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Is management research visible outside the academic community?

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Abstract. We address the question of the visibility of management research for practitioners by measuring scientific journal citations in non-scientific publications. While the social and economic relevance of research in management has been largely commented, it has been more rarely measured. This is due to the fact that management research is mostly aimed at the production of knowledge rather than at giving direct prescriptions for actions. Consequently, the relevance of management research is often of a conceptual, rather than instrumental, nature. While conceptual relevance is not easily measurable, the visibility of management research in managerial publications might give some insight into the perceived interest of management research to managers. We estimate the yearly number of citations in the press of a panel of 63 top-ranked journals in all fields of management over a 15-years period. Our results show that the visibility of academic journals in the press is very modest, and mostly restricted to top-ranking ("world elite") journals. The visibility of management research seems to have, on average, significantly increased over the period 2000-2014. We also report strong field specificities. In particular, the visibility of World Elite Journals in Marketing has increased dramatically over the last decade, while the visibility of Accounting journals has decreased.

Keywords: management research, visibility, relevance gap

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INTRODUCTION

> Each August, we come to talk with each other; during the rest of the year we read each other's papers in our journals and write our own papers so that we may, in turn, have an audience the following August—an incestuous, closed loop.
>
> Donald C. Hambrick, Academy of Management Annual Meeting 1993 (presidential address)

Social utility is the very foundation of management science, which has been, from its birth, aimed at action and supposed to meet firms' needs. Managers and other types of "lay audiences" even compete with academics in reputation and reward allocation for applied management research (Mesny & Mailhot, 2012; Whitley, 1984). Yet, since two reports, funded by the Ford and Carnegie Foundations, recommended basing business-school teaching on more scientific grounds (Gordon & Howell, 1959; Pierson, 1959), the question of the relevance of management research is recurrent. This question has filled several special issues and

forums of academic journals, such as *Administrative Science Quarterly (ASQ)* (1982[1]) and *Academy of Management Journal* (2001[2], 2007[3]). Presidents of the Academy of Management have also regularly addressed the "relevance gap" in their presidential addresses (Bartunek, 2003; Hambrick, 1994; Huff, 2000; Kerr, 1975; Ming-Jer, 2014; Mowday, 1997; Rousseau, 2006).

The notion of practical "relevance" of research encompasses three dimensions (Astley & Zammuto, 1992; Beyer & Trice, 1982; Pelz, 1978). It may either be *instrumental*, if the research aims at influencing managerial action; *conceptual*, if it influences how a practitioner conceptualizes a problem; or *symbolic*, if the research contributes to legitimating predetermined positions. Pearce and Huang (2012) argue that researchers should not aim at mere symbolic relevance; they define *actionable* research as research that has either conceptual or instrumental implications for action.

The prolific literature on the research–practice gap can be separated into two alternative approaches. A number of papers take for granted that scientific criteria impede the relevance of research, and propose avenues for research design or research objectives that would be more in line with managerial preoccupations. This literature adopts a definition of relevance that is mostly instrumental. An alternative research stream posits that management research is relevant to practice, and attributes the lack of implementation of research results mostly to a communication problem. Few articles have empirically measured the relevance gap, and the conclusions of these empirical studies vary widely depending on the definition and measure of relevance used. Among the possible explanations for these contrasted results is the proposition that the production of academic science is more likely to be of conceptual, rather than instrumental, relevance (Astley & Zammuto, 1992; Nicolai & Seidl, 2010). As Mesny and Mailhot (2012) notice, conceptual relevance is less traceable and controllable than instrumental relevance.

The dominant measure of the relevance of published research within the academic community is its citation by other researchers (Kieser & Leiner, 2009). This is what led Hambrick (1994) to criticize the closure of the scientific community, and also what led Luhmann (1994), and Kieser and Leiner (2009), to describe science as an auto-referential system. As Kieser and Leiner (2009) argue, the self-referential nature of the science system takes root in the natural differentiation of societies into specialized systems (such as science, law, economy, and policy). Specialization has a positive effect on the system's performance. The drawback is that systems lose their capacity to communicate with other systems. According to Kieser and Leiner (2009), it is the belonging of science and organizations to separate auto-referential systems that hinders collaboration and communication between academics and practitioners. However, organizations react to *irritations*, such as new concepts emanating from management science. The visibility of research to managers—and, more precisely, press releases about management research—could then be an example of such irritations.

While the lack of visibility of management research outside the academic community has been widely commented upon, it has been very rarely measured. We address this gap by measuring the citations of academic management journals in the international managerial press. The

1. vol. 27, n°4.
2. vol. 44, n°2.
3. vol. 50, n°4.

number of times a scientific publication is cited in the press might measure the visibility of the research to managers. This article is organized as follows. The first section synthetizes the relevance-gap literature and identifies the variables that could influence the visibility of research among managers. The second section presents the data and methodology. The third section summarizes the principal results. The fourth section discusses the results. The last section draws conclusions.

THE RESEARCH-PRACTICE SCHISM IN MANAGEMENT SCIENCE

A number of papers identified the causes, and proposed directions to bridge, the research–practice gap in management science (see Carton & Mouricou, 2017, and Kieser, Nicolai & Seidl, 2015 for an extensive review of this literature). Some researchers attribute this gap to a *knowledge production problem*, and consider that the lack of relevance of most management research is due to an excessive reliance on rigorous methodology. Others assume that management research is relevant to managers, and attribute the research–practice gap to a *knowledge transfer problem* (Van de Ven & Johnson, 2006).

THE KNOWLEDGE PRODUCTION PROBLEM OR THE RIGOR-RELEVANCE DEBATE

The genesis of the rigor–relevance gap comes, historically, from an epistemological and methodological dispute. Numerous papers propose that the relevance gap is caused by research design being inspired by the natural sciences and dominated by positivistic epistemology. Conformity with “hard science” epistemology impedes the development of prescriptive knowledge (Van Aken, 2005). The positivist paradigm leads researchers to favor research designs where they distance themselves from their object of study. This distance prevents them from identifying the possible impediments to the implementation of their theories or concepts, such as managers’ real purposes and tacit knowledge, or organizational defensive routines (Beer, 2001). Moreover, the research of “natural” laws in management denies the fact that organizations are not natural objects, but human artifacts (Susman & Evered, 1978).

Alternative methodologies such as action research (Foster, 1972), Mode 2 research (Huff, 2000) or design science (Romme, 2003) have thus been proposed to develop research programs that can answer “real world” questions. In action research or Mode 2 research, knowledge is co-developed by researchers and practitioners, and the principal criterion of the validity of this knowledge is its workability. Alternatively, the proponents of design science focus not on the science production process, but on scientific objectives, which should either be the construction or the transformation of social artifacts. Design science is thus closer to architecture or engineering than to natural sciences (Romme, 2003; Van Aken, 2005).

Proponents of action research, Mode 2 research, and design science tend to be critical of the academic writing conventions of academic journals, and to consider that publications in those journals should not be the prime objective of research, since scientific jargon, mathematical developments and complex empirical methods are inaccessible to practitioners (Buckley, Ferris, Bernardin & Harvey, 1998; Leisenring & Johnson, 1994). On the other hand, failing to pass the peer review process and to get published in prestigious academic journals has been considered

as an indicator of the lack of rigor of these research designs. Kieser, et al. (2015) highlight the paradox that programmatic calls for more action research get frequently published in top-ranking journals, while the results of the action research that are called for fail to find their way into the same journals.

