A Description of Papers Published in the PM Journals 1998-2007

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Abstract

This study describes the research papers published in the *International Journal of Project Management (IJPM)* and the *Project Management Journal (PMJ)* over a ten-year period. The contribution is a picture of the level of rigor and research maturity in project management research during this period since each paper is categorized using research design framework. In addition, we determine the authors and institutions that have been the most frequent contributors in order to provide a foundation for the discussion of communication with the field and related disciplines. Finally, previous studies on industry application areas have been updated for this ten year period.

We found that the two journals are similar in their level of research maturity though there are differences in the level of rigor. Exploratory studies are the most frequently used type of research. Both journals could increase the number of hypothesis testing papers, an indicator of the level of research maturity. Over a third of the papers did not describe a research design. The level of rigor represented by the type of data analysis could also be improved with 47% (PMJ) and 68% (IJPM) of the articles not reporting any data analysis techniques.

Introduction

In this study, we review the published research in *The Project Management Journal (PMJ)* and *The International Journal of Project Management (IJPM)* during the study period from 1998 to 2007. What research frameworks, designs, and analysis tools were utilized? Who were the most published authors? What institutions (academic and practitioner) were most represented by these authors?

This study adds to the discussion about project management as an academic discipline by observing the scholarly communication within these two major journals. With roots in operations research/management science and organizational behavior/management, project management continues to be influenced by other disciplines such as the allied disciplines as defined and discussed by Kwak and Anbari (2008): information technology, technology and innovation, construction engineering, strategy, performance measurement, and quality. Information from previous studies was updated by categorizing industry application areas of the research in the two journals. This study describes the type of research, research designs, and data analysis techniques and as such reflects the maturity level of research and the level of rigor applied to the research during this ten year period. Contributing and potential contributing

authors will have a better understanding of the research published over this ten year period in the two journals.

We find that the two journals are similar in many ways. Both publish about the same type of research profile which implies that their level of research maturity is similar. In addition, the level of rigor is similar in terms of research design however; *IJPM* research papers more frequently report no data analysis technique. We used a framework to discuss different types of research. This framework was used to classify the research into 5 categories which represent a progression of increasingly sophisticated level of research. According to Mentzer and Kahn (1995), the more mature discipline will have a greater proportion of papers on the higher end of the spectrum. Both *PMJ* and *IJPM* have published a similar profile of research types and were similar to related disciplines.

We cataloged the research methodologies and data analysis techniques used. Surveys were the research methodology of choice for researchers in both journals, followed by case studies and interviews. Data analysis techniques favored by researchers in *PMJ* were descriptive statistics, anecdotal evidence, and correlation analysis and in *IJPM* it was descriptive statistics, correlation analysis, and regression analysis.

Most papers were generic applications, research not focused on a particular industry. Of the papers with an application focus, construction and information systems continued to be the most common industry applications with construction more frequent in *IJPM* and information systems more frequent in *PMJ*.

The Journals

PMJ, the older journal, has been published since 1970 by the Project Management Institute (PMI) and Wiley. PMI was established in 1969 as a professional society by working project managers. PMI has created standards for the profession first publishing the Project Management Body of Knowledge in 1983. In addition, PMI has developed several credentials that professionals can earn through experience, education, and testing. The most widely recognized credential is the Project Management Professional first granted in 1984. In its role to provide access to knowledge, PMI publishes *PMJ*, a peer-reviewed journal. From 1970 to 1984 it was published as *Project Management Quarterly*. It was published 4 times a year (with 5 issues in 2006, Vol. 37) during the study period. (Project Management Institute, n.d.; Stretton, 2007; Wiley Interscience, n.d.)

IJPM has been published since 1983 in the United Kingdom by the Association of Project Management on behalf of the International Project Management Association (IPMA) by Elsevier. It was published six times a year but since 2002 has been published 8 times a year. IPMA was originally formed as INTERNET in 1965, an umbrella organization for primarily European national PM associations. (Elsevier, n.d.; Stretton, 2007)

Both journals have similar missions as can be seen in Figure 1. Both journals focus on addressing the needs of the PM profession in a wide variety of industries, using a wide variety of techniques. Both journal seek to connect research to practice and will publish articles concerned

with research, techniques, theory, and practice. *IJPM* and *PMJ* are aimed at a similar audience primarily serving the members of their respective associations both researchers and practitioners.

