Normative Standards for IS Research

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Abstract

Manuscript rejection rates for the top IS academic journals average 85-90%. An undesirable consequence of this level of rejection is that the IS community becomes discouraged and disaffected with the review process. Part of the reason so many manuscripts are not ready for publication may lie in the lack of agreement and understanding among IS researchers on the key criteria for evaluating IS research. The purpose of this study is to report on a survey of the perceptions of published authors, reviewers, and editorial board members about the manuscript requirements for publication in IS. Knowledge gained from the study has the potential to: (1) improve the overall quality of future submissions by focusing the researchers' time and effort on key criteria and normative standards for publishing research, as differentiated by research method, (2) reduce the number of revisions required before a manuscript gets published, and (3) suggest journal evaluation forms that more accurately reflect the standards of the IS community. The empirical results reported here provide an introspective analysis of the IS field, a set of normative standards for IS, and an action plan for IS journals.

Keywords:Standards for IS research, research methodologies, theory, journal review process

ACM Categories:A.m, H.1.m

The Problem of High Manuscript Rejection Rates

A high manuscript rejection rate by scientific journals is a two-edged sword. Although high rejection rates may indicate that reviewers are making fine discriminations that result in the publication of only the best work, they may also discourage and disaffect the scholarly community (Rackoff, 1985). In many situations, the community perceives these rates to be unreasonable, setting unreachable thresholds for the bulk of the profession. Promising, but poorly written work may never be disseminated to the field because many researchers respond to journal rejections by returning the work to the file drawer (Rosenthal, 1978) rather than reworking it (Gottfredson, 1978). Novice researchers, unfamiliar with how best to make their case and with how to deal with the substance and mechanics of the journal reviewing process, are particularly vulnerable to this natural and very human reaction.

In IS, this is not merely hypothetical. As in other fields, manuscript rejection rates in the top IS journals are very high. According to Boyer and Carlson's (1989) analysis of IS journals, manuscript acceptance rates for the top academic journals in IS averages only 10%. Even acceptance rates for IS conference proceedings can be dishearteningly low. The International Conference on Information Systems (ICIS), for example, accepts only about 15% of submitted manuscripts.

What can be done about high rejection rates? One seeming solution is to create new outlets and to allocate more space in existing journals. But this achieves nothing unless the evaluative standards of reviewers and editors also change in the process. As it happens, IS journals newly created within the last several years do not appear to have higher acceptance rates than the older top journals (Swanson, 1990). The editors for these journals are most often prominent IS researchers who draw their associate editors and editorial boards from the same scholarly community whose evaluations have already resulted in the exceedingly high rejection rates experienced by the top journals.

It would seem that the real problem that must be addressed is that manuscripts are not of sufficient quality to pass the review process. Beyond elaborate prescriptions for more thorough education in research or nostrums and incitations to do better work, what can realistically be done to improve the quality of submitted manuscripts?

The Value of Explicit Standards

This paper contends that manuscript quality can be improved by making explicit, to authors and reviewers alike, the standards that are being used when manuscripts are rejected or accepted. The straightforward and simple argument is that scientific journals should adopt a total quality management perspective and that this is their proper role. As King, Kilmann, and Sochats (1978) contend in their *Management Science* article on the journal review process:

> "In establishing...editorial policy and ***publication criteria***, a scientific journal is defining its own role and importantly affecting the future of the field it represents" (boldface and italics added; p. 775)

Moreover, there is theoretical justification behind the assertion that explicit, well understood, and accepted standards will raise the quality of work, including knowledge work such as scientific research. The well-established theory of goal-setting (Locke, et al., 1981) argues convincingly that knowledge workers will dramatically improve their performance when they have clear, mutually agreed-upon objectives on which to act.[1] When objectives and performance standards are not clear, productivity is known to decline.

Does IS have a set of mutually agreed-upon, unambiguous objectives and professional standards for acceptable, high quality manuscripts? A careful look at the top journals and their practices suggests that we do not. Nowhere, perhaps, is this lack of common standards more evident than in the evaluation forms that the reviewers are required to send in with each manuscript reviewed, as shown in Table 1. A glance at these criteria, which presumably should be used in evaluating manuscripts, shows how widely they vary from journal to journal.

Editorial standards can sometimes be gleaned from a careful reading of the comments of incoming and outgoing senior editors (Emery, 1989; Ives, 1992; King, 1985; McFarlan, 1988), but these standards do not apply universally, nor is it clear that they form a basis for actual evaluation by reviewers. They may, in fact, only reflect the personal beliefs of the senior editor. Senior editors are not the sole gatekeepers for research publication, since reviewers and associate editors also play significant roles in the process (Rousseau, 1985).

