



Communications of the **I**nsformation **S**ystems
Association for **I**nsformation **S**ystems

THE IS IDENTITY CRISIS

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ABSTRACT

Defining the central identity of the information systems (IS) field is a subject of ongoing concern and debate among IS researchers. Published empirical studies to date have focused on restricted sets of IS-related journal publications spread across relatively short time periods. This paper offers a broader review of the central identity of the IS field, using three dimensions proposed by Albert and Whetten [1985]: central character (i.e., what topics do IS scholars research?); temporal continuity (i.e., to what extent has the identity of the IS field remained static over time?); and distinctiveness (i.e., how unique is research published in IS vs. non-IS research journals?). The first two dimensions are examined using a dataset containing 6,466 journal citations drawn from seven leading IS journals over a 32-year period, and the third is evaluated by comparing results from these seven journals with research published in 15 leading non-IS business journals over the same time period. Results suggest that articles published in leading IS journals do share a strong central character that is distinct from research published in non-IS journals, and yet an identity that has continually shifted over time. This study contributes to the literature by providing an empirically supported review of who we are, how we are different, and some thoughts about where we may be going as a discipline.

I. INTRODUCTION

Since the early 1970s, information systems scholars have been concerned about the nature and future of the discipline. Over 30 years ago, Dearden [1972] argued that the IS field was embedded in a mesh of fuzzy thinking and incomprehensible jargon. Since then, what constitutes the IS discipline – that is, the field's central identity – has been the subject of ongoing concern among researchers [Benbasat and Zmud 2003; Weber 2003], and has fueled a passionate debate about whether the IS field is in an identity crisis [e.g., Benbasat and Zmud 2003; DeSanctis 2003; Galliers 2003; e.g., Jones 1997; King and Lyytinen 2004; Robey; 2003].

Numerous papers have attempted to summarize the field. For example, Palvia et al. [1996] content-analyzed 630 articles published over a five-year period; Vessey, Ramesh, and Glass

[2002] examined IS research diversity by analyzing articles published over a five-year period in five leading journals; Lee, Lee and Gosain [2004] reviewed 993 articles in five journals over a ten-year period. Banker and Kauffman [2004] evaluated the IS field's intellectual growth by mapping IS-related papers that have appeared in that single journal against a five-stream framework they designed. While such papers provide useful and interesting perspectives about what is "central" to the IS field, they are all based upon a restricted set of journal publications spread across a relatively short time period, and so provide highly constrained pictures of our identity.

This paper adopts the same general objective as the content analysis papers cited above, which is to characterize the identity of the field of IS. Unlike these earlier works, however, our paper casts a much broader net and includes citations and abstracts drawn from 6,466 articles appearing in seven leading IS journals over a 32-year period, from 1973 to 2004, as well as a comparison to research published in leading non-IS academic business journals. By evaluating this larger set of citation and abstract data, as opposed to a smaller set of full papers, we have purposefully traded off depth for breadth in an attempt to develop a more overarching picture of the discipline.

II. THE IDENTITY OF THE IS FIELD

Literature on the identity of IS as a discipline generally takes one of two approaches: the normative approach, or the descriptive approach [Jones 1997]. The normative approach emphasizes the existence of established rules and seeks to define what topics are to be included within its boundaries, based on some principles assumed at the outset. It is based on the Aristotelian laws of formal, didactic logic, which state that the most basic characteristic of existence is static self-identity (i.e., that for a thing to exist, it must be mutually exclusive of other things). Keen [1980] took a normative position when he stated that IS research ought to address "the effective design, delivery and usage of information systems in organizations" (p. 12), and then called for broader inclusion of reference disciplines in IS research. Similarly, reflecting on the mushrooming diversity of IS research in the mid-1990s, Benbasat and Weber [1996] argued that an articulated core paradigm is needed to regulate the diversity of the field and to characterize the phenomena that make our field different from that of other disciplines. Building on this view, Benbasat and Zmud [2003] adopted a normative stance when they declared that in order for an article to be considered IS research, it must address the immediate nomological net of the "IT artifact" (i.e., the interaction among IT applications, structures, and contexts). By the same token, Agarwal and Lucas [2005] proposed a set of heuristics to establish boundaries for the IS field. In effect, the normative approach contends that the best way to safeguard the identity of the IS field is to erect a set of definitive boundaries to establish what is in, and what is out.

In contrast, the descriptive approach characterizes the central identity of the IS field in terms of what IS researchers (or practitioners) "do." The existence and scope of the IS discipline is seen from this perspective to be empirically defined by the plethora of active institutions, associations, conferences, and journal publications that call themselves "Information Systems" [DeSanctis 2003; Jones 1997; King and Lyytinen 2004]. It is more pragmatic and inclusive in the sense that our identity is determined not by *a priori* principles (as with the normative approach), but rather by the sum total of whatever the body of IS scholars chooses to investigate, however focused or diverse. The descriptive approach is rooted in an epistemology of dialectical logic, which contends that existence is not static but is constantly changing. From the descriptive viewpoint, there is no such thing as a static or changeless identity; rather, identity synthesizes in itself the progressive trends of previous stages, and contains within itself the preconditions of further development [Conforth 1952]. The question of identity is still important from this dialectical perspective, but relates to an identity that can only be discovered in the practice of living, and one that must be expected to develop and to change over time [Conforth 1952; Novack 1969]. King [2001] argued that ". . . it is a lot more sensible to look at what people in the IS field do for their research, and to then label what they do as IS research. In other words, IS research is what IS researchers do, and the breadth of IS research is pretty much the breadth of the imaginations of IS researchers" (p. 1). DeSanctis [2003] expressed a consistent notion when she suggested we

look at the IS field through the lens of a “community of practice” – i.e., that it is necessary to understand the social interactions and practices of the research community in order to understand the discipline. Likewise, Alter [2003] described a “systems in organizations” approach, which views the IS core and scope as including everything that the IS community studies.

The normative and descriptive approaches lead to different propositions on what constitutes identity, and consequently result in quite different positions on the current state of the field. In effect, the normative approach coincides with a “raise the drawbridge” perspective, maintaining that the discipline’s central identity is under attack and will become increasingly ambiguous and difficult to distinguish from other disciplines that are bigger and more powerful (for example, as long as the IS research community fails to focus on the immediate nomological net of the IT artifact [Benbasat and Weber 1996; Benbasat and Zmud 2003]). In contrast, the descriptive approach coincides with a “let a thousand flowers bloom” perspective, embracing an identity of the field that includes “everything under the broad umbrella of topics studied by the IS research community using concepts and methods from any relevant discipline” [Alter 2003, p. 611]. Although these perspectives emerge from diverse philosophical positions, both consider the question of identity to be important. It is within this framework that our study is positioned.