***Project Management Journal*'s Mission**

- The *Journal*'s mission is to address the broad interests of the project management profession and maintain an editorial balance of content about research, technique, theory, and practice.

Project Management Journal's Readership

- The **Project Management Journal** is intended for members of the Project Management Institute and other stakeholders interested in the state-of-the-art research, techniques, theories and applications in project management. The audience for this journal includes project management professionals, scholars, managers and business leaders and other individuals who seek to further their project management skills and practices.

International Journal of Project Management

- The *International Journal of Project Management* offers wide ranging and comprehensive coverage of all facets of project management. Published eight times per year, it provides a focus for worldwide expertise in the required techniques, practices and areas of research; presents a forum for its readers to share common experiences across the full range of industries and technologies in which project management is used; covers all areas of project management from systems to human aspects; links theory with practice by publishing case studies and covering the latest important issues.

***International Journal of Project Management* Audience**

- In the application areas listed, this includes academics: researchers and lecturers in project management; practitioners: senior project managers and planners in business, commerce and industry.

Figure 1 Mission and Audience of the Journals (Elsevier, n.d.; Wiley Interscience, n.d.)

Previous Studies

A summary of nine studies that have described published PM research is given in Table 2.

Table 1 Previous studies of published project management research

Study	Artifact	Time-frame	Questions
Betts & Lansley (1995)	*IJPM*	1983-1992	What has been published? Who has published? Is a style emerging?
Urli & Urli (2000)	All articles in ABI-INFORM with PM terms	1987-1996	How is the PM field of knowledge structured? Can we observe and evolution in the themes studied in this field?
Themistocleous & Wearne (2000)	*IJPM*, *PMJ*	1984-1998	How frequently were BOK topics covered in *IJPM* and *PMJ*? How did the BOK coverage in *IJPM* compare with *PMJ*? Has the cover coverage of BOK topics changed over the last 15 years?
Zobel & Wearne (2000)	Proceedings of PMI Conferences 1996 & 1997; Proceedings of IPMA's Congresses 1996 & 1998	1996-1998	How frequently were BOK topics covered in these conference proceedings?
Morris (2000)	*IJPM*, *PMJ*, PM Network	1990-1999	How frequently were BOK topics covered in *IJPM* and *PMJ*? How did the BOK coverage in *IJPM* compare with *PMJ*? Has the cover coverage of BOK topics changed over the last 15 years?
Kloppenborg & Opfer (2002)	All articles published in English using PMI approved keywords	1960-1999	Identify trends in PM research over 40 year period Identify most significant contributions in PM research over 40 year period. Identify most significant PM issues addresses by PM research.
Söderlund (2004)	*IJPM*; all project related research published in major management or organization scientific journals	1992-2002	Where are the boundaries of the PM discipline? Categorize research in *IJPM* and major management journals into single/multi project and single/multi firm framework.
Crawford (2006)	*IJPM*, *PMJ*	1993-2003	How is the PM research field changing? What are the trends of emphasis?
Kwak & Anbari (2008)	Articles related to PM that were published in 18 top management journals	1950s-June 2007	What are the past, current, and future trends of PM research? What trends in the allied disciplines affect PM research?

Project management journals, business journals, conference proceedings, and databases such as ABI Inform have all been used as artifacts in analysis of the PM literature. In four of the studies, Betts and Lansley (1995), Themistocleous and Wearne (2000), Morris (2000), and Crawford, Pollack, and England (2006), the artifacts used were *IJPM* and/or *PMJ*. Other artifacts used included ABI Inform used by Urli and Urli (2000)for a keyword search. Zobel and Wearne (2000) used proceedings of four PM conferences from 1996-1998. An extensive study covering 40 years of literature (Kloppenborg & Opfer, 2002), created a database of all articles published in English that included PM keywords. More recently, there have been two studies examining the PM topics appearing in a broader literature. Söderlund (2004) examined all PM related research published in major management and organization scientific journals (14 journals and 3 special issues) and *IJPM*. Kwak and Anbari (2008) examined articles related to PM that were published in the top 18 management and business journals. As the primary goal for our study was to analyze the communication that occurs within the field through the primary research journals, we have selected *IJPM* and *PMJ* as the artifacts used in this study.

Betts & Lansley (1995) were celebrating the first 10 years (1983-1992) of publication of *IJPM*. So their study reviewed these 10 years and described what had been published. The most commonly occurring sectors, in decreasing order, were construction, information and service, and process industries. Over the 10 years, most papers were written by practitioners though during the 2nd 5 years there were more papers from academics than practitioners. Academics were most frequently from engineering followed by management, building, and construction. Authors were from 21 countries with the most from the UK followed by the US.