This study sought to discover the criteria used by reviewers and IS editorial board members in accepting and rejecting manuscripts. Knowledge gained from the study has the potential to: (1) improve the overall quality of future manuscript submissions by focusing the researcher's time and effort on key criteria and normative standards for publishing research, as differentiated by research methodology, (2) reduce the number of revisions required before a manuscript is accepted, and (3) suggest journal evaluation forms that more accurately reflect the standards of the IS community. Empirical results reported here provide an introspective analysis of the IS field, a set of normative criteria for IS, and an action plan for IS journals.

Literature Review

Although the underlying dimensions for high quality IS research have not been enunciated for the IS scientific community, there have been numerous studies of publication standards in sociology, psychology, organization behavior, and the physical sciences, as shown in Table 2. In one of the first studies on dimensional structures for evaluating research, Chase (1970) found marked differences in the relative importance of normative criteria between the physi-

[1] Tests of the theory indicate that specific goals have the greatest effect on performance, but there is still an effect from generic goals.

Table 1. Evaluation Standards for the Top IS Journals

MISQ/DATA BASE	*ISR*	*CACM*	*Management Science*
Relevance	Significance of contribution	Technical content	Importance of research
Objectives	Technical adequacy	Originality	Impact on discipline
Readability	Appropriateness to journal	Style and organization	Impact on practice
Organization	Clarity of presentation & significance	Overall quality	Presentation
Literature review			
Methodology			
Quality of evidence			
Contribution			
Potential contribution			

Table 2. Criteria for High-Quality Research

Criteria	Chase (1970)	Wolff (1970)	Price (1985)	Daft (1985)	Mitchell (1985)
1. Statistical/mathematical analysis	x	x			x
2. Theory	x	x	x	x	
3. Coverage of significant literature	x	x	x		
4. Professional style & tone		x		x	x
5. Logical rigor	x		x	x	x
6. Contribution to knowledge	x	x	x		x
7. Contribution to practice	x	x	x		
8. Presentation level		x			
9. Research design		x		x	x
10. Adherence to scientific ethics	x				
11. Manuscript length		x			
12. Reputation		x			
13. Replicability of research	x	x			
14. Suggestions for future research		x	x		
15. Topic selection	x	x	x	x	x

cal and the social sciences. Physical sciences stress precise mathematical and technical criteria, while social sciences emphasize logical rigor and theoretical and applied significance. Wolff's (1970) survey of psychology journal editors enumerated requirements for publication of manuscripts in clinical and personality journals. Results showed consistent agreement on the relative importance of manuscript criteria. Editors rated contribution to knowledge as the most important criterion, followed closely by sound research design and objectivity in reporting results. Findings indicated that an author's reputation and institutional affiliation were least important in manuscript assessment.

Price's (1985) list of criteria is oriented toward the practitioner's perspective on organizational science. He studied how practicing line managers seek information and knowledge from published sources. Among other factors, Price contended that relevance is crucial. Relevance is defined as the ability of research to provide new insights into the organizational problems and relate to findings to organizational dilemmas.

In the field of organizational behavior, Daft (1985) performed an introspective analysis of his reviews of *Administrative Science Quarterly* and *Academy of Management Journal* submissions. Of the 111 manuscripts he reviewed, lack of theory, poor construct validation, and poor research design were the most frequently occurring problems. Mitchell, et al., (1985) gathered descriptive data about the publishing process in organizational behavior. Criteria for quality were drawn from interviews with editors or members of review boards of five organizational behavior journals. Results show that *contribution to knowledge* was rated highest while *poor writing* and *presentation* were rated as less important considerations. The low rating for good writing in Mitchell, et al.'s study is interesting because this criterion is often emphasized by opinion leaders in the social sciences. For example, Campbell (1982), as outgoing editor of the *Journal of Applied Psychology*, wrote:

> "[My] biggest shock in the entire nine years [as an editor] was the discovery [that] many people cannot describe clearly and directly what they wanted to do, what they did, and what they found out. Clearly written manuscripts are in the minority" (p. 693).

Research Questions for the Present Study

Descriptive Criteria for IS Research

Taken together, these studies demonstrate that scientific disciplines do emphasize different criteria in judging research. But because no prior study has assessed these standards for IS, criteria for IS research are unknown at this time. It can be argued, of course, that high quality research should meet most of the 15 criteria listed in Table 2. But the counter argument is that the IS community, like other scientific communities, will inevitably value some criteria more than others and, therefore, stress a subset of these criteria as most critical for new ideas to gain acceptance. Then too, while many of these criteria have been emphasized in doctoral programs and research methodology treatises, greater stress can and should be placed on disseminating these critical success factors (CSFs) to the entire IS scientific community

so that we can reach a higher level of agreement. This self-reflective and introspective understanding of CSF criteria might lead to greater convergence on standards for papers submitted to IS journals.

