

Why Have the Leading Journals in Management (and Other Social Sciences) Failed to Respond to Climate Change?

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The effect of climate change on business is likely to be substantial. It might be expected, therefore, that the scholarly field of business and management would be centrally engaged with the challenges that global warming will bring. Yet, in this article, the author shows that the most cited management journals have barely published an article on the topic. Similarly, low numbers of articles appear in the prestigious journals in economics, sociology, and political science. Why have the top journals failed to respond? The author proposes five possible explanations. Among these five explanations, the author emphasizes the existence of an undesirable delay between ideas appearing first in peripheral publications and then in the elite journals.

Keywords: *climate change; global warming; business and management journals; business schools; social science*

Business and industry have, for at least the last 200 years, adapted to changing political and environmental norms—from labor reforms and pollution controls enforced in 19th century London to the 1970s Clean Air Act in Los Angeles to acid rain reduction in Switzerland to ozone depletion in the antipodes in the 1990s. Many scientists argue that the current problem of climate change is the most serious threat to the planet (Hansen et al., 2006; Intergovernmental Panel on Climate Change [IPCC], 2001, 2007). The existence of global warming can be thought of as an external shock to knowledge. The impact for most of the world is negative, and it is happening outside the control of any nation or government.

Climate change was first discovered in the sciences. Whether society now reacts effectively to the shock, and how it acts to mitigate the effects, is arguably a problem for social scientists rather than for scientists. In preparing for climate change, the business sector may be ahead of the academy, as represented by the research journals. In this paper, I show that few articles on the topic are appearing in major journals in business and management. Indeed, the most prestigious body in the field, the Academy of Management (AOM), has never published an article on global warming or climate change in its academic journals.

If papers on climate change are rare in management journals, what does that signify? Is it merely due to a

time lag in that science leads the social sciences, and the latter will eventually catch up? Have social science researchers been waiting for scientists to agree? Is climate change perhaps simply a practical problem that might be explored in journals of business practice and not in academic journals that examine empirical problems within a theoretical framework? Or is it that management research has become too theory led? This last question is applicable to those who argue that research has become less relevant to business. Finally, I ask also whether the absence of interest in climate change is merely a temporary historical phenomenon that is now altering.

To address these questions, I first collect data from 1970 to 2006 on all mentions of *global warming* and *climate change* in 30 leading English-language management journals. I then compare the results with those for the top 30 journals in economics, sociology, and political science to identify whether those subject areas have published differently. Second, I attempt to put these numbers into context by identifying how many articles have

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appeared on this topic in all social science titles. I then contrast this figure with the number of papers published in all science journals. Finally, I try to assess how these data compare with coverage of pollution during the same period.

After presenting the empirical information, I discuss five possible explanations for the low coverage of climate change in management journals.

The Coverage of Climate Change in the Top Journals

It is necessary to establish an objective measure of research interest in the topic. To do this, I use bibliometric methods. I count how many times the top 30 business and management journals reference the terms *global warming* or *climate change* in their article titles, abstracts, or keywords.¹ These general expressions have been selected over other word combinations because they are most commonly used to describe the phenomenon; terms such as *greenhouse gases* are too technical, whereas *sustainability* is a little too broad. This article does not track all research on organizations and the natural environment (see Etzion, 2007, which is not directly concerned with climate change) or the more general field of corporate social responsibility.

At the time of data collection, there were 118 journals² listed in the combined categories of *business* and *management* in the database that I, and most other researchers, use to source journal articles—Institute of Scientific Information Web of Knowledge (ISI).³ These journals include technical publications and also those of a more applied nature, such as *Harvard Business Review*. Journals are ranked in ISI relative to each other. The most common method, the one that journals themselves often publicize, is by impact factor.

A journal's impact factor is measured by calculating the frequency with which an average article has been cited up to 2 years after publication. Thus, the impact factor of a journal in 2007 will depend on the number of citations in that year to articles published in 2006 and 2005. This citation score is then divided by the total number of articles published in the journal over this 2-year period.⁴ For the purposes of this study, I have used two sets of criteria to create a list of top 30 journals in business and management. The first uses impact factors. The second, named *total cites* in ISI Journal Citation Reports, calculates the total number of citations a journal has received in the previous year—in this case the year was 2006. It is important to note that journal impact factors and citations change regularly.

The main criterion for journals being included in the top 30 list compiled for this study (see Appendix A) is a high ranking by both impact factor and total cites. A second decisive factor for inclusion is that the authors who publish in these journals are typically located in business or management schools. To rank journals using citations to papers is open to objections; for example, it has been shown that a circularity exists, in which articles in the top journals tend to get more heavily cited for reasons beyond their actual quality (for recent discussion of this issue, see Clark & Wright, 2007, and Judge, Cable, Colbert, & Rynes, 2007). The creation of any ranking is an imprecise process, and the one used here is open to criticism; but it allows us some understanding of what is being published at the top end of the discipline.

Identifying whether climate change is mentioned only in an article's abstract, title, or keywords, rather than in the main body of the text, may mean that some articles are excluded. However, it is unlikely that substantial work on global warming is being missed.

Global Warming or Climate Change in the Top 30 Business and Management Journals

The two publications that rank highest by impact factor and total number of citations in ISI are the *Academy of Management Journal* and *Academy of Management Review*. Notably, the data, which run from 1970 to 2006, show that these two leading journals have never published an article mentioning global warming or climate change (in the title, abstract, or keywords). In total, there are just nine articles that refer to climate change or global warming in the top 30 management journals over that period. This is out of a total number of 31,000 published papers in these journals.