Themistocleous and Wearne (2000), Zobel and Wearne (2000), and Morris (2000) were all parts of a large study conducted at the University of Manchester Institute of Science and Technology (UMIST) Centre for Research in the Management or Projects (CRMP) in the late 1990s. The purpose of this study was to review and update the Association of Project Management's (APM) Body of Knowledge (BOK). Themistocleous and Wearne (2000) and Zobel and Wearne (2000) used the APM's BOK with 44 topics that the former used articles in *IJPM* and *PMJ* while the latter examined the same topics that determined the frequency of occurrence of these topics in conference presentations. Morris (2000) conducted a similar study but with a revised and restructured BOK that was developed in the CRMP study.

Several of the studies examined the trends that appear to be emerging from the literature. Betts and Lansley (1995) asked if there was a style emerging in the first 10 years of *IJPM* publication. The CRMP studies asked if the coverage of BOK topics had changed. Urli and Urli (2000) analyzed the literature to describe themes and asked how those themes have been evolving. Crawford et al. (2006) examined the literature for emerging PM trends. Kwak and Anbari (2008) also examined the top management and business journals for emerging PM trends and how trends in the allied disciplines affect PM research. Kwak and Anbari studied the prevalence and nature of PM related topics that have appeared in the top management journals. They found a strong, increasing trend in

the number of PM-related articles published in the top eighteen management and business journals

Söderlund (2004) called for PM researchers to pay more attention to the literature in other management and organization science journals and integrate work reported in management and organization science journals into PM research. "The cross-references between publications in the *IJPM* and other management and organization journals are, however, rare" (Söderlund, 2004, p. 664). In addition, he identified a gap in the research appearing in *IJPM* which he labeled project ecologies – a project environment comprised of multiple firms and multiple projects.

This study contributes by describing more recent research in the two leading project management journals than has been published. In this sense it updates some of the previously mentioned studies categorizing the application areas and type of research. In addition, in order to provide a foundation for the discussion of communication within the field and with the related disciplines through research paper citations, we provide a description of the authors and institutions that have contributed to this literature.

Methodology

Data on all research articles published in *PMJ* and *IJPM* during the years 1998 to 2007 were collected. Both journals have published articles that were not included in this study, book reviews and opinion pieces such as 'From my experience' or 'From an executive point of view'. Page counts, number of authors, author affiliation (institution and country), and keywords (author and EBSCOHost[1]) were retrieved using the Business Source Premier database provided by EBSCOHost. The article abstracts were read and as much of the article as necessary to determine the application, research type, research design, and the analysis techniques used.

In order to describe the type of research published in these journals, we used a framework used by Carter and Ellram (2003) and originally developed by Mentzer and Kahn (1995). Carter and Ellram discussed the evolution of supply-chain research as reflected by the Journal of Supply Chain Management and Mentzer and Kahn discussed the evolution of logistics research as reflected by the Journal of Business Logistics. There are similarities between the evolution of PM research and the evolution of research in these other fields. In particular, all three fields are relative newcomers to academic research, the fields are a blending of multiple fields including management, and all have been significantly influenced by practitioners as well as the academy.

The framework used by Carter and Ellram (2003) has progressing categories of research:

- *Normative literature* is "research that examines what ought to be and what individuals and organizations ought to do" (Mentzer & Kahn, 1995, p. 240). "Literature might be cited in the article, but the point of the inclusion of this literature is to support the opinions/assertions of the author" (Carter and Ellram, 2003, p. 31)

[1] http://www.ebscohost.com/

- *Literature reviews* are "a review and synthesis of existing literature, the result of which is the development of a framework, propositions, or normative prescriptions grounded in the existing literature." (Carter and Ellram, 2003, p.31)
- *Exploratory studies* are "research that makes observations of [add appropriate field] for the purposes of developing theories, but leaves the testing of the theories for other studies" (Mentzer and Kahn, 1995, p. 240-241).
- *Methodology reviews* are "reviews of research methodologies used in the field of [add appropriate field]. A 'how-to' article. Includes articles that review/introduce an academic research methodology (e.g. 'How to use simulation') as well as a practitioner methodology (e.g. 'How to calculate an EOQ')" (Carter & Ellram, 2003, p.31).
- *Hypothesis testing* is research that introduces and then tests research hypotheses or propositions. That is the research examines "testable statements [hypothesis] about non-observable constructs" in order to build theory. (Mentzer & Kahn, 1995, p. 237)

Mentzer and Kahn (1995) claimed that the more developed research field will have progressed further through the framework with a greater number of published articles that employ hypothesis testing and fewer normative papers. In particular, "a maturing scientific discipline mandates a shift toward greater hypothesis testing, more rigorous data analysis, and standard discussions of validity and reliability." (Mentzer & Kahn, 1995, p. 244).