Prior studies on publication standards in fields such as psychology, sociology, and the physical sciences do not differentiate criteria according to type of research methodology. However, we believe methodology clearly dictates the relative importance of some criteria over others. For example, one would expect *research design* to be regarded as an important criterion for laboratory experiments, but irrelevant in conceptual studies. Morgan (1985), in exploring the logic of research methodologies used in the social sciences, agrees that criteria between different methodologies should be considered:

> "Methodologies...attempt to accomplish quite different things and call upon different criteria for determining how well they have been conducted and what they have achieved" (p. 67).

To differentiate criteria according to type of research, the first research question (RQ1) addresses possible variation in the order of importance of criteria across IS methodologies. The first research question, therefore, focuses on how IS researchers rank individual criteria within each methodology.

There were several additional response dimensions that we felt would help us understand the current views of the community. An ancillary research issue addresses the awareness within the community of the need to anchor research on theory. According to Dubin (1976), scientific fields of study are held together and driven by theories that explain phenomena of concern for the field. Theories guide further research and allow accumulation of knowledge about topics of interest (MacKenzie and House, 1978). Without theories to guide research, a field of study remains a "theme" (Keen, 1980, p. 8). Lack of theory also has the effect of producing the appearance of randomness to those gathering the facts (MacKenzie and House, 1978). Given the centrality of theory to developing paradigms, progress in a field will be closely related to how extensively theories serve as conceptual references for research (Webster and Starbuck, 1988).

Presently, theory does not appear to be an important desideratum for good research in IS. According to Banville and Landry (1989), lack of theory in most IS research results in fragmented research streams. This observation has been confirmed for IS research in general (Alavi, et al., 1989) and for research in DSS in particular (Adams, et al., 1989). In the Alavi review of IS research, only 15 articles in the 20 years previous to the study were found to be theoretically oriented. Given that data was gathered on nearly a thousand IS studies, this rate suggests that very little work in the field had to that point been based on theory. Adams, et al.'s investigation of the DSS literature (1989) also supports Banville and Landry's contention that IS lacks theory bases. Given this paucity of theory, an ancillary research question examines the extent to which attitudes about the role of theory in IS research might be changing and how much consensus there is in the IS community that theory is vital for good research.

The ancillary research question (RQ1a), therefore, focuses on the extent to which theory is perceived by the entire IS scientific community to be an important criterion for judging IS research.

A Parsimonious Set of Normative Standards for IS Research

While there are interesting intellectual and empirical questions that can be answered by pairwise comparisons of the individual criterion ratings across the 15 criteria, we felt that the field would profit from a more parsimonious set of criteria than the existing 15 that have been espoused in prior literature. We believe that a smaller set of orthogonal factors derived from the 15 criteria will provide integrative, logically consistent standards which cover all important aspects for assessing quality IS research. A parsimonious set of standards can focus the attention of IS researchers, as well as reviewers, on the elements that need to be addressed for publishable papers. IS journals can profit from having a small number of empirically derived standards for their journal evaluation forms.[2]

There is another compelling reason for delimiting the community standards for quality work. As stated earlier, goal-setting theory provides evidence that performance standards, and feedback on the extent to which individuals meet performance standards, result in demonstrably higher performance. In terms of the review process, therefore, we can expect a higher quality of submissions and a higher rate of acceptances if these standards are articulated, generally subscribed to, and reflected in higher quality manuscripts. The second research question (RQ2) addresses whether it is possible to derive a parsimonious set of meaningful standards for IS research.

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[2] While there are reasons to believe that journal review forms may not have a powerful effect on reviewer's judgments of a manuscript, all top-rated journals utilize these forms and expect reviewers to fill them out as part of their evaluation of papers. Moreover, if reviewers can be shown that the forms obviously reflect the values of the IS community, it is possible that the forms would be taken seriously and used to guide the evaluation process. This approach would also address the issue that many of the reviewer forms have been in existence for many years and have not been updated to reflect existing priorities.

Methodology

To answer the research questions, it was determined that a survey of the perceptions of published IS authors and editors would be the most appropriate methodological choice. Accordingly, a questionnaire dealing with criteria for evaluating the quality of IS journal articles was developed. Fifteen criteria, shown in Table 2, were consolidated from studies conducted in other disciplines.

Sample

To obtain a representative sample of the IS scientific community, names and affiliations of authors and editorial board members were drawn from complete volumes of the *Communications of the ACM, Management Science, MIS Quarterly*, and *Information & Management* for the period from 1985 to 1989. The final sample included 523 IS professionals.

Pilot Testing of the Questionnaire

To assess content validity of the instrument, a pilot questionnaire was administered to 40 faculty and doctoral students in an IS program at a major midwestern research institution. Based on the process for validating content suggested by Straub (1989), the 15 criteria examined in the pilot test were deemed sufficiently content-valid for purposes of judging quality of IS research submissions. The pilot study also suggested the need for different ratings across research methodologies. Following Van Horn (1973) and Vogel and Wetherbe (1984), six methodologies were chosen. They were: (1) case studies, (2) field experiments, (3) field studies, (4) laboratory experiments, (5) conceptual studies, and (6) reviews/tutorials.