The first article on the subject in these top 30 journals appeared in 1997 in the *California Management Review*, which has published four articles, the highest number of papers on climate change among the top 30 list. Other journals that have published an article include *Corporate Governance* (1), *Harvard Business Review* (1), *Journal of Management Studies* (1), *Management Science* (1), and *Research Policy* (1). How do these titles compare with other business and management journals?

The Number of Articles in All Business and Management Journals in ISI

In ISI's Journal Citation Reports, there is a subject heading for business and a separate one for management. For the period between 1970 and 2006, there were a total

Table 1
A Summary of Management and Business Journals That Published Articles on Global Warming or Climate Change: 1970–2006

Publication Dates	Top 30 Journals by Impact Factor and Total Citations	Journals Ranked in or Below the Top 50	All Management and Business Journals
1970–2006	9	35	44

of 44 papers published in these journals that focused on climate change. As mentioned above, nine of these are included in the top 30 journals. Fifteen of the remaining 35 articles were published in the journal *Technological Forecasting and Social Change*, and the next highest number of articles, six, can be found in *Tourism Management*. Both journals are ranked loosely in the top 50. The remaining are in journals ranked outside the top 50. These figures are summarized in Table 1.

Forty-four articles focusing on the changing climate seem low. Also, there is a degree of clustering in that half the total number of published papers in business and management journals appears in just two titles. Should we expect more? These numbers are put in context when they are compared with the publishing output on the subject in other social science fields.

Mentions of Global Warming or Climate Change in the Top 30 Economics, Sociology, and Political Science Journals

Of the four disciplines considered here, economics has published the most articles, and it has done so from the earliest period. However, the journal that has the highest impact factor, the *Quarterly Journal of Economics*, has never published an article that refers to global warming or climate change (in the title, abstract, or keywords). In contrast, the journal with the highest total citations, the *American Economic Review (AER)*, has published 14 papers. Interestingly, the first article to refer to a link between economic growth, carbon dioxide, and the climate was published in the *AER* in 1977.

Between 1970 and 2006, 63 articles in the top 30 economics journals mention global warming or climate change.⁵ This is out of a total number of 51,000 articles. There are 175 journal titles listed in ISI under the category of economics. The field of economics has thus published on climate change somewhat more consistently: The top 30 journals have produced seven times the number of articles compared with those in business and management titles (though there were one-third extra

articles published in economics journals during this period). The figures are presented in Table 2. Next, I look at how the subject of sociology compares with management and economics.

It could be argued that sociology, the discipline concerned with the analysis of society, will be of central importance as the world adapts to climatic changes. Again, isolating the top 30 sociological journals, using the same method of ranking, tells us something about how these issues have permeated research. Surprisingly, no articles mentioning global warming or climate change in the title, abstract, or keywords between 1970 and 2006 were published in the 3 leading sociology journals: the *Annual Review of Sociology*, the *American Journal of Sociology*, and the *American Sociological Review*. This seems unexpected, especially as 40 papers appear on this subject in the remaining 27 journals in the top 30 list. As can be seen in Table 2, this is out of a total of 25,000 articles. Sociology has published four times the number of articles on climate change compared with business and management, though the subject is not represented in the top three titles.

Given the potentially key role of policy makers and governments, a final look through the journals of political science is also revealing. Individual and corporate behaviors, in reducing greenhouse gases (GHGs), are unlikely to change without governmental sticks and incentives. Thus, it is interesting to note that in the two leading journals, the *American Journal of Political Science* and the *American Political Science Review*, no articles were published on the topic of climate change or global warming in the title, abstract, or keywords between 1970 and 2006. Indeed, there were only 11 articles in the top 30 political science journals, as can be seen in Table 2. This is out of a total number of 30,000 articles.

What Have We Learned From This?

The data in Table 2 show that across all four disciplines articles that discuss climate change or global warming are scant. Overall, fewer papers have been published in top business and management journals than in those of economics, sociology, or political science; although when the total number of articles is controlled for the difference is marginal. With the exception of the *AER*, one of the top two economics journals, the most prestigious titles as identified by ISI's Journal Citation Reports across four major social science disciplines—business and management, economics, sociology, and political science—published no articles on climate change between 1970 and 2006.

Table 2
A Summary of the Top 30 Journals That Mention Global Warming or Climate Change in the Title, Abstract, or Keywords in the Disciplines of Management and Business, Economics, Sociology, and Political Science Between 1970 and 2006

Academic Discipline	Number of Articles Mentioning Global Warming or Climate Change	Total Number of Articles Published: 1970–2006
Business and management	9	31,000
Economics	63	51,000
Sociology	40	25,000
Political science	11	30,000

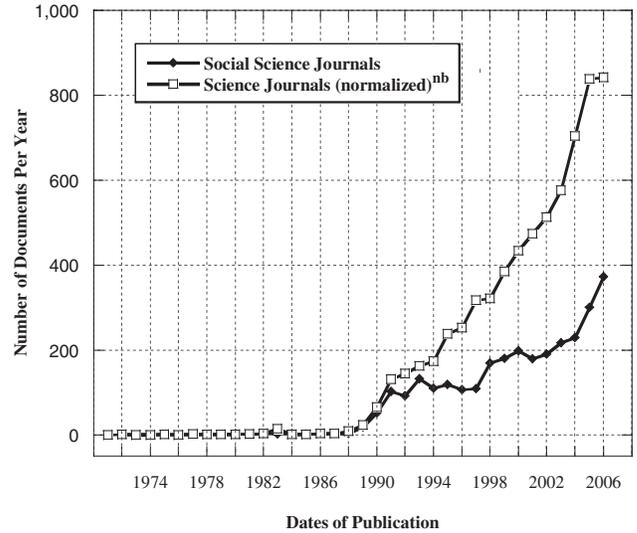
This may be viewed with concern, given that these top journals are, in many cases, produced by the largest and most influential disciplinary associations in the world. For example, the *American Sociological Review* is published by the American Sociological Association, a body that has 14,000 members, with 6,000 attendees at its 2007 conference (www.asanet.org). Similarly, the *American Political Science Review* is published by the American Political Science Association, which describes itself as “the leading professional organization for the study of political science” with 15,000 members in 80 countries (www.apsanet.org). The *AER*, the only top-rated journal to have published on climate change, is also produced by the largest association in its field, the American Economic Association. Finally, the *AOM*, which organizes the largest conference in business education, publishes both the top two management titles.