Results

We describe results for the study period 1998-2007 for each of the two journals examined. First, we compare general characteristics such as number of articles, pages, and authors. Then we describe the authors of the articles published during the study period, specifically, the countries that the authors represented, the institutions they are associated with and the positions held. Then we describe the type of research, research designs, and data analysis techniques used in these two sets of articles.

General description

Table 2 lists details about the number of pages and number of articles published in *PMJ* and *IJPM* during the study period. *IJPM* has published over twice as many research articles and pages of research as *PMJ*. *IJPM* increased the number of issues per year from 6 to 8 in 2002. In 2006 *PMJ* published an extra issue, five instead of the usual four.

Table 2 *PMJ* and *IJPM* Published Pages and Articles by Year

Publication Year	***Pages per Issue***		***Number of Articles***		***Average Pages per Article***	
	PMJ	*IJPM*	*PMJ*	*IJPM*	*PMJ*	*IJPM*
1998	159	359	17	41	9.4	8.8
1999	153	360	17	47	9.0	7.7
2000	201	393	22	43	9.1	9.1
2001	211	432	22	44	9.6	9.8
2002	228	583	23	66	9.9	8.8
2003	202	576	22	65	9.2	8.9
2004	217	621	20	66	10.9	9.4
2005	242	615	22	68	11.0	9.0
2006	423	708	35	72	12.1	9.8
2007	362	820	31	85	11.7	9.6
Total	2398	5467	231	597	10.9	9.2

The average article page length in *PMJ* was 1.7 pages longer than *IJPM*. Articles in *PMJ* were from 3–20 pages long whereas in *IJPM* the range was 4–18 pages. In fact, article length in *PMJ* increased from 9.4 pages to 11.7 pages during the study period at a statistically significant rate of 1/3 page per year.

Author description

There were 462 authors listed on the 231 articles published in *PMJ*. Of these, 374 were unique authors and 51 authors were listed on more than 1 article. In *IJPM*, there were 1269 authors, 184 of which were listed on more than one article. The most prolific authors are listed in Table 3. Over the 10-year study period, the average number of authors per article was slightly higher in *IJPM* (2.1 authors per article) than in *PMJ* (2.0 authors per article). In *IJPM*, the average number of authors per article has slightly increased at a statistically significant rate of 0.08 authors per article per year from 2.05 in 1998 to 2.2 in 2007. Table 4 lists the frequency distribution for the number of authors per article.

Table 3 Most prolific authors in *PMJ* and *IJPM* 1998-2007

PMJ Author	*No. of articles*	*IJPM Author*	*No. of articles*	*All Authors*	*No. of articles*
Jiang, James J.	6	Crawford, Lynn[B]	10	Crawford, Lynn[B]	15
Klein, Gary	6	Ward, Stephen	8	Williams, Terry[B]	10
Crawford, Lynn[B]	5	Cheung, Sai-On	8	Turner, J. Rodney	9
Ibbs, C. William	5	Shen, Qiping	8	Ward, Stephen[B]	9
Dvir, Dov	4	Williams, Terry[B]	7	Jiang, James J.	9
Hobbs, Brian	4	Ng, S. Thomas	7	Morris, Peter W. G.	8
Jaafari, Ali	4	Tam, C. M.	7	Shen, Qiping	8
Jugdev, Kam	4	Turner, J. Rodney	7	Thomas, Janice[B]	8
Mueller, Ralf	4	Chapman, C. B.	7	Cheung, Sai-On	8
Raz, Tzvi	4	Loosemore, M.	7	Müller, Ralf	8
Walker, Derek H.T.	4	Lam, K. C.	6	Klein, Gary	8
Cicmil, Svetlana	3	Morris, Peter W. G.	6	Tam, C. M.	7
Globerson, Shlomo	3	Thomas, Janice[B]	5	Raz, Tzvi	7
Kloppenborg, Timothy J.	3	Wang, Yaowu	5	Loosemore, M.	7
Liberatore, Matthew J.	3	Ling, Florence Yean Yng	5	Ng, S. Thomas	7
Thomas, Janice[B]	3	Thiry, Michel	5	Chapman, C. B.	7
Wang, Xiaojin	3			Jaafari, Ali	7
Williams, Terry[B]	3			Cicmil, Svetlana	7
Zwikael, Ofer	3			Lam, K. C.	6
				Andersen, Erling S.	6
				Artto, Larlos A.	6
				Pollack, Julien	6
				Hobbs, Brian	6
				Dvir, Dov	6