Respondents were asked to select two research methodologies they felt most comfortable reviewing. For each methodology, respondents rated 15 criteria on a 9-point scale ranging from "not important" to "critically important." A sample copy of a survey sent to one of the participants appears in Appendix A.

To control for order effects, criteria were uniquely ordered for each questionnaire (Muller, et al., 1982; Perrault, 1975-76). Each respondent, therefore, received a unique ordering of the questions, generated randomly by a computer program.

Results

The research instrument was mailed to every published author and editorial board member whose name appeared in the selected journals over a five year period. Of 523 questionnaires sent out, 144 (27.5%) were returned. Because each respondent evaluated up to 30 criteria (15 criteria for each of two methodologies), the total number of ratings was 4215, and the N for factor analysis was 281 (less 7 missing data points).[3] This sample formed the data bank for subsequent statistical analysis.

Respondent Characteristics

A profile of survey respondents by geographic location is provided in Figure 1. All parts of the world were represented in the returns, with respondents from North America, (United States — 69%; Canada — 10%) forming the bulk of the respondents. Although there are reasons to believe that respondents from outside of North America could be a biased sub-sample that might not represent the research heritage of their respective international communities,[4] a separate research note published by the authors suggests that this is not the case (Evaristo, et al., 1992).

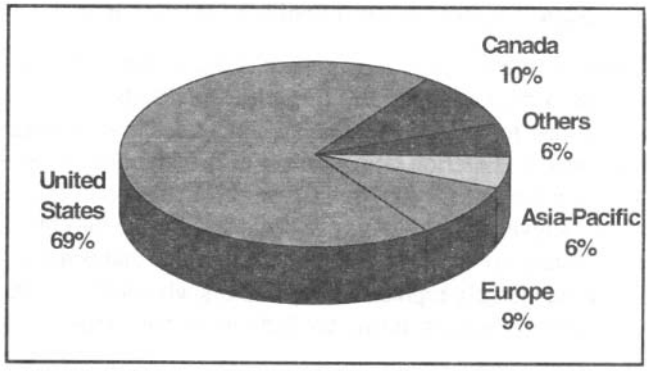

Figure 1. Geographical Distribution of Respondents

Of the survey respondents who were published IS authors, 49% were members of editorial boards of IS journals and journals in related disciplines, such as psychology, computer science, and organizational studies. The overwhelming majority of the respondents were academics (94%), with IS practitioners constituting about 6% of the total returns. A profile of professional characteristics is shown in Figure 2.

Tests for Non-Response Bias

Two time-dated waves were used to test for non-response bias (Babbie, 1973). First-wave returns were received within one month after the survey was sent out.

[3] Missing values were defined in the SAS routines and handled according to standard SAS procedure.

[4] Since the journals selected for the sampling of authors were all journals published in the U.S., it is possible that the international authors who have submitted to the journal have been in some sense "Americanized" by the process.

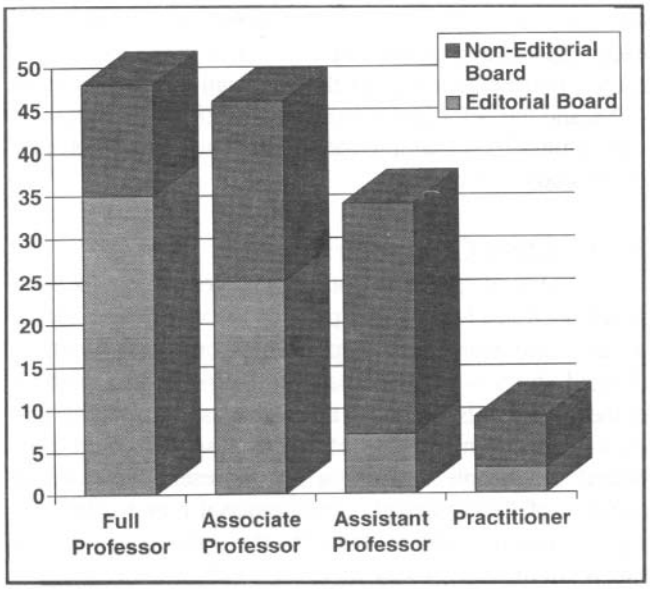

Figure 2. Professional Profile of Respondents

Subsequent responses, which were coded as second-wave returns, served as surrogates for non-respondents.

To test for non-response bias, time-dated waves were compared on criterion ratings across each methodology. No T-tests were statistically significant at the .05 level. These results suggest that findings can be generalized to the entire IS scientific community, to the extent to which that community is adequately represented by authors who published in the selected journals during the last half of the 1980s.

