Communications of the Association for Information Systems

Volume 20 Article 42

November 2007

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ABSTRACT

Since its founding in the 1960s, the Information Systems (IS) field has been involved in critical debates about the nature and future of the discipline. Many researchers feel that diversity in IS research is our strength; others fear that too much diversity leads to losing the field's core identity. Do the scholarly contributions of the IS community reveal either of these two phenomena? In order to address this question, we examine articles published in leading IS journals (*MISQ, ISR*, and *JMIS*) during the period of 2000 to 2006. Our analysis includes classifying the articles using a classification scheme that includes the consideration of IT artifact, the research methods used, and the research topics covered. We provide descriptive statistics following a content analysis procedure and results based on cluster analysis and association rule mining. Our results provide an update on previous findings on IT artifact and its consideration in IS publications. Our results further suggest that while our leading journals cover a broad range of research topics and methods, there is also evidence of popularity on some topics and research methods.

Keywords: Information systems (IS) research**,** diversity in IS research, IS research method

I. INTRODUCTION

Since its founding in the 1960s, the Information Systems (IS) academic community has been involved in critical debates about the nature and future of the discipline. These debates also include sharp criticism from other disciplines outside of the IS community about its legitimacy and relevancy. For example, in the early 1970s, shortly after prominent business schools such as Wharton, MIT's Sloan, and the University of Minnesota instituted new academic programs in IS, a controversial article published in *Harvard Business Review* by Dearden [1972] compared the then-nascent IS field to "a mish mash of fuzzy thinking and incomprehensible jargon." In spite of these many challenges, the IS field has since found a prominent place in most business schools' curricula. Yet, the debate on its "crisis" continues.

In the 1980s, the main concern about the direction of IS research focused on overcoming the narrow scope and definition of “information technology” in IS research. Kling and Scacchi [1982] proposed the concept of “web models” to define IS research as opposed to the “discrete-entity” model where technology is perceived as simply a set of tools employed to achieve or automate specific tasks. The “web models” approach includes a range of constituents including technology, processes, applications, developers, and users as well as the social contexts where technology is used. Markus and Robey [1988] presented a range of ways to conceptualize information technology as playing different roles in organizational changes. Robey [1996] outlined several benefits that the IS field can gain by advancing a diversified research agenda. For example, diversity in research, according to Robey [1996], may help expand the foundation of IS knowledge, an idea supported by many other IS researchers [see, for example, DeSanctis 2003; Galliers 2003; Guthrie 2003; Holland 2003; and Lyytinen and King 2004]. In addition, as Robey claimed, diversity in research can “foster creativity” where conflicting ideas can be voiced and different approaches in addressing the same research problems can be pursued. Mingers [2001] called for a pluralist method, noting that some qualitative and interpretative methods were hard to find in the top journals. Diversity in IS research thus can be defined as including three different aspects [Benbasat and Weber 1996]: diversity in the problem addressed, diversity in the reference disciplines used to address IS-related issues, and diversity in method. The first two types of diversity have caused many debates regarding the direction of the IS discipline and how we should position ourselves in order to compete and/or survive among other academic fields. Alter [2003] argued in favor of a broad scope of IS research, taking a view called “systems in organizations” which encompasses most current IS research and yet still provides flexibility to take advantage of other disciplines. Alter [2003] also outlined “substantive benefits” that can be gained from a diversified research agenda under the systems in organizations umbrella. Another line of reasoning that supports a broad diversity in IS research argues that the IS discipline remains too young and too dynamic to narrow down the scope of its research efforts [see, for example, Myers 2003 and Gray 2003].