Conversely, some authors argue that research need not provide immediate relevance, and that excessively close relationships between researchers and industry might even be harmful for research independence (Vicari, 2013). Some journals even exclude the need for relevance to practice in scientific publication (Daft & Lewin, 2008), or or based on the belief that an excessive focus on relevance could impair research quality (Hinings & Greenwood, 2002; Knights, 2008; Peng & Dess, 2010; Walsh, Tushman, Kimberly, Starbuck & Ashford, 2007). Huff (2000: 55) advocates that "excessive enthusiasm for immediate relevance" tends to condemn academics to pursue "short-run research on questions of minuscule importance", contributing little to corporate evolution. Huff (2000) thus pushes academics to pursue more fundamental knowledge.

EMPIRICAL FINDINGS ABOUT THE RELEVANCE OF ACADEMIC RESEARCH

The supposed antinomy between scientific rigor and relevance leads to variable empirical findings, depending on the measure of these two concepts. McKenzie, Wright, Ball and Baron (2002) show that marketing practitioners are not aware of top-ranked marketing journals. Brennan and Ankers (2004) show that managers, in the field of business-to-business marketing, claim not to be interested in academic research and tend to be more favorably disposed toward consultants, whom they consider to be more understanding of business pressures. Academics in the same field believe that their research is of potential value to managers and aspire to contribute to management practice, but consider that the publication pressures of the academic system impede the production of practice-oriented research. In the fields of finance and economics, Cabantous and Gond (2011) show how research concepts and models can become performative, in the sense that they influence the agent's behaviors. As an example, these authors explain that the concept of rationality, which was developed as a theoretical assumption, has been turned into a social norm through its teaching and promotion by consultants.

Baldridge, Floyd and Markóczy (2004) asked experts[4] to rate the practical relevance of 120 articles in strategy, published in six leading management journals, in 1994 and 1995. They observed a positive relationship between the academic standard and the practical utility of research. Shrivastava (1987) also shows, by assessing the rigor and usefulness of 23 research programs in strategy, that relevance is not necessarily at the expense of rigor. Palmer, Dick and Freiburger (2009) investigate the rigor and relevance of articles published in ASQ from 1956 through 2004. Their results suggest that articles published in ASQ became increasingly relevant to managers after 1976, and that about 75% of the papers published in 2004 could be considered relevant to managers. Moreover, they too show that relevance need not be at the expense of rigor. In particular, empirical papers based on collected data and aiming at testing existing theories could be considered rigorous as well as relevant.

Using a sample of publications from *ASQ* and *Academy of Management Journal (AOMJ)*, Pearce and Huang (2012) show that the

4. The experts are members of the Executive Advisory Board of the «Academy of Management Executive.».

proportion of actionable publications has dramatically decreased from 1960 to 2010. Moreover, the articles classified as actionable came mostly from the subfields of organizational behavior and organizational theory, while other subfields (especially strategy and human resources) produced less actionable research. On the contrary, Bartunek and Rynes (2010) observe that "implications for practice" appear increasingly in empirical papers in the five top-tier management journals they considered[5]. Consistently with Astley and Zammuto (1992), and Nicolai and Seidl (2010), they observe that the content of implications for practice are mostly of conceptual or symbolic nature: "Become more aware," "conduct training," and "learning" appear to be the most frequent recommendations.

The empirical literature on research relevance is too scarce to draw significant and generalized conclusions. Some results can nevertheless be highlighted. First, empirical studies do not totally confirm the assumption that research, in particular research published in top management journals, is not relevant to managers. This assumption may well be the consequence of a prejudice from managers (regarding academic research) as well as from some academics themselves (regarding top-ranked journals). Second, the research–practice gap may well be field-dependent (Pearce and Huang, 2012). Finally, the empirical findings concerning the evolution of research relevance over time are inconclusive.

THE KNOWLEDGE TRANSFER PROBLEM AND THE POPULARIZATION VIEW

Rousseau (2006) attributes the research–practice gap not to a lack of relevance of management research, but to a lack of practice of evidence-based management by managers. Managers might fail to use scientific knowledge because they are not exposed to it (Rynes, Colbert & Brown, 2002). Shapiro, Kirkman and Courtney (2007) conducted a survey among members of the Academy of Management, and showed that while academics and practitioners are concerned by both the knowledge production and the knowledge transfer problems, they rate their concern about the latter at a slightly higher level. Moreover, this concern about the knowledge transfer problem increases with academics' and managers' experience.

Kieser and Leiner (2009) argue that direct communication and collaboration between researchers and practitioners is, in fact, impossible, because science and organizations belong to different auto-referential communication systems. The scientific system is aimed at producing theories and methodologies. Scientific communications aim at truth, and scientific rigor suggests that uncertainty and other alternatives must be considered. Conversely, organizations rely on a specific form of communication, which is aimed at decision. For the sake of efficiency, organizations cannot systematically discuss the preceding decisions. They rather define a decision channel aimed at action. Decisions are associated with uncertainty about the consequences of the alternative decisions, but for the sake of efficiency, organizations need to reduce that uncertainty. They do so by using the first decisions as premises for subsequent decisions. Thus, the communication system that is prevalent and efficient in organizations (in the sense that it allows decisions to be made) is very distinct from the communication system that is prevalent and efficient in the science system (in the sense that it continually challenges preceding findings). Consequently, the two systems cannot directly collaborate or

5. *Academy of Management Journal, Journal of Applied Psychology, Journal of Organizational Behavior, Organization Science, and Personnel Psychology.*

communicate. They can only *irritate* or *provoke* each other by transmitting signals that must be reprocessed by each system. New managerial ideas and concepts transmitted by management magazines might be examples of these irritations.

Consistently, Cohen (2007) argues that the cause of the relevance gap is not the scientization of research, but rather the lack of bridging media. A stream of literature (Hambrick, 1994; Walsh, et al., 2007) focuses on propositions to popularize research results through bridge publications, executive education and consulting, and even websites or blogs, allowing academics to present their research results in terms that would be more understandable to managers. Behind these propositions also lies the claim that the popularization of research should be more considered in rewarding academics, and should contribute positively to academic reputation-building. The scientific journals themselves have addressed this gap by publishing journals that are specifically aimed at a managerial audience, such as *The Academy of Management Executive* or the *Harvard Business Review (HBR).* However, Schulz and Nicolai (2015), and Rynes, Giluk and Brown (2007), observe that the articles published in the *HBR* include very few citations of academic research, casting doubt on the "bridge" role of these publications.