RQ1: The Importance of Criteria by Method

To address the first research question, rank-ordered mean ranks of criterion ratings for all six methodologies appear in Appendix B. As shown in Appendix B, criteria vary in importance across methodologies. One criterion in particular surfaced as crucial. As might be expected, *contribution to knowledge* was ranked first in three of six methodologies. Emphasis on this criterion concurs with the results of Wolff (1970) in psychology and Mitchell, et al., (1985) in organizational behavior.

Appearing in the top half of every list, respondents judged *contribution to knowledge*, *logical rigor* and *theory* to be key criteria for all types of research. Closely following these rankings was *coverage of significant literature*, which was slotted in the first half of all but one list. These results suggest that respondents felt these criteria were important irrespective of the methodology employed in the research.

Among the lower-ranked criteria, *author's reputation/ institutional affiliation* was generally considered insignificant for judging journal submissions. Other criteria received intermediate rankings and showed more variation in their placement than criteria at either extreme. Given the interest in the "relevance versus rigor" controversy in IS (Grover and Sabherwal, 1989; ICIS panel, 1988), it is surprising that *contribution to practice* placed at a lesser priority position in all lists but one.

In order to verify the face validity of our analyses of these data (i.e., to verify that methodology made a significant difference in how criteria were ranked by respondents), a 15 x 6 one-way ANOVA of all rankings (N = 4235) was performed.[5] Both main effects of methodology and criterion type were found to be significant at the .05 level, as shown in Table 3. This test suggests that reviewers do consider type of methodology in weighing the importance of certain criteria when judging manuscripts.

RQ1a: The Importance of Theory as a Criterion

The ancillary research question to the overall question of how the community ranked the criteria was the place of theory in the evaluation of manuscripts. As noted above, the rankings suggest that theory is viewed as a key criterion across all types of research. To test the face validity of this interpretation, we compared the rank mean of theory versus

[5] Ratings were converted into rank or ordinal data to ensure that differences in how respondents interpreted the scales would not affect results. According to Conover and Inman (1981), it is permissible to use rank data as the dependent variable in ANOVAs.

Table 3. ANOVA Results

Source	d.f.	Sum of squares	Mean square	F-value	P-value
Method	5	68123916.9		9.4	.0001
Criterion	14	2569177014.5		126.5	.0001
Model	19	2637300931.5	138805312.1	95.74	.0001
Error	4216	7125936719.9	1449834.5		
R-Square =	.27				

Table 4. Nonparametric Rank Mean Difference Tests

Rank Mean	Conceptual	Field Study	Lab Experiment	Reviews, Tutorials	Field Experiments	Case Study
Theory	10.65*	9.40*	9.36*	9.17*	9.12*	8.42*
All Other Criteria	7.81	7.89	7.9	7.91	7.94	7.96

* Significantly higher at the .05 level

the rank mean of all other criteria for each of the six methods. The results, summarized in Table 4, show that theory was ranked significantly higher than the mean of all other criteria for all methods.[6] These results suggest that, in spite of the historically low use of theory in IS research, the community as a whole does value theory in judging the quality of journal submissions.

RQ2: Derivation of a Parsimonious Set of Standards

To determine if there was a more parsimonious set of standards that could be used to characterize IS research, a principal components factor analysis was run on 281 evaluations (7 data points were missing). Using orthogonal rotation, the rotated factor structure with the highest explained variance (90%) is shown in Appendix C.

At a .3 cutoff level, five factors emerged,[7] including a separate factor for *reputation of author and/or institutional affiliation*. Since it has been previously determined that this criterion should not be highly valued in academic research (Wolff, 1970), the remaining four factors can be said to be "standards" for IS research.

The first standard can be termed "Conduct of Research" since criteria such as use of appropriate statistical techniques, design of research, and replication of other work all deal with how the research was carried out. Conducting research in an ethical fashion (scientific ethics) is also covered under this heading.

A second standard, "Presentation," was revealed in the underlying data. Within this standard are such criteria as logical rigor and professional style. Since length of manuscript was ranked at a low level across all methods, this criterion was dropped from the normative standards. Overall, the emphasis in this standard is on how convincingly the author is able to present his or her ideas to the audience.

The third standard can be termed "Conceptual Significance." Falling under this category are criteria like contribution to knowledge, topic selection, and theory. Literature review and directions for future research are also included under this category. Given that many or most of these elements appear at the top of the ranked criteria lists (Appendix B), it is logical to consider this standard to head a prioritized listing of standards for journal review purposes.

The fourth and final standard is "Practical Significance," which covers both selecting topics appropriate for the audience as well as dealing with problems that apply to the real world. Although criteria in this category are not ranked very highly by the respondents, IS is an applied field and it would seem to be imperative to highlight this standard in reviewing manuscripts.