III. RESEARCH QUESTIONS

To capture the identity of the field, we must first understand what constitutes the concept of identity. Albert and Whetten [1985] proposed three properties that are individually necessary and corporately sufficient to establish the identity of a collective: centrality, temporal continuity, and distinctiveness. They argue that these three aspects form a distinctive framework for investigating identity.

The first property suggests that the *central character* of a collective provides a statement of identity that distinguishes it on the basis of something important and essential [Albert et al. 2000] – in other words, “Who are we?” and “What are we doing?” Applied to the field (or collective) of IS scholarship, this property leads us to ask the following question:

RQ1: *What is the central character of the IS discipline? (I.e., what topics have been published in IS journals?)*

By describing the central character of the IS field, we can learn to what extent “what we have actually done” (i.e., the descriptive viewpoint) relates to “what we should have done” (i.e., the normative viewpoint).

Temporal continuity is a second property of a collective’s identity. Although an organization may undergo changes over time, its identity is partially captured by sameness, enduring characteristics, or things that *don’t* change over time [Albert and Whetten 1985]. In other words, shifts in a collective’s identity should exhibit strong path dependency [Benbasat and Zmud 2003]. Thus, the second research question is posed to evaluate whether and how the discipline has changed over time.

RQ2: *What is the temporal continuity of the IS discipline? (I.e., to what extent have topics published in IS journals remained static over time?)*

Classifying subject matter and tracking how it changes over time provide only part of the story. The *distinctiveness* of a collective must also be used in its identification [Albert and Whetten 1985]. That is, to establish identity we must determine whether a collective’s characteristics differ substantially from that of other collectives.

RQ3: *Does the IS discipline have an identity that is distinct from other disciplines? (I.e., how unique are research topics published in IS vs. non-IS research journals?)*

Developing answers to these three questions is relevant for IS researchers whether they ascribe to a normative/didactic epistemology or to a more descriptive/dialectical perspective. Our intention in this paper is to contribute to the debate on the identity of the IS field by providing IS scholars with an empirically-derived picture of where we've been, the extent to which the focal topics of our research have evolved over time, and how our research is similar to and different from that of other business disciplines.

IV. METHODS

A primary way in which a discipline signals its intellectual core is "through the topics that populate discipline-specific research activities" [Benbasat and Zmud 2003, p. 184]. Numerous citation and co-citation analyses have been conducted in the IS field to this end [e.g., Culnan 1986; Ives et al. 1980; Lee et al. 2004; Palvia et al. 1996; Vessey et al. 2002]. We used a similar approach in this study, though with a much broader coverage of journal articles. In this section we outline the four-stage process used to collect and evaluate historical citation and abstract data: journal selection, citation data collection, article categorization, and validation.

JOURNAL SELECTION

IS journals were selected based on a comprehensive review of eight major journal ranking papers.¹ In order to select the most broadly acknowledged, credible and representative IS journals, we adopted the following heuristic: a journal had to have been ranked within the top 10 journals in the IS discipline by at least three of the eight rankings, and must not have been ranked lower than the top 20 journals in the IS discipline by more than one of the rankings. We also excluded two journals that primarily target practitioner rather than academic audiences (i.e., *Harvard Business Review* and *Communications of the ACM*)². We relied on Trieschmann et al.'s [2000] comprehensive review of previously published discipline-specific rankings to select representative non-IS research journals. We applied these heuristics to identify seven top quality IS research journals, and 15 top quality non-IS research journals.

CITATION DATA COLLECTION

Citation data were drawn from ABI/INFORM (Proquest), the most comprehensive journal portal database used for journal searches [Peffer and Ya 2003]. Two research assistants downloaded citation and abstract data for all of the articles published in the 22 chosen journals between 1973 and 2004 (downloaded data included author, year, title, journal, volume/issue, and article abstract). A total of 26,536 usable records were collected, as summarized in Table 1.

¹ See <http://www.isworld.org/csaunders/rankings.htm> for the list of journal ranking papers and citations (accessed December 2005). We used: Rainer and Miller (2005); Lowry et al. (2004); Katerattanakul et al. (2003); Peffer and Tang (2003); Mylonopoulos and Theoharakis (2001); Whitman et al. (1999); Hardgrave and Walstrom (1997); Walstrom et al. (1995).

² According to the CACM website (http://www.acm.org/pubs/cacm/guidelines/infoauthors_02.html), this journal is addressed primarily to the 85,000 members of the ACM, of which 80% are computing practitioners working in industry, and the remaining 20% are government and academic readers.

Table 1. Summary of Citation Data

#	Journal Name	# Top ten rankings (agreement)	Year range (# total yrs)	# Articles
<u>IS RESEARCH JOURNALS</u>				
1	<i>MIS Quarterly</i>	8/8 (100%)	1985-2004 (20)	499
2	<i>Information Systems Research</i>	8/8 (100%)	1993-2004 (12)	231
3	<i>J. of Management Information Systems</i>	7/7 (100%)	1992-2004 (13)	441
4	<i>Decision Sciences</i>	6/6 (100%)	1973-2004 (32)	1,275
5	<i>IEEE Transactions on Software Eng.</i> ³	4/5 (80%)	1978-2004 (27)	2,225
6	<i>Decision Support Systems</i>	5/8 (63%)	1985-2004 (20)	883
7	<i>Information & Management</i>	3/8 (33%)	1981-2004 (24)	912
Subtotal				6,466
<u>NON-IS RESEARCH JOURNALS</u>				
8	<i>Accounting Review</i>		1973-2004 (32)	1,445
9	<i>J. of Accounting & Economics</i>		1981-2004 (24)	445
10	<i>J. of Accounting Research</i>		1973-2004 (32)	1,165
11	<i>J. of Finance</i>		1973-2004 (32)	931
12	<i>J. of Financial Economics</i>		1978-2004 (27)	940
13	<i>Academy of Management Journal</i>		1973-2004 (32)	2,310
14	<i>Academy of Management Review</i>		1976-2004 (29)	1,495
15	<i>Administrative Science Quarterly</i>		1973-2004 (32)	1,263
16	<i>Strategic Management Journal</i>		1980-2004 (25)	877
17	<i>J. of Consumer Research</i>		1974-2004 (31)	1,101
18	<i>J. of Marketing</i>		1973-2004 (32)	1,136
19	<i>J. of Marketing Research</i>		1973-2004 (32)	1,426
20	<i>J. of Operations Management</i>		1980-2004 (25)	515
21	<i>Management Science</i> ⁴		1973-2004 (32)	2,861

³ Although some IS journal ranking papers treat all IEEE Transactions journals equivalently, Lowry, Romans and Curtis [2004] discussed the limitations of this approach. We have thus focused exclusively on this single, independently-ranked IS journal.