The professional press could be a bridge media for diverse reasons; it is supposed to be regularly read by managers. Journalists could "translate" research results in terms that are understandable by managers. Finally, business journalists could play an active role in selecting the research results that are the most potentially relevant to managers. Rynes, et al. (2007) investigate, in the human resources field, to what extent managers are exposed to research results through periodicals aimed at practitioners. They identify three important research topics in which human resources managers have predominantly false ideas—namely, the role of intelligence, goal setting, and personality—as performance predictors. They show that these three topics have almost no coverage in *Human Resources Magazine, Human Resources Management*, or *HBR*. Moreover, when the topics are covered at all, this coverage is as likely to be research-inconsistent as research-consistent. Finally, apart from *Human Resources Management*, the investigated academic journals provide few academic citations and little quantitative evidence. Rynes, et al. (2007) interpret their results as a failure of academics to disseminate their knowledge to practitioners. However, those results might be driven by the fact that Rynes, et al. (2007) purposely selected research topics with results on which managers disagree or lack knowledge. In the field of management, Pearce and Huang (2012) observe that the magazine *The Economist* cited only one article published in *AOMJ* and no articles published in *ASQ* from 2006 to 2010. During the same period, *The Economist* cited 18 articles from *Psychological Science.* Pearce and Huang (2012) conclude that *AOMJ* and *ASQ* might address topics that are less relevant to managers than *Psychological Science*. However, the generalization of these results is limited since Pearce and Huang (2012) restrict themselves to two major academic journals and only one professional publication, *The Economist*.

RESEARCH QUESTIONS

Following the popularization view, the press read by managers might contribute to the transfer of scientific knowledge to practitioners. As has been shown above, existing empirical results report a very low coverage of academic research in the press. This result suggests either that academics fail to disseminate their research results, or that these results are

considered unimportant or irrelevant to the managerial community. However, the empirical evidence about the visibility of management research in professional publications is still weak. To our best knowledge, existing empirical studies are restricted to a specific research field or to a limited number of journals. No empirical study has yet covered the whole span of management research. In the present paper, the visibility of management research among managers is estimated more systematically than in the previous literature, by measuring the citations in the professional press of top-tier academic journals covering different management fields.
In this paper, we address the following research questions:

(1) How many times, on average, are academic publications mentioned in the popular press?
(2) How has the coverage of academic journals by professional publication evolved over time?

For each research question, we investigate the potential influence of the journal ranking and of the management field in the visibility of academic publications.

METHOD

SAMPLE SELECTION

The academic journals were selected from the 2016 Journal Quality List (JQL) of Professor Anne-Wil Harzing[6]. Our sample is composed only of management journals that are considered top-tier simultaneously by four European rankings: ABS 2015 (*Association of Business Schools Academic Journal Quality Guide,* United Kingdom), CNRS 2015 (*Centre National de la Recherche Scientifique,* France), FNEGE 2013 (*Fondation Nationale pour l'Enseignement de la Gestion des Entreprises,* France), and VHB 2015 (*Verband der Hochschullehrer für Betriebswirtschaft*, Germany). As a result, this sample is composed of journals that are highly regarded within the academic community and that are considered to publish rigorous and academically relevant research. Eight research fields are considered: Accounting, Entrepreneurship, Finance, General Management and Strategy, Human Resources Management, Management Information Systems, Marketing, and Operational Research[7]. For homogeneity purpose, only English-language journals are considered. Finally, 31 journals were removed from the sample because their names were too generic to be used as keywords in bibliometric research (typically, *Finance, Human Resources Management*, and *Management Research*). The one exception is *The Accounting Review,* due to its 4* ranking. For this journal, the data were manually corrected to count the real number of press articles mentioning the journal. The final sample is composed of 63 academic journals. The list of journals is given in Appendix 1.

VARIABLES

The proxy used to measure the visibility of an academic journal in the press (dependent variable) is defined as the ratio of the total number of

6. Available at: **http://www.harzing.com/resources/journal-quality-list**
7, By comparison with the JQL, the field "Finance and Accounting" in the JQL has been separated into two distinct fields—"Accounting" and "Finance"—due to their large number of top-tier journals. Conversely, the field "International Business" has been integrated into "General Management and Strategy."
8, Factiva "Top Sources" includes: Press Release Wires, Dow Jones Newswires, Reuters Newswires, Major News and Business Sources, and *The Wall Street Journal* – All Sources.

citations in non-academic sources (Factiva "Top Sources"[8]) during a given year to the total number of articles published by this journal during the same year. The total number of articles published by each journal on a per-year basis was gathered through two databases, Business Source Premier and EconLit.

The visibility could also be measured by the total number of citations. However, we tested the hypothesis that the average number of articles published by academic journals is equal across fields of management. Both the one-way analysis of variance (ANOVA) and its nonparametric counterpart, the Kruskal–Wallis test, reject this hypothesis at the 5% and 1% levels. Since the number of articles that journals publish differs between fields, it makes sense to control for this difference in the definition of visibility (dependent variable). That explains why we define visibility as the ratio of the press mentions to the number of articles that a journal publishes.

The visibility of the management sciences might also have evolved over time, due to practice or research evolution (see, for example, Davis, 2015). To explore this issue, we split the 15-year period into three five-year time spans, 2000–2004, 2005–2009, and 2010–2014.

Pearce and Huang (2012) have shown that the relevance of research might vary across academic fields. Consequently, the visibility of research results to managers could also be dependent on the academic field. Additionally, following the literature addressing the knowledge production problem, it can also be hypothesized that the visibility of academic research in managerial press is inversely correlated with the selectivity, or rank, of the academic journal in which it is published. To investigate the potential impact of these two factors on visibility, we used the field of management (*FIELD*) of each journal in the sample and its 2015 ABS ranking (*RANK*) as two independent variables. Table 1 reports the visibility of academic journals in the sample both per field of management (Panel A) and per ranking (Panel B) :

8, Factiva "Top Sources" includes: Press Release Wires, Dow Jones Newswires, Reuters Newswires, Major News and Business Sources, and *The Wall Street Journal* – All Sources.

Panel A: Visibility per field of management

Field of management	Acronym	Number of Journals	Mean	Std dev.
Accounting	ACC	9	.1116	.2129
Finance	FIN	8	.1760	.1709
General Management & Strategy	GEN	10	.0964	.0991
Marketing	MKG	10	.2452	.2686
Human Resources Management	HRM	9	.0731	.0637
Management Information Systems	MIS	7	.0209	.0221
Operational Research	OR	5	.0073	.0072
Entrepreneurship	ENT	5	.0393	.0185
Total		63	.1090	.1659

Panel B: Visibility per ranking of journals

Ranking of journals	Number of Journals	Mean	Std dev.
World elite journal	18	.2460	.2430
Top journal	24	.0633	.0662
Highly regarded journal	21	.0437	.0788
Total	63	.1090	.1659

Note. Visibility is defined as the ratio of the total number of citations in non-academic sources to the total number of articles published. The sample includes 63 academic journals publishing papers in eight fields of management. Each of the 63 academic journals in the sample is ranked according to the ABS 2015 ranking.

Table 1 - Visibility of academic research over 2000–2014

STATISTICAL ANALYSIS

To test for the effect of a field-specificity and/or a journal ranking influence on visibility, we use a full factorial ANOVA model[9]. Then, to examine whether the visibility of academic journals has evolved over time, we use a repeated measures ANOVA model, in which time is included as a three-level factor (*TIME*), with each level corresponding to a five-year time span. Last, to pinpoint which factor levels are different, we used a contrast analysis and two widespread multiple comparison procedures (Bonferroni and Tukey post-hoc tests) as a robustness check.