Discussion

Overall, our study showed that criteria varied in relative importance for judging IS journal submissions. Nevertheless, a few criteria were consistently more important than other criteria. *Contribution to knowledge, coverage of significant literature, logical rigor* and *use of theory* were rated as important criteria regardless of methodology. Contribution to knowledge, in particular, was deemed essential under all circumstances. This result confirms the conclusion of Daft, et al., (1987) that the ability to add to our knowledge about a topic is the single most important factor in differentiating significant from not-so-significant research. The best research will be based on a thorough and demonstrated knowledge of the literature that rests on theoretical foundations and carries the weight of its argument by showing how this research extends core knowledge in the field.

If the results of the rankings by method are examined from the point of view of qualitative versus quantitative research (Straub, 1989; Kaplan and Duchon, 1988), highly interesting patterns emerge. From this perspective, case studies, which rely on relatively little statistical analysis, fall into a category with conceptual studies and reviews/tutorials as *qualitative* research, whereas field studies, field experiments, and laboratory experiments, which place more reliance on statistical analysis, are remarkably similar in pat-

[6] All tests were significant at the .05 level.

[7] Spector (1992) and Carmines and Zeller (1979) suggest a factor loading of .3 to .35 as a cut-off point for when an item is considered to load on one factor versus another. Since it is unlikely that the factors are entirely orthogonal, an oblique rotation of the matrix was also performed and factor structures compared. Only two criteria loaded on different factors, indicating that the factors demonstrate an acceptable robustness. Since the factors from the orthogonal rotation were more easily interpretable, this is the factor structure that is reported here.

terns of criteria importance and may be thought of as *quantitative* research.

According to the data, the communication of substantive elements in qualitative research is particularly sensitive to how well the report is written. That is, case studies, conceptual studies, and reviews/tutorials must organize the substantive message in such a way that the audience can readily understand (*presentational level* and *professional style & tone*) the flow of ideas and the power of the arguments (*logical rigor*). It is interesting to note that *presentation, professional style & tone*, important criteria for qualitative research, are not in the top half of the criteria for quantitative research.

For quantitative research, *research design* overshadows other criterion. This rating concurs with Jenkins' (1985) assertion that poor research design has plagued IS research and that the field needs to pay greater attention to the matching of method to problem. Other researchers (Farhoomand, 1987; Hamilton and Ives, 1982) have noted that IS researchers often indiscriminately apply a research method, especially the survey method, to IS problems. Researchers should consider asking questions such as whether the strengths of the survey methodology in gathering opinion data are applicable in areas where dependent variables need to be measured with high confidence (Ives and Olson, 1984).[8]

The emphasis on *statistical analysis* in quantitative research suggests that IS researchers should place high value on careful and precise use of statistical techniques in data analysis. For example, Baroudi and Orlikowski (1989) observe that important relationships among variables in empirical work often go undetected because of low statistical power. IS researchers are also urged to be sensitive to internal and external validity issues and to the need for instrument validation. This emphasis corroborates Straub's (1989) argument for greater attention to the use of statistical techniques in earlier stages of the research cycle than statistical conclusion validity (Cook and Campbell, 1979). Testing relationships between hypothesized variables without ruling out affects of moderating or exogenous variables means that internal validity has not been completely addressed through statistical or experimental controls (Jarvenpaa, et al., 1985).

Looking at the criteria for each of the six methodologies, we notice a unique feature of experiments. *Scientific ethics* was rated almost equally in field and laboratory experiments and as a more important criterion here than in the other methodologies. This seems consistent with the features of experimental designs where the issue of scientific ethics becomes more pronounced as the researcher manipulates and creates artificial environmental conditions.

The view that *theory* is a key criterion regardless of background characteristics of the respondent was verified in the analysis. Attitudes toward the importance of theory were consistent across editorial experience, professorial rank, and extent of reviewing. This finding could be interpreted to mean that IS, as a field, recognizes the central role of theory and theory development. If that interpretation is accurate, we can expect journal submissions to be judged more critically for theoretical content and will see more efforts channeled towards theory building in the IS context.

Normative Standards for IS Research

Our study found an underlying parsimonious set of standards for assessing IS research. The norms include conceptual and practical significance as well as conduct and presentation of research.

In spite of the knowledge the study has provided of the evaluative opinions of reviewers and editors, the practical value of this study will only be felt when the IS community comes to a better understanding and a more general agreement on the importance of these now explicitly stated standards. Journal editors can be instrumental in this process by emphasizing these standards **explicitly** in the evaluation of manuscripts.

Suggestion for New Journal Evaluation Forms

Based on the results of the present study, we propose a straightforward enhancement to existing journal evaluation forms. Although journal editors could choose to use up to six forms, one for each of the six methodologies surveyed, submissions that do not fall neatly into one of the six categories will be difficult to classify if this procedure is adopted. Moreover, editors may not want to adopt an arbitrary cut-off point for selecting a certain number of criteria.