Other research attempts to define a scope of IS research and calls for a more unified view of the discipline [see, for example, Weber 1987; Davenport and Markus 1999; Benbasat and Zmud 2003]. Weber [1987] described an ideal situation for the IS field as a paradigm that is established through research that "attempts to articulate the general characteristics of complex, discrete [IT] artifacts that have longevity." This definition has a resemblance to that proposed by Benbasat and Zmud [2003]. The concern expressed by Weber [1987], also resonated by Benbasat and Zmud [2003], was identified as partly a consequence of the fast-changing, technology-driven nature of the IS field [Benamati et al. 2007]. This dynamism of our subject matter results in a discipline that lacks an enduring theory and paradigm [Davenport and Markus 1999]. This is also evidenced in Ives and Hamilton's study [1982] that showed the median elapsed time of IS journal and book citations to be only 3.9 years--a relatively short time span compared to journals/books in a more established discipline. Benbasat and Zmud [2003] claimed that encouraging researchers to gravitate their research efforts toward the IT artifact core will strengthen the unique identity of the IS field among the greater academic community and its practitioners.

Our objective in this paper is to examine the nature of IS research by providing a classification of IS research articles that have been published by three leading IS journals (*MISQ, ISR*, and *JMIS*) during the period of 2000 to 2006. Our classification scheme is based on the dimensions outlined below and discussed further in Section III:

1) The consideration of IT artifact in IS publications as proposed by

    a. Orlikowski and Iacono [2001] in their “conceptualizations of the IT artifact” framework; and

    b. Benbasat and Zmud [2003] in their “IT artifact and its nomological net” framework

2) The research methods used, based on the categories proposed by Vessey et al.[2002]; and

3) The topics addressed in relation to the recent tracks in the major IS conference (International conference in Information Systems -ICIS) and the special interest groups (SIGs) sponsored by the Association for Information Systems (AIS).

Our contribution to the current debate on the direction of our field is to provide a categorization of IS research, along the dimensions described above. To this end, we employ techniques that include content analysis, cluster analysis and association rule mining using the data obtained from the coding of the articles based on the above classification scheme. Our intention is to provide an update on the nature and state of diversity in IS research, alongside other studies on the nature of our discipline [see, for example, Neufeld et al. 2007; Clark et al. 2007; Benbunan-Fich and Mohan 2006; Katerattanakul et al. 2006; Lee et al. 2004; Chua et al. 2003].

II. JOURNAL SELECTION

We include in our analysis the articles published in *ISR*, *JMIS*, and *MISQ* between January 2000 and December 2006. Meta-research articles such as general commentaries on the IS discipline are excluded from our analysis, leaving a total of 549 articles included in the study (147 *ISR,* 249 *JMIS*, and 153 *MISQ* articles). The three journals we select exclusively publish research specific to the IS discipline and are generally considered as the top three IS journals [see, for example, journal rankings presented by Katerattanakul et al. 2003; Lowry et al. 2004; and Peffers and Tang 2003]. Although the periods overlap, we examine different aspects of research than Benbunan-Fich and Mohan [2006], who focused exclusively on articles about systems development. Other top-tier outlets often targeted by IS researchers such as *Management Science* and *Communications of the ACM* are not part of this study as their publications usually include non-IS articles (e.g., articles from other business disciplines and computer science).

Table 1. Descriptions of the Classification Scheme

Conceptualizations of IT [Orlikowski and Iacono 2001] (see also the first table in Appendix I) - Nominal - Tool - Proxy - Ensemble - Computational
IT artifact and its nomological net [Benbasat and Zmud 2003] (see also the second table in Appendix I) - IT artifacts - IT impact and usage - The managerial, methodological, and technological capabilities as well as the managerial, methodological, and operational practices involved in planning, designing, constructing, and implementing IT artifacts - Error of Exclusion and Error of Inclusion
Research method used [Vessey et al. 2002] (see also Table 2).
International Conference on Information Systems (ICIS) tracks (i.e., which conference track(s) the research topic addressed by an article most closely relate to) (see also Appendix II)
Special Interest Groups (SIGs) sponsored by the Association for Information Systems (AIS) (i.e., which SIG(s) the research topic addressed by an article most closely relate to) (see also Appendix III)

III. THE CLASSIFICATION SCHEME

For each of the three journals, two researchers evaluated and coded each article based on the following classification scheme (see Table 1).