[B]Author is most prolific in PMJ and IJPM

Table 4 Number of authors per Article in *PMJ* and *IJPM* from 1997-2008

Number of authors	*PMJ Articles*	*IJPM Articles*
1	32.0%	26.8%
2	41.1%	43.7%
3	22.1%	20.9%
4	4.3%	7.4%
5	0.4%	1.0%
6	0.0%	0.2%
Total articles	231	597
Average Number of Authors per Article	2.0	2.1

There were more countries represented by *IJPM* authors than by *PMJ* (Table 5). Authors published in *IJPM* represent 51 countries with the largest number (28%) of authors located in the journal's home country of the United Kingdom followed by China (including Hong Kong and Taiwan), and Australia. In *PMJ*, there were 33 countries represented by 39% of the authors from its home country of the United States followed by Canada, United Kingdom, and Australia.

Table 5 Countries represented by Authors

Country	*PMJ Authors*	*Country*	*IJPM Author*	*Country*	*All Authors*
United States	39.2%	United Kingdom	27.9%	United Kingdom	22.6%
Canada	11.3%	China	17.6%	United States	16.3%
United Kingdom	9.5%	Australia	7.3%	China	12.6%
Australia	8.2%	United States	7.1%	Australia	7.6%
Israel	5.6%	Sweden	4.0%	Canada	5.8%
Italy	2.8%	Finland	3.7%	Sweden	3.5%
Sweden	2.4%	Canada	3.7%	Finland	3.2%
Finland	2.2%	Singapore	2.4%	Israel	2.8%
France	1.9%	Netherlands	2.1%	Italy	2.2%
Belgium	1.7%	Italy	1.9%	Singapore	1.9%
Total	84.8%	Total	77.6%	Total	78.8%

Authors in both journals were primarily affiliated with an academic institution (Table 6) followed by Industry, Consulting, and Government/Military. Unfortunately, the institution type affiliation of 14% of authors in *IJPM* was unidentified.

Table 6 Author Institution Affiliation

Institution	*PMJ Authors*	*IJPM Authors*
Academic	82.7%	78.0%
Industry	8.7%	3.8%
Consulting	5.0%	2.3%
Gov't/Military	1.9%	1.5%
Other	0.0%	0.7%
Unidentified	1.7%	13.7%
Total authors	462	1269

The *PMJ* authors represented 173 academic institutions and the *IJPM* authors represented 308 academic institutions. Many institutions were represented on more than one paper (Table 7) though more commonly an institution was represented by a single paper. The 10 most frequently represented institutions for each journal are listed in Table 8.

Table 7 Institution Representation Frequency

No. of Papers	*Institutions represented by PMJ Authors*	*Institutions represented by IJPM authors*
1	51%	48%
2	24%	19%
3	8%	8%
4 or more	17%	25%
No. of Institutions Represented	173	308

Table 8 Academic Institutions with the most author representation

PMJ Author Academic Affiliation	*No. of papers*	*IJPM Author Academic Affiliation*	*No. of papers*
Loughborough University	9	City University of Hong Kong	43
The George Washington University	9	Hong Kong Polytechnic University	37
University of Calgary	8	Helsinki University of Technology	23
RMIT University	8	Loughborough University	19
Tel Aviv University	8	University of New South Wales	18
University of Technology Sydney	8	Cranfield University	16
Umea University	7	University of Hong Kong	16
University of California at Berkeley	7	University of Southampton	16
Athabasca University	7	University of Technology Sydney	15
Xavier University	7	University of Warwick	15

Of the academic positions that were identified in the papers, Professor was the most frequently identified (Table 9) in both journals. This category includes full professors, chaired professors, and emeritus professors. Some professors also identified administrative positions such as Head and were counted in the professor category. In both journals, Associate Professor was the second most frequently identified position. The two journals diverged and revealed their different cultures with the third most frequently occurring position. In *PMJ*, it was Assistant Professors but in *IJPM* it was Senior Lecturer reflecting the more European base. Unfortunately, this information was provided for only 210 of the 992 academic authors of *IJPM* as this information was not published by *IJPM* after 2001. Thus, the academic position information on authors was only based on 4 years of data from 1998-2001.