Four proposed standards for a single purpose journal evaluation form are shown in Appendix D. The form reflects the parsimonious set of standards derived through the factor analysis, prioritized both by existing values of the field and by a normative standard ("Practical Significance") that is highly appropriate for an applied field like IS. Standards that are particular to the mission of a journal can also be added by journal editors for a final form. Moreover, journal editors may wish to formulate additional criteria that are very specific to the activity of evaluating manuscripts. For example, a category on "Potential for publication **after revision**" could be extremely useful in determining the fate of a paper.

Presently, as demonstrated in Table 1, the top journals have little consistency in standards, but, what is more cru-

[8] This question was asked, for instance, during the research design of the present study. Our assessment was that a pretested questionnaire with constructs based on the literature could reliably gather representative *opinion* data about criteria for quality research from the IS community.

cial, they do not always stress the standards empirically identified in this study. *A singular omission from these journal evaluation forms is a standard which highlights the value of theory-based research.*

We urge journal editors and the IS scientific community to seriously consider revising standards used to judge the quality of journal submissions along the lines evidenced in this study. Normative standards proposed here might also be disseminated to prospective IS authors to help demystify the assessment of quality IS research. The order of priority of the standards can be varied by the chief editor to reflect the mission of the journal, but all standards should be included in one way or another. If the normative standards identified here are attended to, we believe that there is a potential to: (1) improve the overall quality of future submissions by focusing the researcher's time and effort on key criteria and normative standards for publishing research, (2) reduce the number of revisions required before a manuscript gets published, and (3) adopt journal evaluation forms that more accurately reflect the standards of the IS community.

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Appendix A

KEY CRITERIA FOR PUBLISHABLE, HIGH QUALITY RESEARCH

INSTRUCTIONS: Imagine you are reviewing a manuscript that adopts the research methodology you checked off. Please rate the following publication criteria on their relative importance when you assess the submitted manuscript. Indicate your views by rating each issue on the following scale:

SCALE:	Not Important				Moderately Important				Critically Important
	1	2	3	4	5	6	7	8	9

Rating Criteria and Definitions

_____ **1. Research design**
Appropriateness of the method, subjects, and techniques; appropriate operationalization of theoretical concepts; internal and external validity.

_____ **2. Professional style and tone**
Appropriate and correct writing style; grammar; clarity of figures and tables; conciseness.

_____ **3. Topic selection**
High or current readership interest; interesting choice of paradigm or data analysis technique.

_____ **4. Contribution to practice**
Link to current technological and organizational problems or challenges faced by MIS practitioners.

_____ **5. Manuscript length**
Length of the manuscript within a range of pages considered acceptable for a given journal.

_____ **6. Reputation**
Status and reputation of the author and author's institution.

_____ **7. Adherence to scientific ethics**
Observing the code of ethics for the conduct of human subjects research to best contribute to science and human welfare.

_____ **8. Replicability of research**
Feasibility of conducting the same study based on the information provided by the author.

_____ **9. Theory**
Use of theories from MIS or reference disciplines to explain the relationships among variables used in this study.

_____ **10. Suggestion for future research**
Directions for extending or improving the present research.

_____ **11. Coverage of significant literature**
Discussion of relevant literature; explication of underlying assumptions.

_____ **12. Contribution to knowledge**
Extending or challenging present beliefs and assumptions in the MIS knowledge base.

_____ **13. Presentation Level**
Presented at a level of sophistication and economy of explanation appropriate to the readership of the journal.

_____ **14. Logical rigor**
Tight, logical flow of ideas with clear ties between literature review and method, and clear links between method and results.

_____ **15. Statistical/Mathematical Analysis**
Appropriateness of analytical techniques (e.g., statistics); appropriateness of interpretation of analytical results; magnitude of effects.

Appendix B

Rank Means of Criteria Ratings

CASE STUDY (N=47)	RankMean
Contribution to knowledge	11.9
Presentational level	10.8
Contribution to practice	10.7
Logical rigor	10.7
Professional style & tone	9.6
Topic selection	8.8
Scientific ethics	8.5
Theory	8.4
Coverage of sig. literature	8.1
Research design	7.9
Suggest future research	7.5
Manuscript length	4.9
Statistical analysis	4.8
Replicability	4.3
Reputation	2.5

CONCEPTUAL (N=80)	RankMean
Contribution to knowledge	12.2
Logical rigor	11.7
Theory	10.6
Coverage of sig. literature	10.6
Presentational level	9.6
Professional style & tone	9.0
Contribution to practice	7.5
Suggest future research	8.8
Topic selection	8.8
Research design	6.4
Scientific ethics	5.9
Manuscript length	5.6
Statistical analysis	4.8
Replicability	4.4
Reputation	3.5