EMPIRICAL RESULTS

VISIBILITY OF MANAGEMENT RESEARCH OVER THE 2000-2014 PERIOD

As indicated in Table 1, over the 15-year period, the average visibility of a journal is around 0.11, meaning that a given academic article is cited, on average, 0.11 times in the press. Even though this ratio may seem low, it is considerably higher than the citations observed by Pearce and Huang (2012) in the *Financial Times* would imply: Pearce and Huang (2012) report only one citation of *Academy of Management Journal* and no citation of *ASQ* over the period 2000–2006. Moreover, the visibility ratio presents important variability across academic journals, ranging from 0.75 for the *Journal of Consumer Research* to 0.0 for the *Journal of the Association for Information Systems*. The median visibility is 0.046, meaning that half of the journals in our sample are hardly visible (fewer than 5% of published papers being mentioned in the press).

Table 2 reports results from the two-factor ANOVA model testing the two main effects of *FIELD* and *RANK* as well as the *FIELD*-by-*RANK* interaction term. As reported in Table 2, the journal ranking (ABS 2015) is the only statistically significant factor at the usual confidence levels, suggesting that the variations in visibility of management journals outside the academic community can be explained by their academic rankings. Quite surprisingly, the research field does not seem to have a significant role in visibility. Therefore, we will focus our attention on the main effect of RANK on visibility in the remainder of this section.

9.The interested reader is referred to Winer, Brown and Michels (1991) for a discussion of such models.

Dependent variable	Type III sum of squares	df	Mean square	F	Partial eta squared[c]	Observed power [a]
VISIBILITY						
Corrected model	.907	21	.043	2.210*	.531	.961
Intercept	.491	1	.491	25.115**	.380	.998
FIELD	.246	7	.035	1.798	.235	.648
RANK	.185	2	.092	4.734*	.188	.760
FIELD×RANK	.179	12	.015	.764	.183	.363
Error	.801	41	.020			
Total	2.456	63				
Corrected Total	1.708	62				
Adj. R^2	.291					

Levene's homogeneity-of-variance test [b]	
F	6,253**
df1	21
df2	41

† p < .10; * p < .05; ** p < .01

[a] Power values are based on fixed-effect assumptions; .05 is used as the alpha level for the power calculations.

[b] Tests the null hypothesis that the error variance of the dependent variable (*VISIBILITY*) is equal across groups. This test is non-sensitive to departures of normality. The significance of Levene's test is under .01, which suggests that the equal variances assumption is violated.

[c] The partial eta squared effect-size measure is close to medium according to Cohen's scale (Cohen, 1977: 284), and is still acceptable for the factor *RANK* in Table 2. The observed power for the factor *RANK* is very close to the benchmark of 80% proposed by Cohen (1977: 53–56). These parameters indicate that this finding is not particularly sensitive to the sample size.

Table 2 - Factorial analysis of variance (ANOVA) over the 15-year time

In order to gain a deeper insight into the results from Table 2, we conducted a contrast analysis to identify the differences of visibility among the three ranking levels that are distinguished by the ABS 2015 ranking for top-tier journals: world elite journal (4* ranking), top journal" (4 ranking), and highly regarded journal (3 ranking). These follow-up tests are displayed in Table A2-1 in Appendix 2. The simple contrasts in Table A2-1 (Panel A) show that the average visibility of world elite journals is significantly higher than the average visibility of both top journals and highly rewarded journals. This suggests a "prestige premium": The visibility of academic research in the popular press increases with the academic ranking. Even within top-tiered academic journals, we observe a difference in visibility between sub-rankings. However, this prestige premiu" is more salient for world elite journals, while top journals seem only slightly more visible than highly regarded journals. Last, orthogonal polynomial contrasts (Panel B) show a significant linear trend, while the quadratic trend is not significant. The negative linear contrast suggests a decreasing linear relation between the average visibility of an academic journal and its ranking.

As robustness checks, we used the Bonferroni and Tukey post-hoc tests allowing for multiple comparisons (see Table A3-1 in Appendix 3). The results confirm that world elite journals are more visible than both top journals and highly regarded journals.

Our answer to our first research question about the visibility of academic journals is thus that this is, on average, modest, with important variations among journal rankings. Even within the top-tiered journals, the most prestigious journals (i.e. ranked world elite journals) are more cited in the popular press than lower-ranked publications (top journals and highly regarded journals). Table A3-1 shows that on average, the academic journals ranked as world elite are 3.9 times more visible than top-ranked journals, and 5.6 times more than highly regarded journals.

This result is in contradiction with the assumption that rigor leads to less relevant research, and consistent with the results of Baldridge, et al. (2004), Shrivastava (1987), and Palmer, et al. (2009). Interestingly, the above results were obtained in the field of GEN, while our empirical results are mainly driven by MKG and ACC. Moreover, two studies focusing on the MKG field present opposite conclusions (Brennan & Ankers, 2004; McKenzie, et al., 2002). McKenzie, et al. (2002) show, on a sample of 47 marketing managers, that most have not heard of a sample of marketing academic journals. However, this sample does not include the four world elite journals of the discipline. Moreover, their investigation has been conducted on a time period that precedes ours. Brennan and Ankers (2004) analyze the results of three preceding surveys on managers' and academics' perceptions, conducted over the period 1999–2004. Our results show that the visibility of marketing journals increased dramatically in the post-2004 period. It might be interesting to investigate whether managers' perceptions about the relevance of research in marketing has evolved over the last ten years, following this better coverage of research results in the managerial press.

EVOLUTION OF MANAGEMENT RESEARCH VISIBILITY OVER 2000-2014 PERIOD

In order to detect whether visibility evolved over time, we consider the evolution of visibility across three sub-periods: 2000–2004, 2005–2009, and 2010–2014. Breaking down a whole time period into shorter time spans is a common practice in academic literature—see, for example, Dai, Free and Gendron (2016); Ferreira, Storopoli and Serra (2014); Mellahi, Frynas, Sun and Siegel (2016); and Podsakoff, Mackenzie, Bachrach and Podsakoff (2005). Also, a five-year window is traditionally used in the management literature because it could serve as a broader platform from which generalizations could be made (Robertson, Blevins & Duffy, 2013).

We also investigated the five-year growth rate of the number of published academic articles over the whole time period of 2000–2014. The table of results is not reproduced here to save space but is available upon request. This five-year breakdown reveals two salient patterns. First, the five-year growth rate is fairly stable over the period, all fields taken together: 24.1% between 2000–2004 and 2005–2009; and 24.5 % between 2005–2009 and 2010–2014. Second, the eight fields of management under review here display substantial differences in terms of their respective five-year growth rates[10]. For example, the number of articles published in the field of FIN increased by 43.5% from 2005–2009 to 2010–2014, whereas the increase was only 4.6% for GEN. Such a huge

10.The so-called five-year growth rates are calculated on an annual basis—i.e. they are equal to the mean of the number of articles published each year within the five-year sub-period.

difference can also be observed between GEN (+7.9%) and MIS (+45.5%) across the two five-year sub-periods 2000–2004 and 2005–2009.

We conducted a repeated measures ANOVA framework, where the within-subjects factor labeled *TIME* denotes the three considered sub-periods, and the two between-subjects factors are *FIELD* and *RANK*. In such a framework, three different types of effects can be tested: (i) the main effect of *TIME* on visibility; (ii) the two first-order interaction terms—*TIME*-by-*FIELD* and *TIME*-by-*RANK*; and (iii) the second-order *TIME*-by-*FIELD*-by-*RANK* interaction term. Table 3 displays the multivariate tests of significance for the aforementioned effects. The most informative and interesting result is yielded by the highest interaction term (*TIME×FIELD×RANK*). It provides evidence that the time evolution of visibility over 2000–2014 is due to the joint effect (or conjunction) of the ranking and the specific field of management in which academic journals publish. The following will thus focus on the *TIME×FIELD×RANK* second-order interaction term.