Table 9 Identified Positions of Academic Authors

Position	***Percent Academic Authors in PMJ***	***Percent Academic Authors in IJPM***
Professor	35.1%	17.6%
Associate professor	14.7%	17.1%
Assistant professor	10.1%	9.0%
Instructor	0.3%	0.0%
Reader	0.9%	1.4%
Senior lecturer	4.3%	15.7%
Lecturer	4.3%	9.5%
Ph.D. Student	9.8%	9.0%
Student	6.3%	1.9%
Research position	6.3%	9.5%
Administrative position	6.6%	8.6%
Visiting faculty	1.4%	0.5%
Total Academic Authors that identified positions	348	210

Of the authors in *PMJ* and *IJPM* who identified a non-academic position (73 and 105, respectively) only 64 and 48, respectively, identified a position. The most frequently occurring positions were an executive (Table 10). This includes both industry executives and consulting company executives. Interestingly enough in both journals, approximately as many authors identified themselves as a consultant as a project manager.

Table 10 Identified Positions of *PMJ* and *IJPM* Non-academic Authors

Non-academic positions	***PMJ Non-academic Authors***	***IJPM Non-academic Authors***
Industry and Consulting Executives	35.9%	22.9%
Consultant	15.6%	20.8%
Project manager	14.1%	18.8%
Engineer	10.9%	10.4%
General manager	9.4%	18.8%
Program Manager	4.7%	0.0%
Analyst	4.7%	4.2%
Miscellaneous	4.7%	4.2%
Total Non-academic Authors	64	48

