authors per paper over the 25-year study period.

We found a marked increase in the number of authors per paper, in which the average number of authors per paper increased from 1.542 in 1990 to 2.585 in 2014. One of the commonly asked questions in tenure cases is whether the candidate has any solely-authored articles. Table 6, which presents the percentage of solely-authored articles in *Marketing Science* for five-year increments, provides insight into the current relevance of this question. As the table indicates, there has been a marked decline in articles with a single author from about 35% 20–25 years ago to 9% in the most recent period. Sole authorship has become rare in *Marketing Science*. It may be time to rethink the expectation of sole authorship, at least for articles published in *Marketing Science*, or for publications in general if this trend also holds for other journals.

Another way to look at the authorship issue is to examine trends in the number of authors per paper. In Figure 5 we see that the number of one or two author papers has declined from about 90% in 1990 to about 50% in 2014. By 2014, about half of all papers in *Marketing Science* had three to four authors. There are a number of possible reasons for this trend toward collaboration by more than two authors. One reason could be that the knowledge required to address marketing issues may require varied skills such as theory, estimation, computer programming, etc., that in turn necessitate collaboration. Alternatively, greater ease of communication might lower the cost of collaborating across authors located in different universities and countries. Because authors from outside of North America tend to work with authors based in the U.S. and Canada, this trend toward collaboration is likely related to increased international authorship in *Marketing Science*.

This trend toward collaboration by three or more researchers raises some important issues for evaluating

Figure 5 **Percentage of One to Two Author Papers and Three to Four Author Papers Over Time**



faculty. Given the joint production, it may be difficult or impossible to evaluate the contribution of any one faculty member independently of the input of others. In some cases free-riding may take place. Specialization may imply that a given team member may be highly productive while lacking certain skills. One member might specialize in programming, another in solving math problems, and another in writing. This raises a question of whether one highly-specialized skill is sufficient for tenure. These issues are well known. The contribution of this analysis is to provide evidence that issues raised by multiple author collaborations may be more pervasive than many realize.

Conclusions

Our analysis indicates that authors from top ranked business schools have continued to publish in *Marketing Science* since its inception. This is consistent with its general reputation as one of the top journals in marketing. That is the one constant. The remainder of our analysis provides a picture of many changes in the demand for publication in *Marketing Science*: an increasing variety of schools that publish in *Marketing Science*; a trend toward increased authorship from outside of North America, which appears to be fueled by collaborations with North American authors; a large number of authors who have published in *Marketing Science*, but only a few who have multiple publications; a marked trend toward an increased number of authors per article, and a marked decrease in solely-authored articles. On the supply of space for publication, the number of publications in *Marketing Science* has increased considerably, after capacity constraints were relaxed during the first decade of this century. These changes have transformed *Marketing Science* into a journal with authors from a more diverse set of institutions, a more global journal, and one that can publish more articles without sacrificing quality.

These changes are interrelated and it is difficult to attribute causality, at least with the data currently at our disposal. Accordingly our analysis suggests a number of possible areas for further research on the drivers of the observed changes. One possibility would be to examine the degree to which the Internet is responsible for increased collaboration, increased variety of publication outlets, and increased internationalization. Another would be to examine the degree to which the international expansion of authorship in *Marketing Science* is due to students trained in the U.S. who return to their home country. An additional issue that might be worthy of study is the extent to which the increasing technical sophistication required to publish in *Marketing Science* has increased gains to specialization, and therefore fostered collaboration. Finally, there could be a more complete study of the relation between international marketing science conferences, and the international expansion of the journal.

Supplemental Material

Supplemental material to this paper is available at http://dx.doi.org/10.1287/mksc.2015.0957.

Editor's Note

This paper was invited by the Editor-in-Chief, Preyas Desai.