Effect	Multivariate Test	Value	F	Hypothesis df	Error df	Partial eta squared	Observed power [a]
TIME	Pillai's trace	.102	2.278	2	40	.102	.436
	Wilks' lambda	.898	2.278	2	40	.102	.436
	Hotelling's trace	.114	2.278	2	40	.102	.436
	Roy's largest root	.114	2.278	2	40	.102	.436
TIME×FIELD	Pillai's trace	.240	.800	14	82	.120	.462
	Wilks' lambda	.764	.821	14	80	.126	.474
	Hotelling's trace	.302	.841	14	78	.131	.484
	Roy's largest root	.280	1.638	7	41	.219	.600
TIME×RANK	Pillai's trace	.196	2.222^{T}	4	82	.098	.628
	Wilks' lambda	.805	2.298^{T}	4	80	.103	.644
	Hotelling's trace	.243	2.368^{T}	4	78	.108	.659
	Roy's largest root	.242	4.968*	2	41	.195	.782
TIME×FIELD×RANK	Pillai's trace	.617	1.524^{T}	24	82	.308	.924
	Wilks' lambda	.421	1.806*	24	80	.351	.966
	Hotelling's trace	1.288	2.093**	24	78	.392	.986
	Roy's largest root	1.214	4.148**	12	41	.548	.996

Box's M test of variance-covariance matrices homogeneity[b]

Box's M	170.048
F	3.323**
df1	30
df2	797.424

† $p < .10$; * $p < .05$; ** $p < .01$

[a] 05 is used as the alpha level for the power calculations.

[b] Box's M test provides a multivariate test for the homogeneity of dispersion matrices. Box's M tests the null hypothesis that the observed covariance matrices of the dependent variables are equal across groups. Box's M is very sensitive to departures from normality. Since the significance value of the Box's M test is lower than .01, there is reason to believe that the equal variances assumption is violated.

Table 3 - Repeated measures ANOVA – multivariate tests

In order to clarify the main result from Table 3 indicating a joint influence of both ranking and field on the visibility of research in management through time, we undertook an in-depth analysis of the two-order interaction term *TIME×FIELD×RANK* reported in Table 3 by using simple effects tests. These follow-up tests provide a fine-grained investigation of an interaction term when significant, such as here[11]. Table 4 presents the results from these simple effects tests. The focus is on analyzing effects of the ranking factor (*RANK*) for each level of the field factor (*FIELD*) over time. To save space, only statistically significant results at the usual confidence levels are reported in Table 4.

TIME	FIELD		Type III Sum of Squares	df	Mean Square	F
2000–2004	ACC	Contrast	.155	2	.078	3.665
		Error	.867	41	.021	
2005–2009	MKG	Contrast	.190	2	.095	3.902
		Error	.998	41	.024	
2010–2014	MKG	Contrast	1.024	2	.512	19.555
		Error	1.074	41	.026	

† $p < .10$; * $p < .05$; ** $p < .01$
[a] Dependent variable: VISIBILITY
[b] Only statistically significant results are reported.
Note: F tests the effect of RANK (ABS 2015). This test is based on linearly independent pairwise comparisons among the estimated marginal means.

Table 4 - Simple effects analysis a,b

Among the eight disciplines of management under review in this study, only two—ACC and MKG—display significant variations in visibility over time. It follows that, on average, the visibility of academic research in all fields of management except ACC and MKG has not significantly changed since 2000, regardless of the prestige of academic journals in which the research was published. When time sub-periods are considered, the impact of ranking on visibility is statistically significant only for ACC in the first sub-period (2000–2004), and for MKG in the two last sub-periods (2005–2014). These findings suggest an opposite pattern between these two disciplines.

As before, we used the Bonferroni and Tukey post-hoc tests as robustness checks, including now both the field of management (*FIELD*) and the three five-year sub-time periods (*TIME*) in the analysis (see Table A3-2 in Appendix 3). Since both tests lead to the same conclusions, only Bonferroni is reported. Interestingly, even the difference in visibility between the two extreme rankings (world elite journal and highly regarded journal) is weakly significant at the 10% level for the ACC field. Table A3-2 also shows that ACC has experienced a decrease in visibility from 2000–2004 to 2005 onwards, as suggested before.

As regards MKG, the results in Table A3-2 are still more informative and statistically significant. The gap is widening between world elite

11.Note that there is no reason to conduct a simple effects analysis when the interaction term, regardless of its order, is not statistically significant at the usual confidence levels. Conversely, when there is a significant interaction, the concept of main effect is not really relevant. In this situation, results must be interpreted through a decomposition of effects, i.e. analyzing effects of a factor for each level of the other one (simple effects analysis). In contrast to the main effects analysis, the simple effects tests report factor effects conditional upon the level of the other one involved in the interaction term.

journals and top journals. The former became more than twice as visible as the latter over the last ten years—see the column untitled "Mean differences (I–J)" in Table A3-2. In addition, there is a huge difference in visibility between world elite journals and highly regarded journals over the most recent five years. The former are nine times more visible than the latter. By contrast, the difference in visibility between the world elite journals and the two lower-ranked marketing journals is fairly constant over the 2010–2014 time span.

Overall, this set of results suggests that the "prestige premium" for marketing journals has increased over the last decade (2005–2014). The four top-ranked marketing journals (namely, *Journal of Consumer Psychology, Journal of Consumer Research, Journal of Marketing*, and *Journal of Marketing Research*) were cited only 166 times in the popular press between 2000 and 2004. The number of citations of those four journals taken together reached 1,104 over the 2010–2014 period. This increase is observed for the four journals, even though it is more salient for *Journal of Marketing* and *Journal of Marketing Research*. Those two journals are also by far the most visible in the press during the last period.

Last, to provide deeper insight into the trend in visibility of academic research over the past 15 years, we conducted a polynomial contrasts analysis. As reported in Table A2-2, the linear component of the *TIME×FIELD×RANK* two-order interaction term is significant at the 1% level. This finding is a stimulating message addressed to researchers in management—regardless of their own field of expertise—as it suggests that overall, the average visibility of research in management outside the academic community has increased linearly over time. Although MKG is primarily concerned with what might be considered as good news, the upward trend reported in Table A2-2 encompasses six of the eight disciplines of management under review in this study (ACC and MIS being the two exceptions). The average visibility ratio of the sample shows growth rates of 9% between the two first sub-periods and 42% between the last sub-periods. Moreover, 40 journals out of 63 have experienced an increase in visibility between 2000–2004 and 2010–2014.

The visibility of academic journals may be influenced by variables other than those considered in the previous analysis. In an earlier version of this paper, we tested the same two-way ANOVA model with a covariate indicating whether or not a journal was sponsored by a professional group. Podsakoff, et al. (2005) observed that the top quartile of management journals—such as *Academy of Management Review* and *Academy of Management Journal*—may have benefited from the fact that they are sponsored by the Academy of Management. Clearly, such a sponsorship promotes academic journals among scholars, but it may also enhance the visibility of research in management among practitioners. Surprisingly, this covariate was not statistically significant.