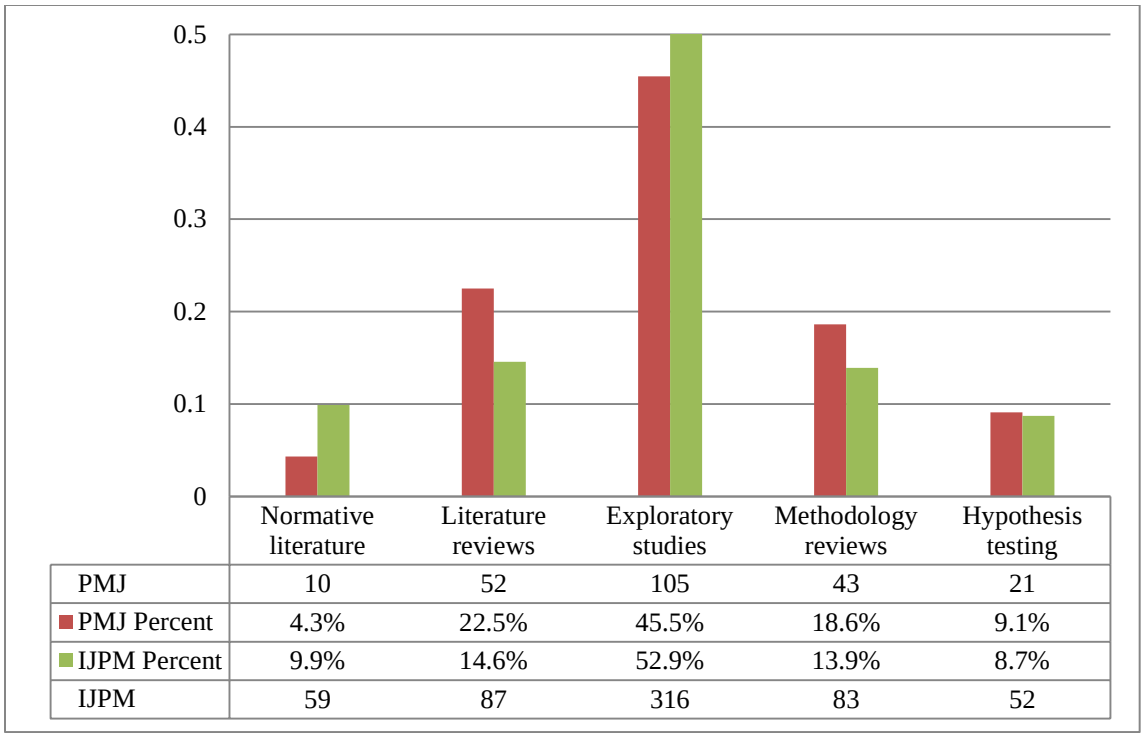
Research description

The majority of papers in both journals had a generic application area, that is, the topic was applicable to more than one industry. This was 5% larger than the number of generic applications found by Themistocleous & Wearne (2000) who examined *PMJ* articles during the period 1990-1998 and found that 59% of the papers had generic application. Of the research papers that we examined that were focused on a specific industry, information systems and construction were the most common, though the frequency was reversed in the two journals. In *IJPM*, articles with construction applications were more common than articles with information systems applications whereas articles with information system application were more common than construction application in *PMJ*. As summarized by Crawford et al. (2006) this was similar to industry applications found in previous work. Typically, construction and information systems have been the most commonly occurring applications in research papers. The remaining industry applications are listed Table 11.

Table 11 Industry Application Areas for *PMJ* Articles

Application	***Percent PMJ Papers***	***Percent IJPM Papers***
Aerospace	0.4%	0.3%
Chemical/petrochemical	1.3%	0.8%
Construction	10.4%	36.0%
Design	3.0%	2.5%
Economic Development	0	1.3%
Education & Training	2.6%	0.8%
Entertainment	0.9%	0.5%
Generic	64.1%	42.2%
Gov - Aerospace/NASA	0.4%	0.0%
Gov - Defense/Military	2.6%	0.2%
Gov - Other	0.4%	3.4%
Health & Medical	0.4%	0.2%
Information systems	10.8%	6.9%
Manufacturing	1.3%	1.3%
Other	0	0.8%
Research & Development	0	0.8%
Retail & Distribution	0.4%	0.0%
Telecommunications	0.4%	0.3%
Transport	0.4%	0.5%
Total papers	231	597

Figure 2 summarizes the type of research in each journal using the framework of Carter and Ellram (2003) discussed in the methodology section. The two journals had a similar profile with the most articles being exploratory studies, followed by literature reviews, and methodology reviews. The two journals diverged with reversed frequency in normative literature and hypothesis testing with *PMJ* published more hypothesis testing research and *IJPM* published more normative literature.



	Normative literature	Literature reviews	Exploratory studies	Methodology reviews	Hypothesis testing
PMJ	10	52	105	43	21
PMJ Percent	4.3%	22.5%	45.5%	18.6%	9.1%
IJPM Percent	9.9%	14.6%	52.9%	13.9%	8.7%
IJPM	59	87	316	83	52

Figure 2 Type of Research Reported in *PMJ* and *IJPM* Articles

Table 12 breaks the 10-year period in two 5-year periods to see if there were any changes in the research typology profile. The largest change in *PMJ*, was an increase in exploratory studies whereas the largest change in *IJPM* was in hypothesis testing. The corresponding largest decreases were methodology reviews in *PMJ* and normative literature in *IJPM*.

Table 12 Changes in Type of Research in *PMJ* and *IJPM* in 5 year Periods

	PMJ			***IJPM***		
	1998-2002	***2003-2007***	***Delta***	***1998-2002***	***2003-2007***	***Delta***
Normative literature	5.9%	3.1%	-2.9%	14.9%	6.5%	-8.5%
Literature reviews	19.8%	24.6%	4.8%	14.5%	14.6%	0.1%
Exploratory studies	35.6%	53.1%	17.4%	17.4%	11.5%	-5.9%
Methodology reviews	26.7%	12.3%	-14.4%	50.2%	54.8%	4.6%
Hypothesis testing	11.9%	6.9%	-5.0%	2.9%	12.6%	9.7%

For some perspective, we compared the research typology profiles of *IJPM* and *PMJ* with those of the *Journal of Business Logistics (JBL)* in 1995, and the *Journal of Supply-Chain Management (JSCM)* in 2003 (Table 13). The *JBL* data includes approximately 15 years of published articles that represent those articles published from volume 1-14, through the first issue in 1993. This was the early history of *JBL* so the profile is of a much younger research field than *PMJ* and *IJPM* represented. The *JSCM* data has

articles from 35 years of the journals history, from its inception in 1965 through 1999. By contrast, we have only looked at the 10 year period 1998-2007. According to Mentzer and Kahn's (1995) suggestion, both *PMJ* and *IJPM* research are further along the research development continuum with fewer papers categories as normative literature, and more hypothesis testing articles.