Does the low number of articles across these four disciplines mean that the social sciences as a whole are not covering climate change? To understand this, it is necessary to assess how many papers are being published in scholarly journals in the social sciences more broadly and also to contrast this number of articles with those being generated in science journals. Finally, a separate test is done that compares coverage of climate change with previous and current coverage on pollution more generally, both in the social sciences and the natural sciences.

Coverage of Climate Change and Pollution in the Social Sciences More Broadly and the Sciences

In 2006, there were 6,164 science journals listed in ISI, and there were 1,768 social science titles—over a

Figure 1
Articles published annually in social science journals and in science journals (normalizing for the total number of publications) that mention global warming or climate change between 1970 and 2006



Note: Mentions are in the title, abstract, or keywords. They include all document types not solely articles. Journals are those listed in Institute of Scientific Information (ISI) Web of Knowledge. Science journals have been normalized by dividing the number of documents published in each time period by 3.5. This has been done because there is just over a third more science journals than social science journals listed in ISI.

third fewer. In 1998, the earliest time period for which journal numbers are listed in ISI, the number of science to social science journals was 5,467 to 1,679. This also was slightly greater than a ratio of 3:1. If we are to compare the scientific output and the social-scientific output on global warming issues, we need to normalize for this kind of difference between the two underlying scholarly areas.

Figure 1 shows the distribution, between 1970 and 2006, of all documents in science and social science journals that mention the words climate change or global warming.⁶ The search term was specified as *global warming or climate change not pollution* so as to isolate the former from the latter. I have attempted to control for the higher quantity of science journals by normalizing publications. This has been done by dividing the number of science articles in each time period by 3.5, which represents approximately the ratio of science to social science titles. There are other inconsistencies in the publishing practices between the two fields. Not only are more science journals published but they also tend to

include more articles per volume and more volumes per year. Moreover, the turnaround of journals is noticeably faster in the natural sciences. In economics, an extreme example, it can take up to 2 years between the acceptance of an article and its eventual publication in a journal (Ellison, 2002; Hamermesh, 1994). Consequently, there is always likely to be a discrepancy in the number and speed of articles by scientists compared with social scientists.

Nevertheless, Figure 1 shows that many articles referring to climate change and global warming are being published in the social sciences. Therefore, the small number of articles in management journals, and the other traditional social science disciplines, cannot be explained by a general lack of work outside the hard sciences. It is clear from the evidence that articles on this topic are being written and published.

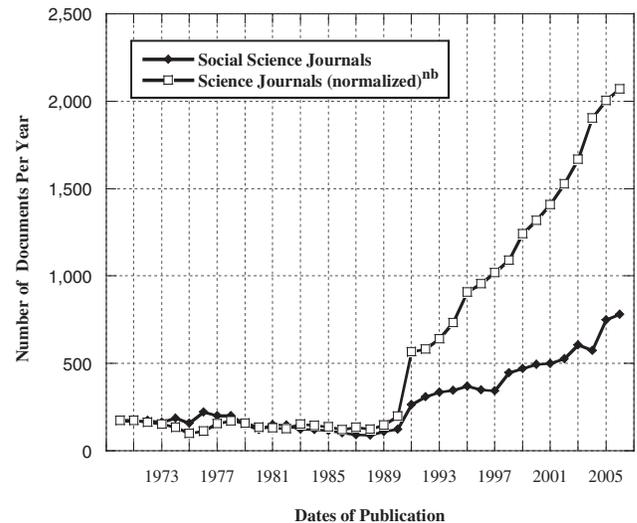
It seems useful to compare these findings with a benchmark. Here I choose the case of pollution, which was a major public concern, pre-global warming, in the 1970s and one that has continued to this day. The problem with using pollution as a comparator variable is that, technically, climate change is caused by pollution; therefore, the two are interchangeable. However, for the purposes of this study, I am treating them as somewhat different concepts, which tends to be the case in the media and science generally. Hence, I used the search term *pollution not global warming not climate change*.

Figure 2 documents the number of mentions of *pollution* in all science and social science journals between 1970 and 2006, again controlling for the extra number of science journals. It is interesting to note that there appears to have been an approximately constant ratio, over the 20-year period from 1970 to 1990, in the number of science to social science documents on pollution. The ratio of science to social science publications is closer in output on climate change than on the topic of pollution. In contrast, in the journals under inspection in this article, more articles have been published on pollution.

Table 3 shows that 45 articles in the top business titles mention pollution—again in the abstract, title, or keywords between 1970 and 2006. As can be seen, the disciplines of sociology, political science, and, especially, economics have all published more articles referencing pollution than climate change.