CLASSIFICATION USING CONCEPTUALIZATIONS OF THE IT ARTIFACT [ORLIKOWSKI AND IACONO 2001]

First, we coded the articles based on the consideration of IT artifact according to the framework proposed by Orlikowski and Iacono [2001]. Orlikowski and Iacono [2001], after examining articles published in *ISR* between March 1990 (its inaugural issue) and December 1999 and following Kling and Scacchi [1982] and Markus and Robey [1988], categorized the articles according to how the researchers perceived information technology. These classifications consist of five main clusters: nominal, computational, tool, proxy, and ensemble views. The largest cluster of articles, nominal, representing almost 25 percent of research published in *ISR* during those 10 years, involves research that investigates IT artifacts only “in name” but not “in fact.” These articles address IT-related issues but the actual information technology is not described, conceptualized, or theorized. In this paper, we classify the research published during the period from 2000 to 2006 in *ISR*, *MISQ*, and *JMIS* into these five clusters. Our classification of *ISR* articles can then be compared directly with that by Orlikowski and Iacono [2001].

CLASSIFICATION USING IT ARTIFACT AND ITS NOMOLOGICAL NET [BENBASAT AND ZMUD 2003]

Benbasat and Zmud [2003] argue that the focus of IS research should be on the “IT artifact” defined as “the application of [information technology] to enable or support some task(s) embedded within a structure(s) that itself is embedded within a context(s).” They point out that much effort in IS research fails to satisfy the requirements of their IT artifact framework. These were research articles that either 1) fail to include an IT artifact or its immediate “nomological net” (thus called “errors of exclusion”) or 2) involve research topics that are more appropriate for other research fields (thus called “errors of inclusion”). However, their results were based on an examination of a relatively small number of articles, those published in 2001 and 2002 in *ISR* (50 articles) and *MISQ* (33 articles).

Although the study by Benbasat and Zmud [2003] is related to that by Orlikowski and Iacono [2001], we decided to use both because each study focuses on different aspects of IT artifact. While the classification according to Orlikowski and Iacono [2001] provides the lens for researchers to conceptualize the IT artifact, the classification according to Benbasat and Zmud [2003] concerns the focus of each article, whether it is the IT artifact itself or a construct within its immediate nomological net. For example, the impact and usage of IT, as addressed by Benbasat and Zmud [2003], can be examined based on different IT conceptualizations (e.g., Tool or Proxy views in Orlikowski and Iacono [2001]).

With the diversity of opinion on the state of the "crisis" in the field [see Agarwal and Lucas 2005], we provide descriptive statistics showing the diversified scope of IS research as well as the types of research that might not, according to Benbasat and Zmud [2003], belong in the IS discipline. Specifically, we provide an updated and expanded examination of IS articles that might fall into the two error categories provided by Benbasat and Zmud [2003].

CLASSIFICATION USING RESEARCH METHODS

We also provide an overview of the current state of IS research, relating the methods used in the research published in the three journals. The research method is the “means for gaining knowledge.” We concentrated on research methods rather than epistemology because research methods represent “the means for gaining knowledge” [DeLuca and Kock 2007, p. 187] and “may be used with any epistemological perspective.” [ibid. p. 193].

Several research methods in IS research have been identified in previous studies [see, for example, Alavi and Carlson 1992; Farhoomand and Drury 1999; Vessey et al. 2002]. Though these studies identified methods that are very common (e.g., field studies, lab experiments, case studies, and field experiments), there are other methods that have become popular in IS research recently (e.g., conceptual analysis/mathematical, simulation). In order to allow classification of articles that employ these methods, we follow the list proposed by Vessey et al. [2002] that categorize research methods into eight categories [see Table 2]. These categories are relatively more up to date and provide a more complete list. In addition, since it is possible that a research article may rely upon multiple methods, we also allow the coders to record up to two research methods per article.