As a robustness check, we duplicated the statistical analyses with a sample exclusive of the four outliers in terms of visibility, namely *The Accounting Review* (ACC), *Journal of Finance* (FIN), *Journal of Marketing* (MKG), and *Journal of Consumer Research* (MKG). The aim was to check whether the results depended heavily on the visibility of these four influential cases in the data. Overall, the previous empirical findings held true with this restricted sample. However, it is worthwhile noting that visibility is then driven by the field of management in which a journal publishes, and no longer by its ranking, over the whole period 2000–2014. Although it is difficult to identify the specific reasons for this shift, a possible explanation is that the stratification of rankings is more modified than the

stratification of fields within the sample. Indeed, the four journals excluded from the sample are ranked as world elite journals.

Our answer to our second research question is thus that, on average, academic research in management has gained momentum outside its own community over the last 15 years (2000–2014). Even though this upward trend is mainly led by MKG, that holds true for most fields of management considered in this study. This is good news for the whole community of researchers engaged in promoting academic research in management among practitioners.

The main notable exception to this enhanced visibility is the ACC field, where the mean visibility ratio has decreased over the time period. While ACC was second to FIN in visibility on the 2000–2004 period, it came fifth in the 2010–2014 period, behind MKG, FIN, GEN, and HRM. Leisenring and Johnson (1994) attribute the low audience of accounting research among practitioners both to the research–practice gap and to the small number of academic publications in accounting. It is true that the number of publications in accounting, and especially in *The Accounting Review,* has significantly decreased over our period of study. However, the visibility ratio is not always correlated with the number of publications. For example, the visibility ratio of the *Journal of Consumer Research i*ncreased over the period, despite a decrease in the number of published papers that is equivalent to that of *The Accounting Review*. We leave it up to accounting researchers to investigate whether changes in research design in their field could explain this decreased visibility in the press.

DISCUSSION

OVERVIEW OF THE STUDY AND MAIN FINDINGS

Figure 1 displays an overview of the research framework, highlighting the two research questions investigated in this paper and the main empirical findings. The average visibility of academic research in the managerial press is segmented by: (i) field of management; (ii) ranking of academic journals; and (iii) five-year time span. The number of journals per field of management is also reported. As shown in Figure 1, MKG is the most visible discipline outside the academic community, with an average visibility ratio of 24.52%, and OR the least visible with a ratio lower than 1%. This compares with an overall average visibility recorded in the sample equal to 10.90% and a median visibility of 4.65%.

The two research questions in Figure 1 (right side) encompass the three above factors with potential effect on visibility (*FIELD, RANK*, and *TIME*). To put it simply, the first research question is interested in uncovering which factor or combination of factors impacts visibility, while the other focuses on the time evolution of visibility. Regarding the former, we found that the average visibility of research in management outside the academic community is fairly low. In line with the statistically significant effect of the *RANK* factor on visibility, an important dissimilarity between journal rankings is observed. Specifically, the most prestigious journals (i.e. ranked world elite journals) are also the most often cited in the managerial press. As regards the second research question, we found that the visibility of management research has gained momentum outside its own community over the last 15 years, even if this upward and encouraging trend is mainly due to just one discipline (MKG).

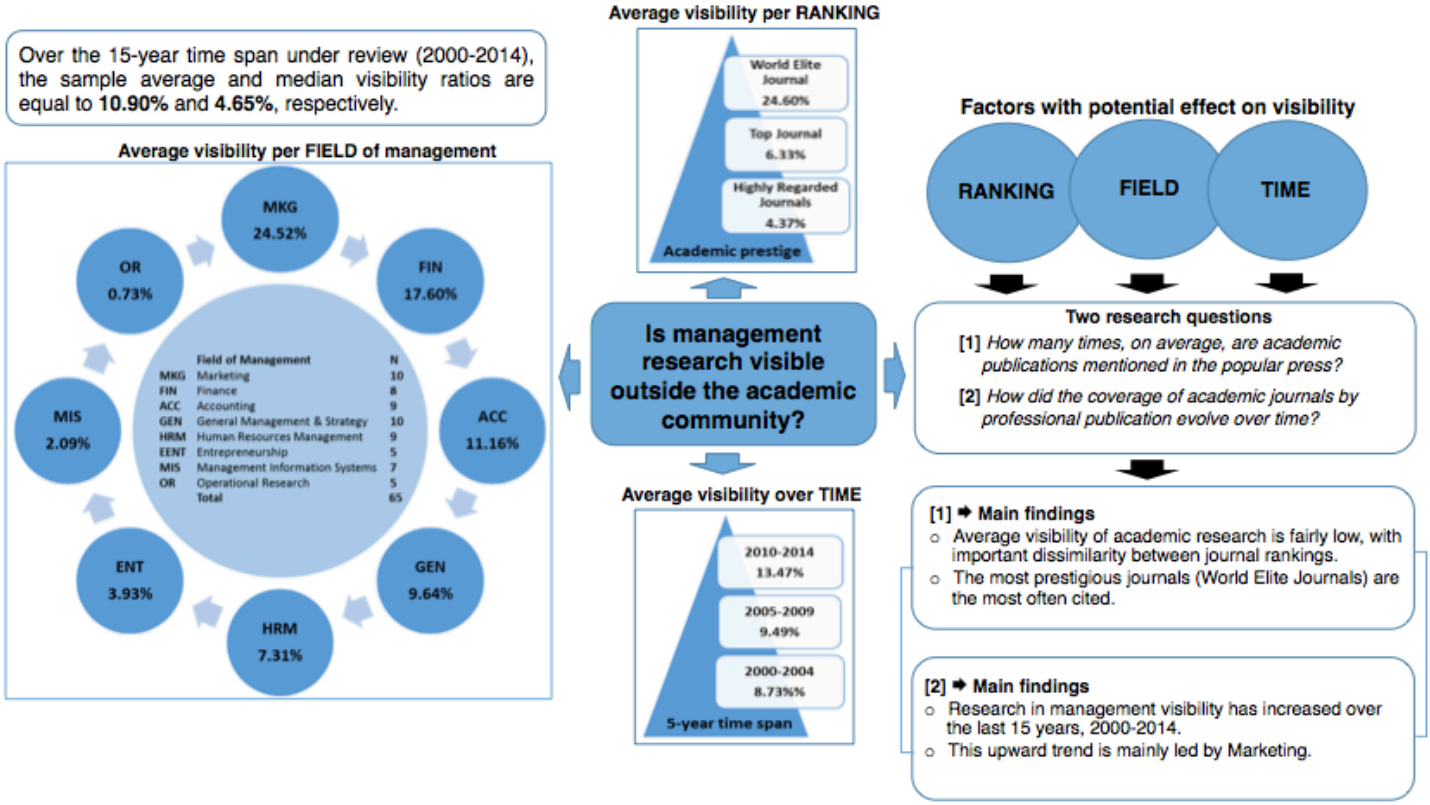

Figure 1 - An overview about visibility of management research in the press

ACADEMIC PRESTIGE AND VISIBILITY IN THE PRESS CAN GO TOGETHER

Overall, apart from the general management field, our results tend to contradict the supposed trade-off between academic quality and practical relevance. The outstanding and most selective journals (namely, the *Journal of Consumer Research*, *Journal of Marketing, The Accounting Review*, and *Journal of Finance*) tend to be more frequently cited in professional publications than do less prestigious publications in the same field. One possible explanation could be that the most innovative papers tend to be published in the most prestigious academic journals. Podsakoff, et al. (2005) note that publication in top-tier journals is one of the most important factors used by universities in making resource allocation decisions on matters such as salary, release time, promotion and tenure decisions, and summer research support. They also explain that each publication in top-tier journal has a cumulative value of approximately $84,000 over a researcher's career[12]. Most importantly, it increases the likelihood for a researcher of being scrutinized by peers and thus being cited in subsequent publications. This would explain why researchers with the most innovative research insights try to publish them first in the most prestigious journal.