That the social sciences are behind the sciences in generating articles on global warming and pollution should be expected as these phenomena were first identified, and continue to be monitored, by scientists. However, it seems that the topic of climate change has been flourishing in the social sciences broadly defined. Where the major publishing differences occur is in the ratio of all social science

Figure 2
Articles published annually in social science journals and in science journals (normalizing for the total number of publications) that mention pollution between 1970 and 2006



Note: Mentions are in the title, abstract, or keywords. They include all document types not solely articles. Journals are those listed in Institute of Scientific Information (ISI) Web of Knowledge. Science journals have been normalized by dividing the number of documents published in each time period by 3.5. This has been done because there is just over a third more science journals than social science journals listed in ISI.

articles compared with the proportion reaching the very top journals in business, sociology, economics, and political science.

Should There Be More Articles on Climate Change in the Top Business and Management Journals?

It has been shown above that four core social science disciplines have few articles on global warming, but it could be argued that the field of management studies has a particular relevance to the changing climate and market environments. In 2004, 37% of global energy use was attributed to industry (IPCC, 2007). This figure was down from 40% in 1970 as technologies became more efficient. Most are large businesses though small and medium-sized enterprises also make up a sizeable percentage (IPCC, 2007). Many of the world's energy-intensive industries are now located in developing countries,

Table 3

A Summary of the Top 30 Journals That Mention Pollution Not Global Warming or Climate Change in the Title, Abstract, or Keywords in the Disciplines of Management and Business, Economics, Sociology, and Political Science Between 1970 and 2006

Academic Discipline	Number of Articles Mentioning Pollution Not Global Warming Not Climate Change	Total Number of Articles Published: 1970–2006
Business and management	45	31,000
Economics	286	51,000
Sociology	55	25,000
Political science	67	30,000

although the per-capita consumption of energy in high-income nations is 11 times that of low-income ones (International Energy Agency, 2006).

Hoffman (2005) suggested that 60 U.S. corporations with, he argues, net revenues of approximately \$1.5 trillion have adopted voluntary GHG emission reduction targets. Voluntary agreements between companies are increasingly being created with the help of nongovernmental organizations (Levy & Newell, 2005), for example, the Business Leader Initiative on Climate Change, the Carbon Trust, and the Cement Sustainability Initiative, among others. Through the Carbon Disclosure Project (www.cdproject.net), 940 companies report their GHG emissions, which is supported by investors who control around a quarter of the global stock markets (IPCC, 2007).

Hoffman (2005, 2007) argued that many companies are engaging with climate change. They are doing this not through altruism but to ensure the survival of their own businesses. Hoffman (2005) stated that the reason companies are responding by reducing their emissions is decidedly strategic. Packard and Reinhardt (2000, 2001) suggested that the companies that carefully assess the risks and make wise investments will be the long-term survivors. The strategy literature promotes scenario planning, so this situation should seem natural to management scholars.

Lash and Wellington (2007), of the World Resources Institute, identified six categories of risk related to the changing climate: those created through government regulation, the research and development of new products and services, litigious actions against environmental harm, reputational and branding effects, rising supply chain costs, and a greater prevalence of environmental disasters, such as hurricanes. There are numerous articles

in management journals that cover these areas—just, it appears, few that focus empirically on climate change.

It might be argued that it is not the top journals blocking the passage of articles; it is instead the result of a general drought in the field. As has been shown, articles in quite large quantities are being generated in the social sciences. Another piece of evidence is that books are being written by a number of business school scholars. Authors such as Hoffman (2005, 2007), Kolk and Pinske (2005, 2007), Levy and Newell (2000, 2005), and Packard and Reinhardt (2000, 2001) have published in both arenas, but mostly they have published books.

The Academy of Management

Articles are usually submitted to journals after they have been through a cycle of conferences. Thus, an interesting next step is to examine whether papers on this subject were presented at the 2007 AOM conference, which is the largest and oldest in the field in the world.

The AOM conference in 2007 was titled “Doing Well By Doing Good.” The conference Web site stated, “This year’s theme demonstrates how firms can be financially successful while at the same time trying to accomplish some positive social goals and make life better for their employees and the communities where they operate.” Hence, one might expect to find a considerable number of presentations about global climate change. There were 1,664⁷ different sessions at the 2007 conference representing, approximately, 4,000–6,000 academic articles. Around 7,000 participants attended the conference. Of the 1,664 conference sessions, approximately 25 focused generally on climate change. Nearly all were organized by the AOM division Organizations and the Natural Environment (ONE) or the division Social Issues in Management. Notably, there were substantially more sessions on climate change at the 2007 conference than all previous meetings. For example, there was only one session that mentioned climate change at AOM’s 2003 conference, two sessions at the 2004 conference, and three at the AOM conference in 2005 and 2006 (see AOM Web site).

There are 24 divisions and interest groups in the AOM. Within the traditional business and management divisions—for example, Business and Policy Strategy, Organizational Behavior, International Management, Entrepreneurship, and Organizational Development and Change—there were no sessions that focused on the impact of environmental change. This implies that the issue is peripheral to the core subjects within the discipline.

The AOM conference statement stresses financial success for firms and improving life for employees and

communities. The Pew Global Attitudes Project (Spring 2007) surveyed a total of 45,000 people across 46 countries and reported on how a range of current topics are viewed by different populations (report available at www.pew-global.org). Environmental problems were identified as the top global threat by 37% of those surveyed in the United States, 51% of Italians, 66% of Swedes, and 53% of Argentineans. Although research agendas cannot be led entirely by public opinion, these figures seem of some relevance. It could be argued that this is especially true in an academic field, like ours, that presents itself as appealing also to the real world of business.

Possibly more worrying, my calculations show the four prestigious and highly ranked AOM journals⁸ have never published an article that refers to global warming or climate change.