Table 2. Research Methods [Vessey et al. 2002]

Categories	Description
CA	Conceptual analysis
CAM	Conceptual analysis/mathematical
CS	Case study, action research, ethnography, and grounded theory
DA	Data analysis and literature review
FS	Field study and descriptive/exploratory survey
ID	Instrument development
LH	Laboratory experiment (human subjects) and protocol analysis
SE	Field experiment, systems evaluation, laboratory experiment (software), concept implementation (proof of concept), and simulation

CLASSIFICATION USING RESEARCH TOPICS

Prior studies also examined the nature of IS research based on research topics and provided classification of topic areas covered by IS researchers [see, for example, Barki et al. 1988; Alavi and Carlson 1992; Vessey et al. 2002]. However, the IS field is one of the fields that is often affected by the continual changes in technology. As a result of this, ideas and issues that attract IS researchers often change from time to time. In our attempt to address this issue, we observe that the field regularly responds to these changes and brings together new ideas and issues to its audience through its sponsored forums, such as conferences and special interest groups. For example, an examination of the tracks at the field's major conference, International Conference on Information Systems (ICIS), shows that they not only include traditional topics, but also give an opportunity for ground-breaking ideas. In addition, the field regularly sponsors special interest groups that address the interest of a research community that attempts to provide a unique perspective to the field. Thus, our goal in classifying the articles in terms of research topics is to evaluate how the field's effort at this front is also reflected in its top-tier publication outlets. In other words, we want to examine how topics published in the three journals relate to the topics represented by the above forums. By considering conference tracks and special interest groups (SIGs), not only we cover topics that are traditionally considered relevant for the IS audience, but also cover contemporary issues that have been the center of attention by the IS community recently.

Thus, we use a list of conference tracks included in the recent ICIS conferences [see Appendix II]. Over the years, these tracks have become increasingly diverse and the more recent years have included topics that were not represented in previous years. In particular, the years 2006 and 2007 have a more complete list and include additional tracks for breakthrough ideas in information technology and general topics. Similar to the research method, since each research article might be considered for multiple conference tracks (i.e., research topics), the coders identify up to two tracks that are most closely aligned with the topic addressed by each article. In addition, we explore another measurement of research diversity in topic areas by matching each article with up to two special interest research groups (SIGs) sponsored by the Association for Information Systems [see Appendix III].

IV. THE CODING PROCESS AND INTER-CODER RELIABILITY

For each journal, two of the researchers work independently to code the articles, following the content analysis procedure outlined in Neuendorf [2002]. Before the classification process started, we documented the definitions of each classification categories according to the referenced articles [e.g., the “nominal” cluster from Orlikowski and Iacono [2001]. The coders then discussed and came to an initial agreement on the interpretation of these definitions. During the initial stages of the classification process, the coders coded 20 articles in each session. Each coding session was followed by a resolution session where disagreements in the coded data were resolved and recorded. After two initial resolution sessions, the coders resolved differences following the coding of approximately every 50 articles.

Table 3. Intercoder Reliability Statistics

Category	**Percent Agreement**			**Cohen's Kappa**		
	ISR	*JMIS*	*MISQ*	*ISR*	*JMIS*	*MISQ*
Conceptualizations of IT	82.3%	72.7%	83.0%	77.0%	63.8%	76.0%
IT artifact & nomological net	79.6%	72.3%	90.2%	70.2%	61.0%	83.4%
Method I*	85.7%	70.7%	76.5%	82.1%	65.0%	70.2%
Method II	67.3%	20.9%	25.5%	44.8%	9.8%	12.8%
ICIS Track I*	61.9%	52.2%	52.3%	57.4%	45.4%	46.7%
ICIS Track II	53.1%	31.7%	44.4%	15.5%	15.0%	26.2%
SIG I*	63.3%	50.6%	56.2%	58.9%	43.6%	51.0%
SIG II	62.6%	34.9%	59.5%	23.1%	10.6%	23.4%

* Up to two possible values are allowed; thus the coders may identify the same categories, but in different orders. See additional statistics in the paragraphs following.

The percentage of agreement and Cohen’s kappa were used as measurement of intercoder reliability. In general, kappa values between 0.61 and 0.80 are regarded as “substantial,” and those greater than 0.80 are deemed “almost perfect” [Landis and Koch 1977]. Table 3 presents the results of the intercoder reliability analyses.