The fact that top journals are significantly more visible than others could have several alternative explanations. The most prestigious universities and business schools could be both the most able to hire

12. Podsakoff, et al. (2005) refer to a study by Gomez-Mejia and Balkin (1992).

faculty members that publish in the most prestigious journals, and the most efficient in diffusing their research to the media. Universities might also tend to highlight their most prestigious publications. The prestige premium could also result from selection by the journalists themselves, who might concentrate their attention on the journal of reference in the field.

PROMOTING THE VISIBILITY OF ACADEMIC PUBLICATIONS

It is worth noting that the two journals that are the most cited in the press, the *Journal of Marketing* and *Journal of Consumer Research,* both have a "press release" page on their website, which proves that both journals actively promote their publications to the press. The American Marketing Association, publisher of

also publishes "executive summaries" on the journal's website. This suggests that the diffusion of research—or, following Kieser and Leiner (2009), the "irritation" of organizations by science—may not be a passive process, but rather needs an active strategy from the research system. It might be interesting to investigate, in a future study, a possible causality relation between the actions taken by a journal in favor of press releases, and its visibility. Public diffusion of research results by press release is common in some scientific disciplines, such as health and physics. Even if the scientific community is sometimes ambivalent about this "science by press release," it may—especially in management research—be an interesting means to diffuse new scientific knowledge. Moreover, if press releases are an efficient way to enhance research visibility among practitioners, an interesting conclusion would be that visibility could then be monitored, not only by management journals themselves, but also by management schools and even researchers. This might explain the observed increase of visibility in recent years. Following the awareness of the research–practice gap, the ability of management schools and universities to diffuse research results is increasingly being scrutinized. Business schools may well have reacted to this attention by hiring public relations specialists to write press releases translating their faculties' research. They might also have accompanied their researchers in diffusing their research results to the media.

FIELD SPECIFICITIES

Some particularities in journal scopes and rankings might have influenced our results. The higher visibility of world elite journals might well have influenced our results on the differences of visibility among fields. Two fields have no world elite journal (HRM and ENT). Two fields have only one world elite journal (OR and MIS). Researchers in those fields having papers with high potential might try to get them published in connected fields or in GEN journals. This publishing strategy would decrease the apparent visibility of the fields with few or no world elite journals. Surprisingly however, the GEN field, despite having five world elite journals, shows visibility ratios that are three times lower than the MKG field over the two last sub-periods. The low visibility in the press of academic fields such as MIS, OR, ENT, and (to a lesser extent) HRM could have alternative interpretations. For MIS and OR, especially, the number of citations of academic journals in the press is 100 times lower than the number of articles published by the same journals. The choice of the press references, however, might have influenced our results. *MIS Quarterly,* for example, appears to have a very low visibility in the management press, but some press issues read by IT managers could be excluded from the

Factiva Management database. In that case, *MIS Quarterly* could well have better visibility in its specific field even if its visibility among general managers is much lower. This could also be true for the OR field.

VISIBILITY IS NOT RELEVANCE

The interpretation of our research results concerning the role of the popular press in bridging the research–practice gap should be taken cautiously. First, our visibility measure is not a perfect proxy of research relevance to managers. Visibility and relevance could be correlated only if press journalists are capable of identifying (among the published research) the findings that should be more relevant to managers. As Aldag (1997) notes, research impact is the conjunction of several factors, such as relevance, understanding and acceptance. One should also keep in mind the risk that, when cited in the press, important elements of research might be "lost in translation" (Shapiro, et al., 2007).

Second, our study is restricted to top-tier academic journals. This limitation has been applied in order to narrow the analysis to academic publications that could not be suspected of a lack of scientific rigor. However, the drawback is that the rigor–relevance debate can only partly be addressed in this research. While we show that within top-tier journals, world elite journals are actually more visible than other publications, we cannot exclude that less prestigious journals could be even more visible in the press.

Finally, some papers from the relevance-gap literature have criticized the field specialization of research (Kieser, et al., 2015: 158). Mode 2 research, in particular, considers that trans-disciplinary research should be more relevant to practice. In this study, we purposely excluded some trans-disciplinary journals (for example, academic journals covering both the ACC and FIN fields). In a following research, it might be interesting to investigate whether trans-disciplinary journals are more visible than disciplinary ones.

CONCLUSION

We estimated the yearly number of citations in the press of a panel of 63 top-ranked journals in all fields of management over a 15-year period. Our two main results are the following. First, academic journals in management have significant room for improvement in terms of scientific dissemination. Overall, academic journals are hardly visible, and this visibility seems mostly restricted to the most prestigious academic journals. Second, and more reassuring for management research, the visibility of academic journals has increased over the period 2000–2014 for most management fields, with the notable exception of ACC. In particular, the visibility of world elite journals in MKG has increased dramatically over the last decade.

APPENDIX 1 SAMPLE

ISSN	Journal	FIELD	ABS 2015	Cnrs 2015	Fnege 2013	Vhb 2015	FT50
0361-3682	Accounting Organizations and Society	ACC	4*	1	1	A	1
0001-4826	Accounting Review (The)	ACC	4*	1*	1*	A+	1
0165-4101	Journal of Accounting & Economics	ACC	4*	1	1	A+	1
0021-8456	Journal of Accounting Research	ACC	4*	1	1	A+	1
1380-6653	Review of Accounting Studies	ACC	4	1	1	A	1
0278-0380	Auditing: a Journal of Practice & Theory	ACC	3	2	2	B	
0963-8180	European Accounting Review	ACC	3	2	2	A	
0278-4254	Journal of Accounting and Public Policy	ACC	3	2	2	B	
0823-9150	Contemporary Accounting Research	ACC	4	2	1	A	1
1042-2587	Entrepreneurship, Theory and Practice	ENT	4	1	1	A	1
0883-9026	Journal of Business Venturing	ENT	4	1	1	A	1
1932-443X	Strategic Entrepreneurship Journal	ENT	4	2	2	A	1
0266-2426	International Small Business Journal	ENT	3	2	2	C	
0047-2778	Journal of Small Business Management	ENT	3	2	2	B	
0022-1082	Journal of Finance (The)	FIN	4*	1*	1*	A+	1
0304-405X	Journal of Financial Economics	FIN	4*	1	1	A+	1
0893-9454	Review of Financial Studies	FIN	4*	1	1	A+	1
0929-1199	Journal of Corporate Finance	FIN	4	2	2	B	
1042-9573	Journal of Financial Intermediation	FIN	4	2	2	A	
0022-1090	Journal of Financial & Quantitative Analysis	FIN	4	1	1	A	1
0378-4266	Journal of Banking & Finance	FIN	3	2	1	A	
0022-4367	Journal of Risk & Insurance	FIN	3	2	2	A	
0001-4273	Academy of Management Journal	GEN	4*	1	1	A+	1
0363-7425	Academy of Management Review	GEN	4*	1*	1*	A+	1
0001-8392	Administrative Science Quarterly	GEN	4*	1*	1*	A+	1
0047-2506	Journal of International Business Studies	GEN	4*	1	1	A	1
0143-2095	Strategic Management Journal	GEN	4*	1*	1*	A	
1045-3172	British Journal of Management	GEN	4	2	2	B	
0022-2380	Journal of Management Studies	GEN	4	1	1	A	1
1090-9516	Journal of World Business (Columbia)	GEN	4	2	2	B	
1740-4754	European Management Review	GEN	3	2	2	B	