Table 13 Type of Research Comparison to *Journal of Business Logistics* and *Journal of Supply-Chain Management*

Research type	***PMJ***	***IJPM***	***JBL***	***JSCM***
Normative literature	4%	10%	54%	33%
Literature reviews	23%	15%	-	3%
Exploratory studies	45%	53%	36%	39%
Methodology reviews	19%	14%	6%	17%
Hypothesis testing	9%	9%	4%	8%

We continue to use the framework created by Carter and Ellram (2003) to describe the types of research designs and data analysis techniques used in *PMJ* and *IJPM* articles. Of the 231 *PMJ* articles, 63% employed and described at least one research design in the study. Similarly, in *IJPM*, 65% employed and described at least one research design. The number of research designs used in each article is profiled in Table 14 and the type of research design is profiled in Table 15. The types of designs were: Surveys, Case study(ies), Interviews, Mathematical modeling, Archival study, Simulation, Other. Interestingly, the profiles are similar for both journals.

Table 14 Number of Research Designs used in *PMJ* and *IJPM* Articles

No. of Research Designs	***PMJ Articles***	***IJPM Articles***
0	37%	35%
1	44%	47%
2	15%	13%
3 or more	4%	5%

Table 15 Research Designs used in *PMJ* and *IJPM* Articles

Research design	***PMJ Articles****	***IJPM Articles****
Survey(s)	28.1%	29.6%
Case study(ies)	19.5%	20.8%
Interviews	16.9%	17.9%
Mathematical modeling	7.8%	8.7%
Archival study	6.9%	8.0%
Simulation	2.6%	2.0%
Other	3.9%	2.7%

* Will not total to 100% since not all articles used a design and some articles used more than one design.

Of the *PMJ* articles, 53% employed and described at least one data analysis technique and 32% of *IJPM* article employed and described at least one data analysis technique. A categorization of the number of data analysis techniques employed is given in Table 16. In *PMJ*, descriptive statistics was the most commonly used data analysis technique followed by anecdotal evidence, and correlation analysis. In *IJPM*, while descriptive statistics was the most commonly described data analysis technique, the second most common was correlation analysis followed by regression analysis. Data analysis techniques are listed in Table 17.

Table 16 Number of data analysis techniques used in *PMJ* and *IJPM* Articles

Number of data analysis techniques	***PMJ Articles***	***IJPM Articles***
0	47%	68%
1	36%	17%
2	10%	10%
3	6%	4%
4 or more	1%	1%

Table 17 Data Analysis Techniques used in *PMJ* and *IJPM* Articles

Data analysis technique	*PMJ Articles*[*]	*IJPM Articles*[*]
Anecdotal evidence	8.2%	1.0%
ANOVA	4.8%	3.0%
Content analysis	5.2%	1.7%
Correlation analysis	7.4%	6.4%
Descriptive statistics	23.8%	16.4%
Discourse analysis	0.9%	0.0%
Factor analysis	6.9%	4.9%
Goodness of fit tests	1.7%	2.0%
Means testing	4.8%	4.4%
Other	3.0%	3.5%
Path Analysis/SEM	0.0%	1.0%
Ranking	0.0%	1.7%
Regression analysis	6.1%	5.9%

[*] Will not total to 100% since not all articles used a design and some articles used more than one design.

Conclusion

After reviewing the articles that were published in *PMJ* and *IJPM* from 1998-2007, we conclude that the journals are very similar on many dimensions. Both journals had an average of 2 authors per article. Both journals most frequently published articles that are applicable across all industries. The most frequent type of research in both journals was exploratory studies, followed by literature review, and methodology review. As the research in the fields mature, we would expect hypothesis testing to increase. Articles in both journals used a similar profile of research designs with surveys used most frequently followed by case study(ies) and interviews though over a third reported no research design. As the level of rigor increases, more research designs will be reported. Articles in the two journals used the same data analysis techniques except that *PMJ* has articles that used anecdotal evidence more than articles in *IJPM*. Both journals could improve the number of data analysis techniques and the sophistication of the data analysis.

The differences are that *IJPM* was published more often and as a result has published 2.6 times more articles from more authors representing 1.5 times more countries. Though the articles in *PMJ* were on average 1.7 pages longer and have increased at a statistically significantly rate of 1/3 page per year over the study period. *IJPM* published more articles with construction industry applications whereas *PMJ* published more articles that are applications of the information systems industry.

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