22	<i>Operations Research</i>	1973-2004 (32)	2,160
Subtotal			20,070
Total			26,536

ARTICLE CATEGORIZATION

We developed a computer routine to automatically classify article titles and abstracts according to a pre-defined vocabulary of terms. This approach has been demonstrated to usefully characterize a body of research with a high degree of accuracy [Haas 1997; Tibbo 1992]. For example, Losee and Haas [1995] conducted an automated classification of eight traditional disciplines (including Biology, Economics, Electronic Engineering, History, Math, Physics, Psychology, and Sociology), and achieved classification accuracy rates between 92 percent and 100 percent. This approach has also been applied in the IS discipline [e.g., Farhoomand and Drury 1999].

We adopted the best available vocabulary for the IS research domain – that is, the Barki, Rivard, and Talbot [1993] MISQ keyword classification scheme (hereafter referred to as BRT). This list contains 1,319 keywords organized into a six-level hierarchy with nine first-level terms (e.g., Reference Disciplines, External Environment, etc.), and is theoretically grounded in the Ives, Hamilton, and Davis [1980] research framework. Our computer routine searched each article title and abstract for occurrences of each BRT term. When a term was found, the article was tagged with a code for that category. If the article contained a second term belonging to the same category, no action was taken (i.e., there was no double-counting within a category). If the article contained additional terms belonging to different categories, each of these categories was tagged with the appropriate code. This procedure did not rely on any preexisting keyword classifications that may have been included in the article itself – rather, categorization was based entirely on the content of article titles and abstracts.

VALIDATION

To assess the validity of our automated categorization approach, we randomly sampled and manually categorized 200 IS articles from our dataset, and compared this with the computer-generated results. Chi-square tests showed no significant differences in first-level BRT categories across the two methods (Table 2).

V. RESULTS

CENTRAL CHARACTER

What is the central character of the IS discipline? We approached this question by examining the 6,466 IS research articles published over a 32 year period. The overall distribution of articles across the first-tier BRT categories is shown in Figure 1.

⁴ Trieschmann et al. (2000) discussed the problem of making discipline-based assignments using multi-disciplinary journals such as *Management Science (MS)*. Although the eight rankings we used consistently identified *MS* as a top IS journal, in fact the majority of these articles relate to the management science discipline. In this paper we have followed Trieschmann et al. (2000) and classified *MS* according to its dominant discipline.

Table 2. Validation Results – Automated vs. Manual Screening

BRT Category	IS research articles (N=200)	
	Automated	Manual
A – Reference Disciplines	166	158
B – External Environment	21	24
C – Technological Environment	90	85
D – Organizational Environment	60	53
E – IS Management	74	69
F – IS Development and Operations	79	68
G – IS Usage	25	19
H – Information Systems	109	92
I – IS Education and Research	5	3
Unclassified	9	9
Total hits	638	580
Average hits per article	3.2	2.9
Chi-Square	$\chi^2=1.97, p=0.99$	

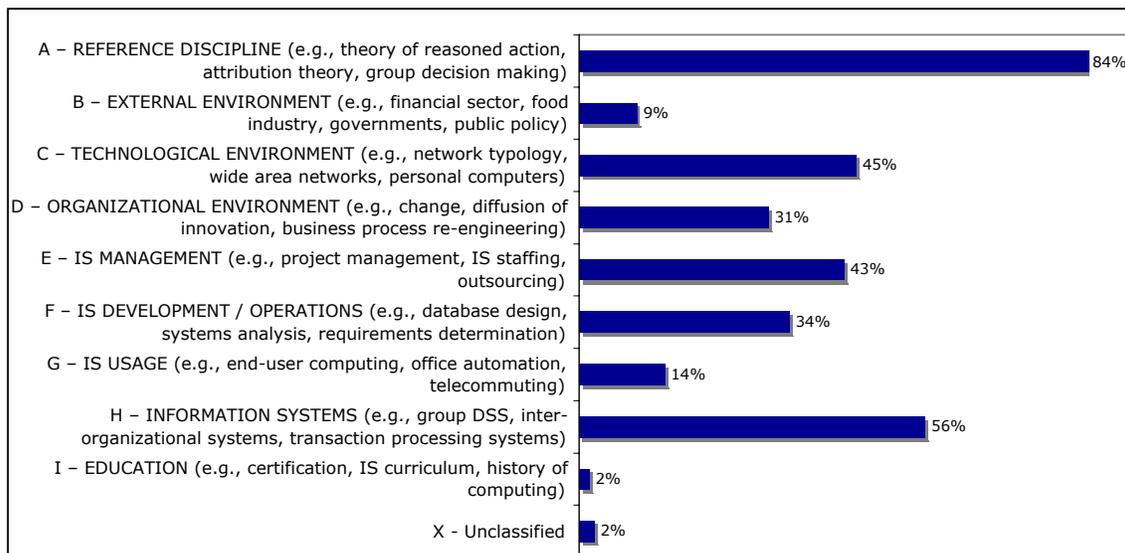


Figure 1. Percentage⁵ of IS articles by BRT (1973-2004)

⁵ Percentage term reflects the number of IS journal articles containing a term from this category, divided by the total number of IS journal articles.

This analysis showed several things about the central character of the IS discipline. First, published IS research apparently relies on reference disciplines (84 percent of all papers included at least one reference discipline term in the title or abstract), consistent with the claim that the IS discipline seems to have heavily drawn from reference disciplines [e.g., Benbasat and Zmud 2003; Wade et al. 2006]. Such theoretical and conceptual reliance may reflect advancement through integration, consistent with Sir Isaac Newton's famous comment to Robert Hooke in 1675: "If I have seen further [than others] it is by standing on the shoulders of giants." Certainly, such cross-disciplinary theoretical integration is necessary and beneficial, and can lead to the development of breakthrough knowledge [Robey 1996]. At the same time, by drawing from and integrating with outside disciplines to the extent that it does, we wonder whether the IS discipline may have become overly reliant on them [Benbasat and Zmud 2003] – perhaps in the process dulling the conceptualization skills required to develop truly new ideas.

Second, several first-level research categories are curiously underrepresented, which may signal research gaps and opportunities at the macro level. For example, terms from category G – IS Usage were reflected in fewer than 14 percent of the papers, yet we believe this category contains phrases that are highly relevant to business practitioners (e.g., competitive IS, strategic IS, top management, user requirements and user support). Similarly, only 9 percent of the papers contained any terms from category B – External Environment, despite the likelihood that many IS researchers would consider terms in this category to be core to our discipline (e.g., economics, politics, discrimination, property rights, privacy, ethics). The relative scarcity of published research in some of these areas may be helpful in pointing researchers, perhaps especially new scholars, toward under-researched areas.