FIELD STUDY (N=71)	RankMean
Contribution to knowledge	11.1
Research design	10.7
Logical rigor	10.6
Statistical analysis	9.3
Theory	9.4
Coverage of sig. literature	8.9
Professional style & tone	8.8
Presentational level	8.6
Contribution to practice	8.0
Topic selection	7.7
Scientific ethics	7.6
Replicability	6.7
Suggest future research	6.2
Manuscript length	3.9
Reputation	1.7

LAB EXPERIMENT (N=45)	RankMean
Research design	13.0
Logical rigor	11.4
Statistical analysis	10.9
Contribution to knowledge	10.2
Replicability	10.1
Theory	9.3
Coverage of sig. literature	9.2
Scientific ethics	9.1
Professional style & tone	7.4
Presentational level	7.1
Topic selection	6.1
Contribution to practice	5.4
Suggest future research	5.3
Manuscript length	3.5
Reputation	1.3

REVIEWS, TUTORIALS (N=32)	RankMean
Coverage of sig. literature	12.4
Logical rigor	11.4
Contribution to knowledge	11.1
Suggest future research	10.1
Presentational level	9.1
Theory	9.1
Topic selection	8.7
Contribution to practice	8.3
Professional style & tone	8.2
Scientific ethics	6.4
Research design	6.1
Statistical analysis	5.3
Manuscript length	5.3
Replicability	3.9
Reputation	3.8

FIELD EXPERIMENT (N=54)	RankMean
Research design	12.3
Logical rigor	10.9
Statistical analysis	10.7
Contribution to knowledge	10.3
Theory	9.1
Coverage of sig. literature	8.7
Scientific ethics	8.7
Presentational level	8.4
Professional style & tone	8.2
Replicability	8.0
Contribution to practice	6.8
Topic selection	6.3
Suggest future research	5.8
Manuscript length	3.3
Reputation	1.5

Appendix C

Factor Structure for Criteria

Rotated (Orthogonal) Factor Pattern for Principal Components Factor Analysis

	Conduct of Research **FACTOR 1**	Presentation **FACTOR 2**	Conceptual Significance **FACTOR 3**	Practical Significance **FACTOR 4**	Reputation **FACTOR 5**
Replication	**0.86534**	0.08235	0.04762	-0.13994	-0.02588
Statistical/mathematical analysis	**0.81693**	-0.10070	-0.05386	-0.13368	-0.04339
Research design	**0.81457**	-0.09904	0.00660	-0.02483	-0.18575
Scientific ethics	**0.64277**	0.09970	-0.02763	0.16663	0.13636
Professional style	0.00067	**0.82743**	-0.03942	0.05837	-0.04849
Presentation level	-0.05027	**0.76575**	0.11720	0.23737	-0.04151
Length	0.07558	**0.58341**	0.11168	-0.04855	0.24259
Logical rigor	0.05124	**0.37871**	0.22158	-0.54235	-0.39940
Coverage of significant literature	-0.07621	0.04436	**0.72657**	-0.07645	0.13926
Theory	0.18016	0.02425	**0.70759**	-0.14605	-0.13520
Suggest future research	-0.21462	0.32965	**0.54136**	0.11252	0.15892
Contribution to knowledge	0.03360	-0.05320	**0.47847**	0.31624	-0.53195
Contribution to practice	0.03254	0.12025	-0.13348	**0.79441**	-0.10276
Topic	-0.15976	0.33715	0.13176	**0.54768**	0.03757
Reputation	-0.04846	0.08771	0.16970	0.06037	**0.77486**

Variance explained by each factor:

FACTOR 1	FACTOR 2	FACTOR 3	FACTOR 4	FACTOR 5
26.1%	20.4%	16.9%	14.9%	12.3%

Final community estimates: total = 90.89%

APPENDIX D

Suggested Normative Standards for Journal Evaluation Form

I. Conceptual Significance

The work represents an important contribution to knowledge. It extends or challenges present causal assumptions in the IS theory or knowledge base. It uses theories from IS or reference disciplines to explain the relationships among variables in the study. Ties to relevant literature are clear, as is the thrust of the central argument. The work explicates underlying assumptions well and provides direction for extending or improving on the present research.

II. Practical Significance

The work contributes to our understanding of current technological and organizational problems or challenges faced by IS or other practitioners. In presenting an interesting paradigm or data analysis technique, it maintains readership interest.

III. Conduct of Research

Methods, subjects, and techniques are well suited to the exploration of the research questions. The work demonstrates appropriate operationalizations of theoretical constructs and an acceptable degree of internal and/or external validity. The choice of statistical and/or mathematical analysis is appropriate, as is the interpretation of results. Study results are objective and in such a form that other researchers could replicate the work. The work adheres to generally accepted standards for scientific ethics.

IV. Presentation of Research

The work adopts a professional style and tone and is concise. It is grammatically correct and clear in its use of figures and tables. The flow of ideas in the paper is logical and there is a clear tie between literature review and method and a clear link between method and results. The work is presented at a level of sophistication and length appropriate to the readership of the journal.