The kappa values for the “conceptualizations of IT” and the “IT artifact and nomological net” categories are all in the substantial range. As noted earlier, we record two values for the method and research topic categories (ICIS tracks and SIGs). Thus, it is possible, for example, that the two coders may identify the same two categories but code them in different orders. Despite this, for the method category the two independent coders agreed with substantial degree for the primary method. However, the results are different for the research topics. Many articles may have tangential relationships with different topics and sometimes it is not straightforward to identify each article with a given topic. As a result, the reliability figures for the research topics (ICIS tracks and SIGs) are relatively lower. Once again, these numbers do not show the possibility that the coders identify the two most relevant topics but in different priorities. When we calculate the percent agreement based on all possible matches between the two coded values, the results are all in the almost perfect range [i.e., *ISR*: 95.91 percent for ICIS tracks, 89.12 percent for SIGs, and 90.47 percent for method; *JMIS*: 88.76 percent for ICIS tracks, 83.13 percent for SIGs, and 89.96 percent for method; and *MISQ*: 94.86 percent for ICIS tracks, 93.68 percent for SIGs, and 94.47 percent for method]. For the rest of our analysis, we use the values recorded in the primary fields of the method, ICIS tracks, and SIGs.

V. DATA ANALYSIS

Figure 1 and Figure 2 [see also Table 4 and Table 5] present the percentage breakdown of the articles coded based on the consideration of IT artifact as proposed by Orlikowski and Iacono [2001] and Benbazat and Zmud [2003], respectively. In the percentage breakdown of the conceptualizations of IT [Orlikowski and Iacono 2001], we observe that for *JMIS*, the largest category is the nominal conceptualization. The "ensemble" and "proxy" conceptualizations represent the largest category for *MISQ* and *ISR*, respectively. Notably, there is also a large percentage difference among the three journals for those conceptualizations. We also observe that *ISR* publishes relatively more articles that belong to the "computational" category. In total, most articles were found to be in the "tool" and "proxy" conceptualizations [see Figure 1].