One popular normative perspective is captured in Benbasat and Zmud's [2003] claim that much research being published in leading IS journals was inappropriately focused and thus eroding our central character, and that IS research should be focused essentially on the "IT artifact." "Topical diversity can, and has, become problematic in the absence of a set of core properties, or central character, that connotes, in a distinctive manner, the essence of the IS discipline" [Benbasat and Zmud 2003, p. 185]. As a rough preliminary analysis of this claim, we examined the proportion of research published in IS journals between 1998-2004 that contained one of the following IT-related words in the article title or abstract: "hardware," "software," "database," or "network." (Benbasat and Zmud did not provide a precise definition for "IT artifact" in their article, but their examples convey a sense that IT artifacts should relate directly to core computing technology). Results of this admittedly rudimentary analysis showed that only around 40 percent of the IS articles published during this time period included one or more of these core information technology keywords. Even allowing for considerable error in our results, the high proportion of articles that do not contain the four IT-artifact keywords is striking, and lends support to Benbasat and Zmud's conjecture that much research published in IS journals is not focused on the IT artifact. This finding will be troubling for researchers embracing Benbasat and Zmud's normative/didactic ("raise the drawbridge") perspective, but not so for those coming from a descriptive/dialectical ("let a thousand flowers bloom") point of view.

TEMPORAL CONTINUITY

To assess the temporal continuity of published IS research topics, we ran a Chi-square test comparing the BRT distribution from the earliest seven-year period (1973-1979) to that of the latest seven-year period (1998-2004) (Table 3), and found significantly different distribution patterns ($\chi^2=91.6$, $p<.001$). Most notably, the proportion of articles in the Organizational Environment and Technical Environment categories increased by 17.0 percent and 12.7 percent respectively, while articles on IS Development & Operations decreased by 13.8 percent.

To develop a further sense of temporal continuity, we turned to the Ives, Hamilton and Davis [1980] framework upon which the BRT classification scheme itself is based. Ives et al. argued that in order to belong to the domain of information systems a research article must materially focus on one or more of the following: (1) the information subsystem (i.e., the product of an IS development process); (2) the organizational environment (i.e., the development, operations and

use of technological, organizational and external resources and constraints which dictate the scope and form of each information subsystem); and/or (3) processes (i.e., the development, operations, and use processes that link the information subsystem with its environment). Combining these three categories, Ives et al. developed a typology of IS research, in which *Type I* research focuses exclusively on a single variable group (i.e., Environment, Process, or Information Subsystem), *Type V* research integrates ideas from all three groups, and *Type II, III,* and *IV* research combine ideas from two different categories. At a broad level this typology provides a normative statement about what should be considered IS research, and implies that IS research papers make a tradeoff between exclusivity of focus (as in Type I papers) and cross-integration of ideas (as in Type V papers).

Table 3. Chi-Squared Tests – 1973-1979 vs. 1998-2004

Category	1973-1979		1998-2004		Diff
	Articles [†]	Percent [‡]	Articles [†]	Percent [‡]	
A – Reference Disciplines	277	89.4%	1,444	81.5%	-7.8%
B – External Environment	26	8.4%	202	11.4%	3.0%
C – Technological Environment	89	28.7%	733	41.4%	12.7%
D – Organizational Environment	53	17.1%	603	34.0%	17.0%
E – IS Management	134	43.2%	706	39.9%	-3.4%
F – IS Development & Operations	120	38.7%	442	25.0%	-13.8%
G – IS Usage	13	4.2%	253	14.3%	10.1%
H – Information Systems	155	50.0%	842	47.5%	-2.5%
I – Education and Research	1	0.3%	50	2.8%	2.5%
Unclassified	5	1.6%	74	4.2%	2.6%
Total Hits	868		5275		
Total Articles	310		1771		
Hit rate	2.7		2.8		
Chi-square	$\chi^2=91.57, p<0.001$				

* p < .05

† The number of categorized articles (no double-count)

‡ The number of categorized articles divided by the total number of articles

In order to examine the temporal continuity of research topics we mapped the BRT keyword classification scheme back into the Ives et al. framework (Figure 2), and then plotted the pattern of IS research topics over time (Figure 3).