Might the ongoing debates about the relevance, or not, of business schools tell us something about the low number of climate change articles? AOM states that it is “dedicated to advancing the scholarship and practice of management.” Some commentators argue that the top journals advance the former but increasingly ignore the latter. One of the challenges for business schools has been to try to straddle two communities—research and practice. Publishing is expected to be both scholarly and relevant (Augier & Teece, 2005). Recently, some have protested that research has become overly scientific and no longer appropriate to the sector that business schools were created to serve (Bennis & O’Tool, 2005; Khurana 2007; Pfeffer & Fong, 2002). A further claimed criticism is that empirical, real-world evidence is used merely to support theory (Hoffman, 2004) and is presented in articles written to satisfy the demands of the discipline only (Khurana & Marquis, 2006).

On the issue of global climate change, the academy should presumably be ahead of the wave. The impact on businesses may be the greatest since globalization, a subject heavily featured in the top 30 management journals (over 200 articles since the 1980s). The first and most cited article, “The Globalization of Markets” by Theodore Levitt, was published in *Harvard Business Review* in 1983.

Possible Explanations

It is important to attempt to understand the low number of published articles on climate change in management journals. I now consider five potential explanations. I focus specifically on the disciplines of business and management and, to a limited degree, economics. However, some of the arguments presented are relevant

to other social science fields. It is likely that each of the accounts below will carry some weight. Despite this, in the article’s conclusion, I attempt to identify the main reason for the dearth of climate change articles.

Explanation 1: The Science of Climate Change Has Only Just Been Confirmed

If evidence of climate change has only recently been established, then it is natural that published articles in social science journals will lag. But has it really only recently been confirmed by science, or has there been a “culture of denial” (Cohen, 2001)? Also, what is an acceptable lag?

Many social scientists found the evidence convincing some time ago. In 1977, William Nordhaus published an article titled, “Economic Growth and Climate: The Carbon Dioxide Problem,” in the highly cited journal the *AER*. In it he wrote that

“In contemplating the future course of economic growth in the West, scientists are divided between one group crying ‘wolf’ and another which denies that species’ existence. One persistent concern has been that man’s economic activities would reach a scale where the global climate would be significantly affected. Unlike many of the wolf cries, this one, in my opinion, should be taken very seriously” (1977, p. 341).

Nordhaus, a professor at Yale, has continued to publish articles and books on the GHG effect.

In a 1991 issue of the distinguished *Economic Journal* the economist Pearce wrote that “scientific opinion continues to differ on the extent to which global warming is ‘real,’ although the IPCC (Intergovernmental Panel on Climate Change) report (1990) poses a formidable challenge for anyone choosing not to believe it” (1991, p. 938). In the same issue of the *Economic Journal*, Cline (1991) argued that scientific uncertainties should not be grounds for inaction given the enormity of the potential damage to humanity. Put simply, the bad outcome is so bad that insurance must be the preferred option. This is an old idea. Business cycles, strategic planning, the assessment of potential threats, and opportunities—these have always been high on the research agenda in management.

Explanation 2: There Is a Time Lag Between the Discovery of Scientific Knowledge, Its Interpretation in the Social Sciences, and Its Eventual Publication in Top Journals

This explanation, which is twofold, seems likely to form part of the answer. The first part suggests that there

is a natural lag between knowledge discovery in the sciences and how that knowledge is understood and interpreted in the social sciences. It is helpful here to return to Figure 1, which shows the number of articles on climate change published in the sciences and social sciences since 1970. Although science journals are more numerous—this is controlled for in Figure 1—the data demonstrate that in both fields an equivalent number of articles have been published across similar time periods. The same pattern is found in Figure 2, which compares coverage of pollution between the social and natural sciences. These findings imply that the lags in the two branches of knowledge may not be greatly different.

The second part of the explanation points to a further lag—between the development of a research question in the social sciences and its evolution into print. This happens partially due to the time required to collect and analyze data; but, importantly, the lag effect is exacerbated in the social sciences because the turnaround period of an article from its inception, through the review cycle into an eventual publication, can be as long as 3 to 4 years. The process is typically much shorter in the sciences, as discussed above. Yet, again, the data presented in Figures 1 and 2 would suggest that even with longer publishing lags in the social sciences, many articles on climate change were in print some time ago.

The most likely explanation for the absence of climate change research in the leading journals is that the major lag is taking place within the core of the social sciences. Publishing is happening in journals that are peripheral to the main social science disciplines. For example, 2,200 journal articles are listed in ISI as having been published in social science journals between 1970 and 2006 on climate change.⁹ But of these, the overwhelming majority, 70%, are reported as coming in the subject categories of environmental sciences and environmental studies. Arguably, these fields are not traditional social science disciplines. They exhibit signs of interdisciplinarity, which might explain why some of the journals are listed in ISI in both science and social science categories. Interestingly, the subject category of economics—one of the oldest social science disciplines—is reported as publishing the next highest number of social science articles on climate change at 22% of the total. When the journal titles for economics are analyzed, a similar pattern emerges; the highest number of articles can be attributed to specialist peripheral journals (i.e., those with either environmental, ecological, or energy in the title).

Thus, a specialization or a “ghettoization” has occurred. The data presented earlier confirm that relatively few articles on climate change and global warming have broken

into the top journals of the main disciplinary fields in social science. Part of the reason may be that it is more difficult for reviewers in the elite core of a subject, who are not familiar with embryonic fields of research, to judge the quality of articles. This may further slow the emergence of an issue like climate change and its proliferation into top journals. If this is the case, then it might be possible for journal editors to produce special issues and to invite guest editors to take the intellectual lead. These editors could be selected from peripheral or specialist fields and journals.