1460-8545	International Journal of Management Reviews	GEN	3	2	2	B	
1057-7408	Journal of Consumer Psychology	MKT	4*	1	1	A	1
0093-5301	Journal of Consumer Research	MKT	4*	1	1	A+	1
0022-2429	Journal of Marketing	MKT	4*	1*	1*	A+	1
0022-2437	Journal of Marketing Research	MKT	4*	1	1	A+	1
0167-8116	International Journal of Research in Marketing	MKT	4	2	1	A	
0022-4359	Journal of Retailing	MKT	4	2	2	A	
1094-6705	Journal of Service Research	MKT	4	2	2	A	
0092-0703	Journal of the Academy of Marketing Science	MKT	4	2	2	A	1
0148-2963	Journal of Business Research	MKT	3	2	2	B	
0923-0645	Marketing Letters	MKT	3	2	2	B	
0960-085X	European Journal of Information Systems	MIS	3	1	1	A	
1350-1917	Information Systems Journal	MIS	3	2	2	A	
1086-4415	International Journal of Electronic Commerce	MIS	3	2	2	B	
0742-1222	Journal of Management Information Systems	MIS	4	1	1	A	1
0963-8687	Journal of Strategic Information Systems	MIS	3	2	2	A	
0276-7783	MIS Quarterly	MIS	4*	1*	1*	A+	1
1536-9323	Journal of the Association for Information Systems	MIS	4	2	2	A	
0018-9391	IEEE Transactions on Engineering Management	OR	3	2	2	B	
0144-3577	International Journal of Operations & Production Management	OR	4	2	2	B	
0925-5273	International Journal of Production Economics	OR	3	1	1	B	
0020-7543	International Journal of Production Research	OR	3	2	2	B	
0272-6963	Journal of Operations Management	OR	4*	1	1	A	1
0007-1080	British Journal of Industrial Relations	HRM	4	2	2	B	
0894-4865	Family Business Review	HRM	3	2	2	B	
0167-4544	Journal of Business Ethics	HRM	3	2	2	B	1
0963-1798	Journal of Occupational & Organizational Psychology	HRM	4	2	2	B	
0894-3796	Journal of Organizational Behavior	HRM	4	2	1	A	
0001-8791	Journal of Vocational Behavior	HRM	4	2	2	B	
1048-9843	Leadership Quarterly	HRM	4	2	2	A	
0749-5978	Organizational Behavior and Human Decision Process	HRM	4	1	1	A	1
0019-7939	Industrial and Labor Relations Review	HRM	3	1	2	A/B	

APPENDIX 2 CONTRAST ANALYSIS

TABLE A2-1. CONTRAST ANALYSIS BETWEEN THE THREE RANKINGS OF ACADEMIC JOURNALS*

Panel A: Simple contrasts[a]			
	World elite journal and highly regarded journal	Top journal and Highly regarded journal	Top journal and world elite journal
Estimated contrast	.156	.008	–.148
Standard error	.054	.045	.055
95% confidence interval	[.046; .266]	[–.083; .099]	[–.259; –.037]
Panel B: Polynomial contrasts[b]			
	Linear	Quadratic	
Estimated contrast	–.110	.057	
Standard error	.038	.035	
95% confidence interval	[–.188; –.033]	[–.013; .127]	

† $p < .10$; * $p < .05$; ** $p < .01$

* Dependent variable: *VISIBILITY*

[a] Simple contrasts compare each level of a factor to a reference level. The values for the coefficients are the differences between each factor level and this reference factor level.

[b] When polynomial contrasts are used, the first contrasts represents the linear component (the means falling more or less on a straight line), and the second contrasts represents the quadratic component (curving upward or downward).

TABLE A2-2. POLYNOMIAL CONTRASTS ANALYSIS[A]

Source	TIME	Type III sum of squares	df	Mean square	F	Partial eta square	Observed power[a]
TIME	Linear	.026	1	.026	3.036	.069	.398
	Quadratic	.005	1	.005	1.622	.038	.238
TIME×FIELD	Linear	.094	7	.013	1.540	.208	.568
	Quadratic	.005	7	.001	.226	.037	.106
TIME×RANK	Linear	.041	2	.020	2.339	.102	.447
	Quadratic	.017	2	.008	2.627	.114	.494
TIME×FIELD×RANK	Linear	.384	12	.032	3.684	.519	.991
	Quadratic	.027	12	.002	.709	.172	.336
Error (TIME)	Linear	.356	41	.009			
	Quadratic	.130	41	.003			

† $p < .10$; * $p < .05$; ** $p < .01$

[a] .05 is used as the alpha level for the power calculations.

APPENDIX 3 ROBUSTNESS CHECKS

TABLE A3-1. MULTIPLE PAIRWISE COMPARISONS— BONFERRONI POST-HOC TESTS[A]

RANK (I)	RANK (J)	Mean differences (I – J)	Std. error	95% confidence interval Lower bound	Upper bound
World elite journal	Top journal	.1827**	.0435	.0739	.2915
	Highly regarded journal	.2023**	.0448	.0902	.3144
Top journal	World elite journal	–.1827**	.0435	–.2915	–.0739
	Highly regarded journal	.0196	.0417	–.0846	.1238
Highly regarded journal	World elite journal	–.2023**	.0448	–.3144	–.0902
	Top journal	–.0196	.0417	–.1238	.0846

† p < .10; * p < .05; ** p < .01

[a] Dependent variable: VISIBILITY

Note. The Bonferroni method is based on the number of comparisons actually made, while the Tukey test involves comparing each pair of means as if these two means could be the largest and smallest in the set of r means to be compared. The former (latter) performs better than the latter (former) when the number of means to be compared is small (large). However, Bonferroni is more popular than Tukey in academic research. For the sake of brevity, we report only the results of the Bonferroni analysis. Results remain unchanged when using the Tukey method.

TABLE A3-2. MULTIPLE PAIRWISE COMPARISONS – BONFERRONI POST-HOC TESTS[AB]

TIME	FIELD	RANK (I)	*RANK* (J)	Mean differences (I – J)	Std. error	95% confidence Interval Lower bound	Upper bound
2000–2004	ACC	World elite journal	Highly regarded journal	.268†	.111	–.010	.545
2005–2009	MKG	World elite journal	Top journal	.307*	.110	.032	.583
2010–2014	MKG	World elite journal	Top journal	.652**	.114	.367	.938
			Highly regarded journal	.655**	.140	.305	1.005

† p < .10; * p < .05; ** p < .01

[a] Dependent variable: *VISABILITY*

[b] To save space, only statistically significant results at the usual confidence levels are displayed.

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