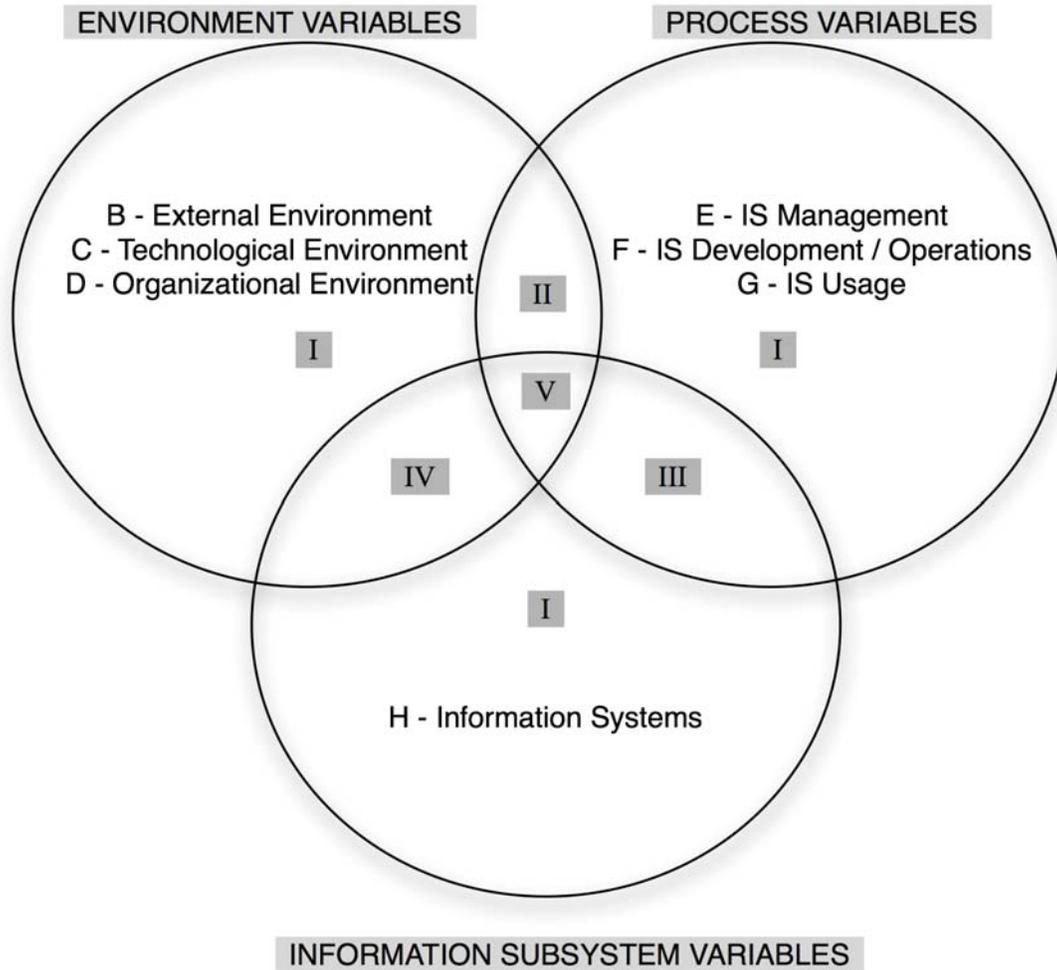


Figure 2. Integration of the Ives, Hamilton and Davis (1980) Research Framework with the Barki, Rivard and Talbot (1993) MISQ Keyword Classification Scheme

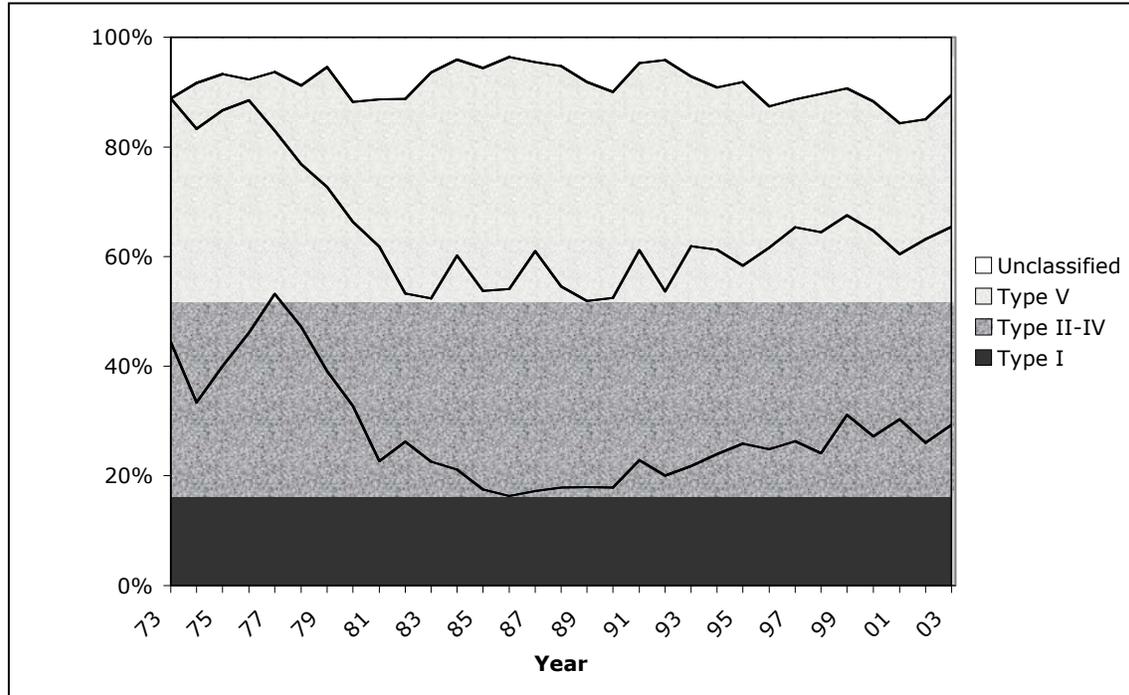


Figure 3 .Temporal Pattern of Research Types in the IS Field (1973-2004) ⁶

Although this plot did not show large pattern shifts in a year-over-year analysis, an evolution was apparent across the 32-year time span. In 1973, nearly half of all research published in our top journals was comprised of narrowly focused Type I papers, while very few broadly integrative Type V papers could be found. Fifteen years later in 1988, Type I papers made up less than 20 percent while Type V papers accounted for almost half of the total research output. By 2004 Type I papers again became popular, fewer Type V papers were published, and a growing proportion of research was unclassifiable using the BRT classification scheme. We argue that these massive changes over time signal a distinctive, “flexible and moving core” of the field [Robey 2003]. Such sea changes cannot help but have deeply influenced our field’s identity.

We observed with interest that the proportions of Type I vs. Type II-IV vs. Type V papers seem to have stabilized and equalized by 2004. It is possible that a field’s research tends to “even out” across a spectrum ranging from “simple” research (single subdomain) to “complex” research (multiple subdomains). Further empirical research from other fields such as Marketing would be helpful for evaluating whether this “settling down effect” is unique to IS, or a common evolutionary phenomenon.

DISTINCTIVENESS

To address RQ3 regarding the distinctiveness of the IS field, we compared the nature and frequency of research topics published in IS vs. non-IS research journals over the 32-year period (1973 to 2004) using the BRT and Ives et al. [1980] frameworks, respectively.

⁶ Y-axis represents the percentage of the accumulated number of IS articles over the total number of articles.

Table 4. Distinctiveness of IS vs. Non-IS Academic Articles (1973-2004)
Based on Barki, Rivard, Talbot (1993) Classification Scheme

BRT Category	IS Journals		Non-IS Journals		Difference
	Articles [†]	Percent [‡]	Articles [†]	Percent [‡]	
A – Reference discipline	5,403	83.6%	14,462	72.1%	11.5%
B – External environment	604	9.3%	2,349	11.7%	-2.4%
C – Technological environment	2,898	44.8%	1,498	7.5%	37.4%
D – Organizational environment	1,974	30.5%	6,076	30.3%	0.3%
E – IS management	2,766	42.8%	5,780	28.8%	14.0%
F – IS development/operation	2,195	33.9%	2,103	10.5%	23.5%
G – IS usage	894	13.8%	927	4.6%	9.2%
H – Information systems	3,620	56.0%	4,972	24.8%	31.2%
I – Education	106	1.6%	22	0.1%	1.5%
Unclassified	160	2.5%	2,600	13.0%	-10.5%
Total Hits	20,406		40,789		
Total Articles	6,466		20,070		
Chi-Square	$\chi^2=5116.62, p<.001$				

[†] The number of categorized articles (no double-count)

[‡] The number of categorized articles divided by the total number of IS (or non-IS) articles

Comparing IS and non-IS research articles published between 1973 and 2004 using the BRT framework, the overall distribution of IS vs. non-IS academic articles differed significantly ($\chi^2=5116.6, p<.001$) due to several factors (Table 4). First, articles published in IS journals more frequently focused on issues related to “technological environment” (44.8 percent versus 7.5 percent), “information systems” (56.0 percent versus 24.8 percent), and “IS development/operation” (33.9 percent versus 10.5 percent). Normative researchers – e.g., those who find themselves aligned with Benbasat and Zmud’s “IT artifact” perspective – may argue that a much larger proportion of our research should be focused the technological environment, since this is what distinguishes us from non-IS disciplines (whereas researchers who have adopted a dialectical position may not be troubled by these results).