This last argument suggests that the flood of business and management publications is only now beginning to reach the gates. A plethora of grant proposals may be sitting on desks in funding bodies. Change, perhaps, is imminent.¹⁰

Explanation 3: Climate Change Is a Practical Problem and Not a Conceptual One

The social sciences are organized around their distinctive theories. Conceptual structures often lead intellectual inquiry, and the empirical facts are, to some extent, fitted around theoretical frameworks. Environmental change may be viewed as nontheoretical and simply a case study of a practical problem. The fragmented nature of the business and management discipline may make it harder still to incorporate the emerging themes of climate change because there may be no obvious home for the topic. For example, for economists, energy is a natural research area. However, it could be argued that the field of particular relevance to the changing climate and, concomitantly, changing business is the field of strategy—as suggested above.

Possibly, unlike science, we do not have the theoretical models available that would facilitate an easy transition into a form capable of empirical analysis. If an alien were to arrive on earth tomorrow, a scientist would immediately start investigating its properties. A social scientist, on the other hand, might require some action before embarking on research. But it would seem odd if we decided that the alien could not be studied because we did not have the appropriate theory.

Presumably, issues of gender and race could have been interpreted as mere practical problems. Yet, conceptual work on these topics exists in business and management journals, one assumes, because the world deemed them important. Maybe because debates about the legitimacy of scientific claims have rumbled on for years, the subject of climate change is viewed as being relevant only to activists. Thus, when all doubts have been dispelled and the claims legitimized, then scholarship can begin. Yet, in contrast, the

discipline of economics legitimated climate change many years prior to today's public accord.

Kolk, who has written about environmental issues, including climate change, from a business school since 1997, suggests that it is still difficult to collect the type of data necessary to publish empirical articles. She adds that those using a case study methodology find it more difficult to get work published. With regard to conceptual articles, she believes that the phenomenon is not widespread enough to make a convincing argument.¹¹

Finally, it may be that assimilation occurs via the applied titles. As has been noted above, among the top 30 list, *Harvard Business Review* and *California Management Review* published articles on climate change before the more theoretically rigorous publications.

Explanation 4: It Is a Reflection of Political Bias

A fourth possible reason for the lack of exposure in management journals may be that there is political bias. This is not an easy hypothesis to test. A resistance to climate change could be political in that it is right leaning or proindustry or it could be related to differences in nations' political ethos. One of the most high-profile politicians both to maintain a position of climate change denial and to continue to oppose the 1997 Kyoto Protocol was U.S. President George Bush. Bush held out despite the fact that U.S. scientists contributed close to half of all scientific articles about the changing climate (listed in ISI). The U.S. has in recent decades been the world's most powerful nation and also the largest emitter of GHGs. Accusations that the president is pro-oil industry have been based on his family's, and Vice President Dick Cheney's, links with oil companies, his past as an oil executive, and his strong support for drilling in Alaska.¹² The U.S. government's reluctance to acknowledge global warming was, arguably, supported by major corporations that viewed talk of climate change as antibusiness. Consequently, American business communities have been slower to respond when compared with their European counterparts (Levy & Newell, 2000). This situation is changing (Hoffman, 2007); for example, at the recent UN talks on climate change held in Bali (December 2007), many industrialists were vocal in calling for long-term emissions targets to allow businesses to set future investment strategies (Pearce, 2007).

It is not easy to assess how much the Bush administration's stance might have contributed to the lack of coverage in business and management journals, but,

arguably, this may be a significant background factor. The existence of a proindustry bias in business schools has been suggested by some: specifically, they are overly focused on wealth creation, economic growth, and shareholder returns. It is argued that they err toward the conservative. This can mean that research topics that might challenge these ideals, including social responsibility, economic inequality, and environmental damage, may be marginalized (Hoffman, 2004; Khurana, 2007; Walsh, Weber, & Margolis, 2003).

The Princeton economist Deaton (2007) compared nations' reactions to the *Review on the Economics of Climate Change* authored by the economist Nicolas Stern and funded by the British Government (Stern, 2007). Deaton suggested that the *Stern Review*, which has generated a great deal of debate around the world, went relatively unnoticed in the United States. Among the community of American economists (Nordhaus, 2007; Weitzman, 2007), Stern has been criticized because in his modeling, he fails to incorporate discounting for the future; in other words, for me to save for the future requires incentives in the form of interest rates. Similarly, I require inducements to change my behavior now to benefit future generations. Stern underplays this factor. But the arguments about the *Stern Review* may be a reflection of the differences between U.S. and European political structures (Deaton, 2007), in that the United States tends toward an individualistic approach to taxation and consumption, whereas Europe has traditionally been viewed as more collective. Climate change is, arguably, an extreme form of externality that requires collectivity at a level not previously imaginable. To argue that the climate is changing largely as a result of intensive growth also challenges the tenets of neoclassical economics, which is still the norm within the discipline despite the recent interest in nonpecuniary well-being (Easterlin, 1995; Oswald, 1997; Rehdanz & Maddison, 2005).

Deaton (2007) pointed to the low number of mentions the *Stern Review* received in *The New York Times*, and, somewhat more predictably, *The Wall Street Journal*. It is interesting then to look at how other non-left-leaning media cover the broader issue of climate change.¹³ In a simple way, I attempt to do this by counting the number of times global warming and climate change appeared in the online versions of the *Financial Times*, *Forbes*, *Time* magazine, and *The Economist* between 1997 and 2007 (also see Appendix B¹⁴). The results below seem not to support a right wing conspiracy theory.

1. Since 1997, the *Financial Times* has mentioned global warming 2,669 times and climate change 4,592 times.

2. *Forbes* has mentioned global warming 258 times and climate change 205 times.
3. *Time* magazine has mentioned global warming 960 times and climate change 698 times.
4. *The Economist* has mentioned global warming 472 times and climate change 410 times.