Second, articles published in IS journals appeared to be nearly as reliant on reference disciplines as those published in non-IS journals (83.6 percent versus 72.1 percent). Further to the discussion above regarding possible over-reliance on reference disciplines, this finding suggests that we may not be alone when compared with other business disciplines.

Substantial differences were also observed using the Ives et al. [1980] framework (Table 5). Over the entire 32 year period, IS journals contained a much higher proportion of Type V research (i.e., papers dealing with environment, process, and information subsystem variables) compared with non-IS journals (30.5 percent versus 6.5 percent). IS journal also contained more Type II-IV research (i.e., papers dealing with two of environment, process, and information subsystem

variables) compared with non-IS journals (36.4 percent versus 23.8 percent). IS journals also contained proportionately less Type I research (i.e., papers dealing with a single set of environment, process, or information subsystem variables) compared with non-IS journals (24.4 percent versus 38.9 percent). Finally, a much smaller proportion of IS journal research was “unclassifiable” using the Ives et al. framework (8.8 percent versus 30.9 percent).

Table 5. Distinctiveness of IS vs. Non-IS Academic articles (1973-2004)
Based on Ives, Hamilton, and Davis (1980) Research Framework

Ives et al. categories	IS Journals		Non-IS Journals		Difference
	Articles [†]	Percent [‡]	Articles [†]	Percent [‡]	
Type I	1,576	24.4%	7,797	38.9%	-14.5%
Type II, III, IV	2,353	36.4%	4,779	23.8%	12.6%
Type V	1,970	30.5%	1,298	6.5%	24.0%
Unclassified ⁷	567	8.8%	6,196	30.9%	-22.1%
Total	6,466	100.0%	20,070	100.0%	
Chi-Square	$\chi^2=3905.79, p<.001$				

[†] The number of categorized articles (no double-count)

[‡] The number of categorized articles divided by the total number of IS (or non-IS) articles

VI. DISCUSSION

SUMMARY OF FINDINGS

A primary way in which a discipline signals its intellectual core is “through the topics that populate discipline-specific research activities” [Benbasat and Zmud 2003, p. 184]. Our study offers a review of the intellectual core of the IS field by summarizing research topics published in the leading IS journals, using the Barki, Rivard and Talbot [1993] classification scheme. Analyses of 26,536 research abstracts of articles published between 1973 and 2004 showed key identifying characteristics of the IS field. Our study adds empirical evidence to the normative/descriptive debate by examining the identity of the IS field through three defining components: central character (topics studied), temporal continuity (topical evolution over time) and distinctiveness (IS vs. non-IS topics published).

Our findings support the contention that the IS discipline does indeed have a definitive core identity – an identity that has been changing substantially (or “mutable and adaptive,” [Robey, 2003 p. 353]) over time, and that is increasingly distinctive vis-à-vis other disciplines in terms of the broad integration of ideas. As far back as 1980, Ives et al. called for more multiple-variable studies (i.e., type II, III, IV, and V research), and argued that type V research provided the richest setting for IS research. Our results demonstrate that during this 32-year history, the trajectory of our field has indeed evolved from an essentially single-domain view of the subject matter, to more multidimensional perspectives. This particular temporal movement has apparently been in response to multiple calls for change that have arisen within the field. As a discipline, we appear to be listening to these calls and subsequently renewing ourselves, as evidenced by the moving

⁷ Unclassified articles included those that were not classifiable using the BRT framework, as well as articles falling into BRT category (Reference Discipline) or category I (IS education and research).

distribution of various types of research. “Letting go of a monistic view of technology implies recognizing that technologies. . . do not provide the same material and cultural properties in each local time or context of use” [Orlikowski and Iacono 2001, p. 132].

UNCLASSIFIABLE ARTICLES IN IS JOURNALS

It was noteworthy that 74 (4.2 percent) of the articles published in IS journals of interest between 1998-2004 were not classifiable by our computerized routine. What do these unclassifiable articles mean to us? We manually reviewed each article and found three different types of non-classifiable papers (summarized in Table 6). The first type of paper dealt with broad issues and commentaries that were essentially related to the IS research domain, but did not contain any reference to specific, traditional IS terminology (N=33 papers fell into this group). These papers were strategically important, apparently designed to guide the direction of future research (e.g., Weber’s [2003] editorial, “Still Desperately Seeking the IT Artifact”), and in some cases encouraged examination of non-orthodox paradigms [e.g., Walsham 1995].

The second type of unclassifiable paper included new research topics that became popular after the BRT framework was last updated in 1993 (e.g., CIO leadership, knowledge management, virtual organizations, e-business, trust) (N=22 papers were in this group). Note that many classifiable papers also included new topics; what set this group of 22 papers apart was that they were completely unclassifiable using the BRT framework.

The third category included papers that were drawn from neighboring disciplines and positioned as IS research (N=19 fell into this group). This set appeared to be more closely aligned to fields such as computer science, management science and operations research, and comprised the large majority of unclassifiable articles in years prior to 1998.

Table 6. Frequencies of BRT-Unclassified Articles by Journal (1998-2004)

Journal	Broad issues / commentary	New research areas	Neighboring disciplines
<i>MIS Quarterly</i>	17	5	0
<i>Information Systems Research</i>	3	3	0
<i>J. of Management Information Systems</i>	11	5	0
<i>Decision Sciences</i>	1	1	5
<i>IEEE Transactions on Software Eng.</i>	1	0	12
<i>Decision Support Systems</i>	0	5	1
<i>Information & Management</i>	0	3	1
Total	33 (44.6%)	22 (29.7%)	19 (25.7%)

CLASSIFIED ARTICLES IN NON-IS JOURNALS

We were surprised to find that so many non-IS journal articles could be successfully classified using BRT keywords (on average, articles appearing in IS journals contained 3.2 BRT keywords, while those in non-IS journals contained 2.0 BRT keywords), and by the Ives et al. framework (69.9 percent of papers were classified). We offer two main explanations for this finding. First, as the diffusion and adoption of information technology has continued its aggressive advance into all

areas of the firm and the economy, non-IS business researchers have increasingly published topics historically considered to be in the domain of IS research. As one example, research papers related to electronic commerce have appeared in the major journals of every other business discipline during the past decade.