There is evidence that attitudes to global warming are correlated with an individual's political beliefs. For example, those who express greater skepticism about the anthropomorphic, or human, contribution toward the changing climate are disproportionately right leaning (Heath & Gifford, 2006). But what of the political left—is there evidence to show that left-leaning management scholars have pursued a climate change agenda? The evidence suggests not.

Critical Management Studies (CMS) is a branch of management theory that began in Europe in the 1970s and is recognized as being associated with the left. It is an established field that is taught in business schools and it has “interest group” status within the AOM. CMS “is critical of established social practices and institutional arrangements, and challenges prevailing systems of domination” (www.criticalmanagement.org). With this perspective, it might have been thought that the CMS interest group would have been associated with sessions on climate change at the AOM 2007 conference. However, this was not the case. Also, at the last CMS conference in 2007, which ran for 2 days with 500 delegates, there were no sessions on either climate change or global warming.¹⁵ This suggests that the omission of climate change from the scholarly agenda of business and management is not merely the product of right-wing attitudes.

Explanation 5: Promotion Incentives Are Skewed in Business Schools Toward Incremental Additions to Known Knowledge

Another possible reason for the low number of articles about climate change may be that young researchers' promotion incentives are skewed. It is easier, some might say, to become a good technician, proficient in theory development, rather than to initiate new fields or new ways of thinking—which may be required in response to climatic changes. For example, in general, to progress one's career in a business school requires articles in the top journals, not, say, books (that some suggest are more open to new ideas). It may be easier for a young author's article to be accepted at a top journal if he or she builds on preexisting knowledge from the same top titles (Judge et al., 2007). There may also be an age-of-faculty factor that could compound the problem, insofar as older

researchers might be less likely to adapt to new scientific knowledge.

A difficulty with this line of argument, however, is that it is unclear why analyses of climate change should not be attractive to ambitious young researchers and the leading journals in the field. The repercussions of environmental change will affect younger generations the most. This argument is, thus, more a reflection of the problem discussed in the article rather than a separate explanation for it.

Conclusion

Have the top business journals failed to respond to the shock to knowledge we now call climate change? This article's evidence suggests that the answer is yes. It considers five possible explanations. Although open to genuine debate, when choosing among these five explanations, I emphasize one in particular. It is the existence of a kind of “ghettoization” that has led to an undesirable lag in social science between articles appearing in peripheral publications and elite journals.

The data show that, over the past few decades, only 9 articles on global warming or climate change have appeared in the top 30 business and management titles (out of approximately 31,000 articles in all). The four AOM journals have never published an article on the topic. When scanning all journals in the field—a total of 118 titles—only 44 published articles can be found. The impact of environmental change on businesses will be substantial. Given the dual focus of business schools, namely to produce both scholarly research and work relevant to business practice, more published articles would have been expected.

There also appears to be a paucity of work on the subject in other core social science disciplines. I show that the top journals in sociology, political science, and economics have published little on climate change. Next I go on to examine the frequency of papers in all social science titles and compare the findings with those in science journals. It is apparent from the evidence that a substantial number of papers on environmental change have been written in the social sciences. However, they are not integrated into the mainstream disciplines; instead they are in specialist and peripheral fields and journals.

To try to explain why climate change has had such a low profile in management journals, the article suggests five possible hypotheses. Each explanation will have some relevance; however, I attempt to conclude the article with the argument I believe carries the most weight.

The first of the article's five possible explanations argues that the low number of management articles is to be expected because the science has only just been confirmed. I have questioned this. For example, it is noticeable that scholars in the sister field of economics were publishing articles on the effects of GHGs in top journals as early as 1977. Moreover, strategic planning and risk assessment are the stock-in-trade of much business scholarship.

As another potential explanation I have considered whether climate change may be viewed as a practical problem rather than a conceptual one. The social sciences are formed around particular theoretical perspectives, whereas environmental change might be regarded as a case study. Yet, other issues of social relevance (e.g., gender) and economic relevance (e.g., globalization) have been extensively covered in business journals. The environmental field may still be too undeveloped either to allow the collection of interesting empirical information or to produce conceptual work. The data in this article show, by contrast, that considerable work on the subject is being published outside the mainstream disciplines in the social sciences. Thus, this is unlikely to explain the drought.

A further possible explanation is that promotion incentives in business schools are skewed: young faculty are perhaps encouraged to publish material that does not differ too far from the norm. Articles are more likely to be accepted if they build on to preexisting knowledge instead of initiating new ways of thinking. However, this argument seems to be a statement about facts rather than a conceptual explanation for the facts.

The fourth explanation I suggest is political bias. That so few articles on climate change appear in business and management publications might lead to claims of conspiracy. Business schools may be prioritizing wealth creation and favoring business elites; they may be marginalizing issues, such as environmental damage and social responsibility, that appear to conflict with this. The skeptical attitude of the Bush administration, linking climate change with antibusiness sentiments, may, I suggest, have contributed. Arguably, the United States has been slow to accept the scientific evidence, despite the fact that American universities and scholars have contributed hugely to our understanding of the changing climate. Nevertheless, right-leaning political bias cannot, I argue, be the main explanation. Even in the left-leaning management field of CMS, the data show that global warming has a low profile, which weakens conspiratorial claims. Also, I run a simple test on some of the right-leaning media, such as the *Financial Times* and *Forbes*, and find that there is a high number of mentions of climate change.