Second, we believe the high IS keyword hit rate in non-IS journals may be due to the fact that the keywords contained in the BRT framework are not exclusive, but rather reflect a discipline that is by nature highly cross disciplinary. For example, it is not surprising to find that non-IS journal articles contain BRT terms such as “behavior,” “economy,” “telecommunications,” “organizational culture,” or “social impacts.” This lack of exclusivity does not mean that these terms are not relevant for characterizing the IS discipline. Indeed, we would argue that the terms are relevant, and that as a whole they offer a useful, distinguishing picture of who we are as a discipline – that is, a discipline that seeks to build and integrate across people, tasks, technologies, structures, strategies, countries, and societies. This argument is further supported by the fact that unlike IS research, our non-IS colleagues have published relatively fewer Type II-IV papers, and almost no Type V research (i.e., research that spans Environment, Process, and Information Subsystem domains). The distinctiveness of the IS research field, then, may be related in part to its diversity and ability to integrate.

DIVERSITY OF THE IS FIELD’S IDENTITY

The question of how much the IS field can reasonably diversify has been under debate since the mid-1990s. On the one hand, Benbasat and Zmud [1996] argued that too much diversity threatens the identity of the field. On the other hand, Robey [1996] proposed that diversity can beneficially expand the foundation on which knowledge claims in the field are based, attract good people, and foster further creative research. Indeed, he compared our field to a well-tended garden in which the gardeners must be strategic in choosing flowers to bloom [Robey 1996]. Encouraging the development and growth of new “flowers” within our garden demands embracing a certain degree of diversity and loss of control. While it remains as a question “can we afford to satisfy our intellectual curiosities and risk getting lost in the process?” [Robey 1996, p. 403], we as a field need to maintain a momentum through which to aggressively pursue new instructional and research opportunities [King and Lyytinen 2004].

We characterized approaches to investigating and understanding the IS field as being either normative or descriptive. We primarily followed the descriptive approach in the conduct of our analysis, although certain normative aspects entered as well (e.g., the Ives et. al. framework used to classify the articles is essentially a normative framework). However it was not our intention to present this study as a “purely” descriptive one; indeed it is likely the case that there is no such thing. Much like the debate between qualitative and quantitative research methods, neither the descriptive nor the normative approaches to understanding the nature of the IS field is inherently “better” than the other. Rather, the two perspectives complement each other.

VII. LIMITATIONS

To the best of our knowledge this study is the most comprehensive of its kind in terms of the length of the evaluation timeframe and the number of papers evaluated. In order to achieve this degree of coverage, some critical tradeoffs were necessary. In particular, in taking a top-down view of research published in IS journals we have inevitably been unable to capture all of the details, and the keyword-based computer search method employed here may have resulted in a certain degree of miscategorization.

Alternative approaches to characterizing a field exist; e.g., our discipline may be conceived as a community of practice [DeSanctis 2003], or as a transdisciplinary collective [Galliers 2003]. This study focused exclusively on research published in top-tier journals. Although publication in predominantly North American research journals is currently the most broadly recognized and comparable outcome of scholarly excellence, future empirical research into the identity of the IS

field could usefully be expanded to include non-North American journal publications, as well as books, conference proceedings, workshops, and IS dissertations.

We also made some classification decisions that may have affected findings at the margin. For example, we followed Trieschmann et al. [2000] in classifying *Management Science* as a non-IS journal (potentially inflating Type I error), while we followed the IS journal ranking literature in classifying *IEEE-TOSE* and *Decision Sciences* as IS journals (potentially inflating Type II error). Similarly, IS researchers occasionally publish work in non-IS journals, and non-IS researchers occasionally publish work in IS journals, resulting in some degree of measurement error (although peer and editorial reviews presumably certify that the content of a paper relates to the underlying discipline of the journal). Other classification approaches could have been taken, such as splitting cross-disciplinary journals into IS and non-IS subsets, or using the researcher as the unit of analysis. However, our intuitive sense is that doing so would not likely have resulted in substantially different findings, and would have raised additional conceptual and methodological challenges.

To empirically and more closely examine this concern, we re-categorized *IEEE-TOSE* and *Decision Sciences* as non-IS journals and conducted a post-hoc analysis of the data. We found that the distinctiveness between papers published in IS versus non-IS journals was still highly significant overall ($\chi^2=1813.42$, $p<.001$), consistent with our findings when these journals were included in the IS set ($\chi^2=5116.62$, $p<.001$). However, the character of the IS journal sample did change moderately – in particular, removing these two journals from the IS set resulted in increased proportions of IS journal articles dealing with organizational environment (from 30.5 percent to 47.4 percent) and IS usage (from 13.8 percent to 22.9 percent), and a decreased proportion of articles dealing with development/operations (from 33.9 percent to 26.0 percent). We also tried re-categorizing *Management Science* as an IS journal, and found that differences remained significant ($\chi^2=3899.74$, $p<.001$) – again with small underlying changes. We contend that the variations reflect natural (and healthy) journal diversity and did not substantially affect our original findings.

Finally, because the BRT classification scheme was last updated in 1993, we suspect that its efficacy in classifying the literature published in the first 20 years of our study window (1973-1993) may be better compared with the last 10 years (1994-2004). This likely accounts for the increasing proportion of “unclassified” research papers in later years, as shown in Figure 3. Use of this scheme may have “hidden” impacts from unprecedented phenomena that have occurred in the past decade, such as the global adoption of the World Wide Web.

VIII. CONCLUSION

Central character, temporal continuity and distinctiveness provide a useful approach to establishing the identity of a collective [Albert and Whetten 1985]. Through an investigation of “what we did,” this study demonstrates that the IS field exhibits all three characteristics. It does have a strong central character that involves many aspects of what the normative perspectives suggest as “what we should do”, when examined using Barki, Rivard, and Talbot’s [1993] keyword vocabulary. Patterns of temporal continuity are clearly evident when viewed over a 32-year time span. And, the field of published research is clearly distinguishable when compared against other business disciplines, implying that our identity may be reasonably stable, after all. At the same time, an ongoing evolution in IS research is evident with the continual introduction of new “out of the box” studies that are not easily classifiable using orthodox frameworks. This new activity provides a source of vigor within the field that drives the continual renewal of our identity.

REFERENCES

- Agarwal, R. and H. C. Lucas. (2005). "The Information Systems Identity Crisis: Focusing on High-Visibility and High-Impact Research," *MIS Quarterly* 29(3), pp. 381-398.

- Albert, S., B. E. Ashforth, and J. E. Dutton. (2000). "Organizational Identity and Identification: Charting New Waters and Building New Bridges," *Academy of Management Review* 25(1), pp. 13-17.
- Albert, S. and D. A. Whetten. (1985.) "Organizational Identity," *Research in Organizational Behavior* 7, pp. 263-295.
- Alter, S. L. (2003). "Sorting Out Issues about the Core, Scope, and Identity of the IS Field," *Communications of the Association for Information Systems* 12, pp. 607-628.
- Banker, R. D. and R. J. Kauffman. (2004). "The Evolution of Research on Information Systems: A Fiftieth-Year Survey of the Literature in Management Science," *Management Science* 50(3), pp. 281-298.
- Barki, H., S. Rivard, and J. Talbot. (1993). "A Keyword Classification Scheme for IS Research Literature," *MIS Quarterly* 17(2), pp. 209-226.
- Benbasat, I. and R. Weber. (1996). "Research Commentary: Rethinking "Diversity" in Information Systems Research," *Information Systems Research* 7(4), pp. 389-399.
- Benbasat, I. and R. W. Zmud. (2003). "The Identity Crisis within the IS Discipline: Defining and Communicating the Discipline's Core Properties," *MIS Quarterly* 27(2), pp. 183-194.
- Conforth, M. (1952). *Dialectical Materialism: An Introductory Course*. London: Lawrence and Wishart.
- Culnan, M.J. (1986). "The Intellectual Development of Management Information Systems, 1972-1982: A Co-citation Analysis," *Management Science* 32, pp. 156-172.
- Dearden, A. (1972). "MIS Is a Mirage," *Harvard Business Review* January-February, pp. 90-99.
- DeSanctis, G. (2003) "The Social Life of Information Systems Research: A Response to Benbasat and Zmud's Call for Returning to the IT Artifact," *Journal of the Association for Information Systems* 4(7).
- Farhoomand, A. F. and D. H. Drury. (1999). "A Historiographical Examination of Information Systems," *Communications of the Association for Information Systems* 1(19).
- Galliers, R. D. (2003). "Change as Crisis or Growth? Toward a Trans-disciplinary View of Information Systems as a Field of Study," *Journal of the Association for Information Systems* 4(7), pp. 337-351.
- Haas, S. W. (1997). "Disciplinary Variation in Automatic Sublanguage Term Identification," *Journal of the American Society for Information Science* 48(1), pp. 67-79.
- Ives, B., S. Hamilton, and G. B. Davis. (1980). "A Framework for Research in Computer-Based Management Information Systems," *Management Science* 26, pp. 910-934.
- Jones, M. (1997). "It All Depends What You Mean by Discipline," in J. Mingers and F. Stowell (Eds.) *Information Systems: An Emerging Discipline* London: McGraw-Hill.
- Keen, P. G. W. (1980). "MIS Research: Reference Disciplines and a Cumulative Tradition." Proceedings of the First International Conference on Information Systems, Philadelphia, PA, 1980, pp. 9-18.
- King, J. (2001). "Commentary on Defining the Domain of IS Research," E-mail message sent from John King to Blake Ives in preparation for AMCIS 2001 panel.(Used with permission).
- King, J. and K. Lyytinen. (2004). "Reach and Grasp," *MIS Quarterly* 28(4).

- Lee, Y., Z. Lee, and S. Gosain. (2004). "The Evolving Intellectual Diversity of the IS Discipline: Evidence from the Referent Disciplines," *Communications of the Association for Information Systems* 13(546).
- Losee, R. M. and S. W. Haas. (1995). "Sublanguage Terms: Dictionaries, Usage and Automatic Classification," *Journal of the American Society for Information Science* 46(7), pp. 519-529.
- Lowry, P. B., D. Romans, and A. Curtis. (2004). "Global Journal Prestige and Supporting Disciplines: A Scientometric Study of Information Systems Journals," *Journal of the Association for Information Systems*, pp. 29-77.
- Novack, G. E. (1969) *An Introduction to the Logic of Marxism*. New York: Merit Publisher.
- Orlikowski, W. J. and C. S. Iacono. (2001). "Research Commentary: Desperately Seeking "IT" in IT Research - A Call to Theorizing the IT Artifact," *Information Systems Research* 12(2), pp. 121-134.
- Palvia, P. C., B. Rajagopalan, A. Kumar, and N. Kumar. (1996). "Key Information Systems Issues: An Analysis of MIS Publications," *Information Processing & Management* 32(3), pp. 345-355.
- Peffer, K. and T. Ya. (2003). "Identifying and Evaluating the Universe of Outlets for Information Systems Research: Ranking the Journals," *Journal of Information Technology Theory and Application* 5(1), pp. 63-84.
- Robey, D. (1996). "Research Commentary: Diversity in Information Systems Research: Threat, Promise, and Responsibility," *Information Systems Research* 7(4), pp. 400-408.
- Robey, D. (2003) "Identity, Legitimacy and the Dominant Research Paradigm: An Alternative Prescription for the IS Discipline," *Journal of Association for Information Systems* 4(7), pp. 352-359.
- Tibbo, H. R. (1992). "Abstracting across the Disciplines: A Content Analysis of Abstracts from the Natural Sciences, the Social Sciences, and the Humanities with Implications for Standardization and Online Information Retrieval," *Library and Information Science Research* 14, pp. 31-56.
- Trieschmann, J. S., A. R. Dennis, G. B. Northcraft, and A. W. Niemi. (2000). "Serving Multiple Constituencies in the Business School: MBA Program versus Research Performance," *Academy of Management Journal* 43, pp. 1130-1141.
- Vessey, I., V. Ramesh, and R. L. Glass. (2002). "Research in Information Systems: An Empirical Study of Diversity in the Discipline and Its Journals," *Journal of Management Information Systems* 19(2), pp. 129-174.
- Wade, M., M. Biehl, and H. Kim. (2006). "Information Systems Is Not a Reference Discipline (and What We Can Do about It)," *Journal of the Association for Information Systems* 7, pp. 247-268.
- Walsham, G. (1995). "The Emergence of Interpretivism in IS Research," *Information Systems Research* 6(4), pp. 376-394.
- Weber, R. (2003). "Editor's Comments: Still Desperately Seeking the IT Artifact," *MIS Quarterly* 27(2).

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Communications of the Association for Information Systems

ISSN: 1529-3181

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