Finally, although there is an inevitable delay between the generation and publication of knowledge, this time lag cannot wholly explain the dearth of articles on climate change in the top management journals. Instead the major explanation for the phenomenon documented in the papers appears to be the following. The data show that work on climate change is being generated in the social sciences, but it is in fields that are generally viewed as peripheral to the central disciplines of business, economics, sociology, and political science. As explained earlier in the article, over 2,000 journal articles are listed by the ISI as having been published in social science journals on climate change since 1970. Yet the majority are attributed by ISI to the subject categories of environmental sciences and environmental studies. Thus, the analysis of climate change has, if only unconsciously, been sidelined intellectually—into an area outside the journals in which the leading business scholars and other social scientists publish. This, I suggest, has led to a lag between the study by social scientists of climate change and the appearance of articles in the elite social science journals.

This article cannot say why the lag has been so long. Perhaps the core subject areas, including management, have become used to acceptable methodologies that may not lend themselves to new intellectual areas; data collection for studies on global warming may be more challenging because its effect on humans remains unclear; the top journals demand top quality, and it is possible that the field has not yet become sufficiently rigorous. Nevertheless, because of the likely importance of climate change, to businesses and human society more generally, one might have expected less delay within the leading disciplinary fields. That they are the top journals suggests that they should lead, not lag, intellectually.

In the much cited article by Barley and Kunda (1992), the authors argued that the focus of managerial research and theory is heavily influenced by the economic climate of the day. It may be that the costs we are beginning to incur, caused by increasingly severe weather, may prove to be the ultimate driver of change.

Appendix A

Top 30 Business and Management Journals Listed in ISI Web of Knowledge by Impact Factor and Total Citations

Academy of Management Journal
Academy of Management Review
Administrative Science Quarterly
California Management Review

(continued)

Appendix A (continued)

- Corporate Governance
- Decision Science
- Harvard Business Review
- Human Relations
- Human Resource Management
- Information Systems Research
- Journal of Business Venturing
- Journal of Consumer Research
- Journal of Information Technology
- Journal of International Business Studies
- Journal of Management Information Systems
- Journal of Management Studies
- Journal of Management
- Journal of Marketing
- Journal of Operations Management
- Journal of Organizational Behavior
- Journal of Product Innovation Management
- Journal of the Operational Research Society
- Leadership Quarterly
- Management Science
- MIS Quarterly
- Organizational Behavior and Human Decision Processes
- Organization Science
- Organization Studies
- Research Policy
- Strategic Management Journal

Note: These journals are a combination of those listed in the categories of “business” and “management” in Journal Citation Reports in Institute of Scientific Information (ISI). Only those listed in ISI are included, meaning, inevitably, that some titles will be excluded. Journals have been selected using two measures from ISI Journal Citation Reports—impact factor and total cites (data collected in June 2007). The journals are presented alphabetically, not in order of rank. One journal, the *Academy of Management Executive*, recently renamed *Perspectives*, has not been included because of its name change. Some titles are listed in a number of categories. Only those journals where the central contributors are from business schools have been included. For example, the *Journal of Environmental Economics and Management* is also listed as an economics publication. Here it has been counted as economics because most contributors are located in economics departments and not in business schools.

Appendix B

Terms That Appear in *The Economist* and in the Top 30 Management Journals in the ISI Web of Knowledge Over 10 Years Between January 1997 and June 2007

Number of Mentions in All Documents to:

Business Terms	The Economist (Approximately 500 Issues)	Top 30 Management Journals in ISI (Approximately 1,500 Issues)
1. Business strategy	77	104
2. Human resources	158	152
3. Corporate governance	534	451

(continued)

Appendix B (continued)

Business Terms	The Economist (Approximately 500 Issues)	Top 30 Management Journals in ISI (Approximately 1,500 Issues)
4. R&D	384	307
5. Supply chain	300	333
6. Corporate social responsibility	34	65
7. Innovation	2,044	1,928
8. E-business	101	61
9. Global warming	472	5
10. Climate change	410	11

Note: ISI = Institute of Scientific Information.

Notes

1. The term *global warming* predates the now more commonly used, and technically correct, term *climate change*.
2. Figures for June 2007. Note that new titles are added to the ISI list regularly.
3. There are two categories in Institute of Scientific Information (ISI)—business and management. However, I have used these two terms interchangeably in the text.
4. Further information is available in ISI under Journal Citation Reports. It should be noted that not all journals are included in ISI. Those that are less cited, are not in English, or are new tend not to be in ISI.
5. The lists of top 30 journals compiled for this article can be obtained on request from the author.
6. These include all document types not solely articles (e.g., book reviews).
7. A small proportion of these were social events and Academy of Management (AOM) meetings.
8. In the abstract, keywords, or title in *Academy of Management Journal*, *Academy of Management Review*, *Academy of Management Executive* that became *Academy of Management Perspectives*, and *Academy of Management Learning and Education* (between the years 1970 and July 2007 in ISI).
9. In ISI, some of the environmental journals are classified as “social science” and also “science.”
10. As mentioned earlier, a number of business school faculty have written books on climate change, which may have been their only publishing option within the management field. Many of these authors were also centrally involved in establishing the AOM division, Organizations and the Natural Environment (ONE).
11. In personal correspondence (June 2007).
12. For an interesting discussion on climate change and the oil industry, see Levy and Kolk (2002).
13. For further information on the media and climate change, see Boykoff and Rajan (2007).
14. Appendix B looks for a correlation in the number of times that key business terms are mentioned in *The Economist* magazine and the top 30 management journals. It shows that except in the case of climate change and global warming, there is a strong association in the use of these terms.
15. For Critical Management Studies (CMS) Conference 2007, see www.mbs.ac.uk/research/organisationstudies/cms5/index.aspx.

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