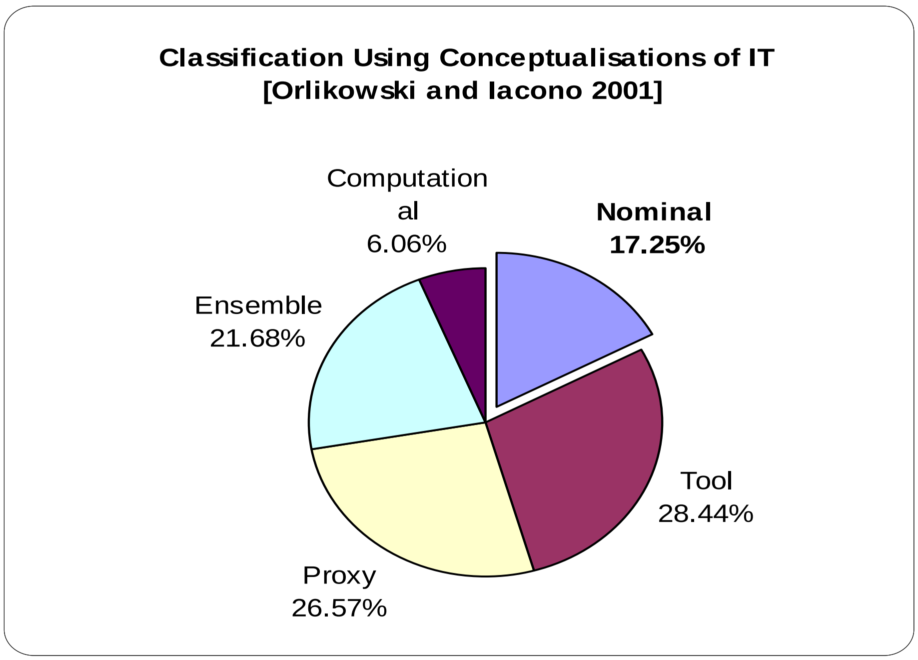

Figure 1. Classification Using Conceptualizations of IT: All three journals

Table 4. Percentage Breakdown for Conceptualizations of IT by Journal Type

Journal	Nominal	Tool	Proxy	Ensemble	Computational	Total
ISR	8.26%	28.10%	33.06%	14.05%	16.53%	100.00%
JMIS	30.39%	29.83%	23.20%	14.36%	2.21%	100.00%
MISQ	7.09%	26.77%	25.20%	39.37%	1.57%	100.00%
Total	17.25%	28.44%	26.57%	21.68%	6.06%	100.00%

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Similarly, in the percentage breakdown for IT artifact and nomological net Benbasat and Zmud [2003], we observe that the largest group of articles in *JMIS* belongs to the "error of inclusion/exclusion" category. For *ISR*, the largest category is the "IT impact and usage" group, and for *MISQ*, the "IT capabilities and practices" category consists of the highest number of articles. In total, most of the articles were found to be in the categories of "IT impact and usage" and "IT capabilities and practices" [See Figure 2].

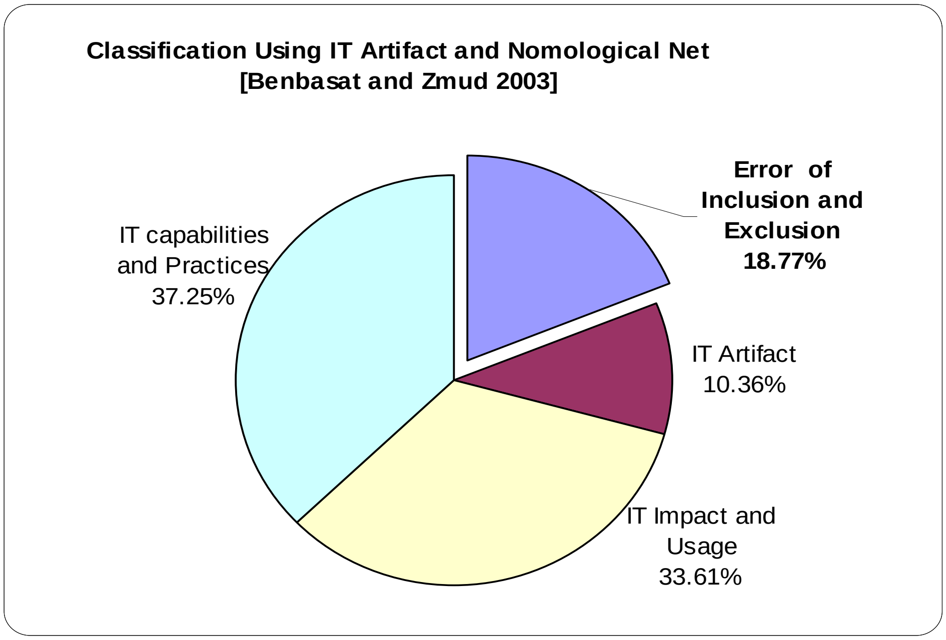

Figure 2. Classification Using IT Artifact And Nomological Net: All Three Journals

Table 5. Percentage Breakdown For IT Artifact And Nomological Net by Journal Type

Journal	Error of Inclusion and Exclusion	IT Artifact	IT Impact and Usage	IT capabilities and Practices	Total
ISR	8.60%	20.43%	41.94%	29.03%	100.00%
JMIS	34.01%	10.20%	24.49%	31.29%	100.00%
MISQ	7.69%	2.56%	38.46%	51.28%	100.00%
Total	18.77%	10.36%	33.61%	37.25%	100.00%

For the research method classification, CAM (Conceptual analysis/mathematical) is the most frequent method for *ISR*. For *JMIS* and *MISQ*, FS (Field study and descriptive/exploratory survey) is the most frequent method. In general, FS, CAM, and LH (Laboratory experiment (human subjects) and protocol analysis) are the methods that are frequently adopted in IS research published in the three journals [see Figure 3].

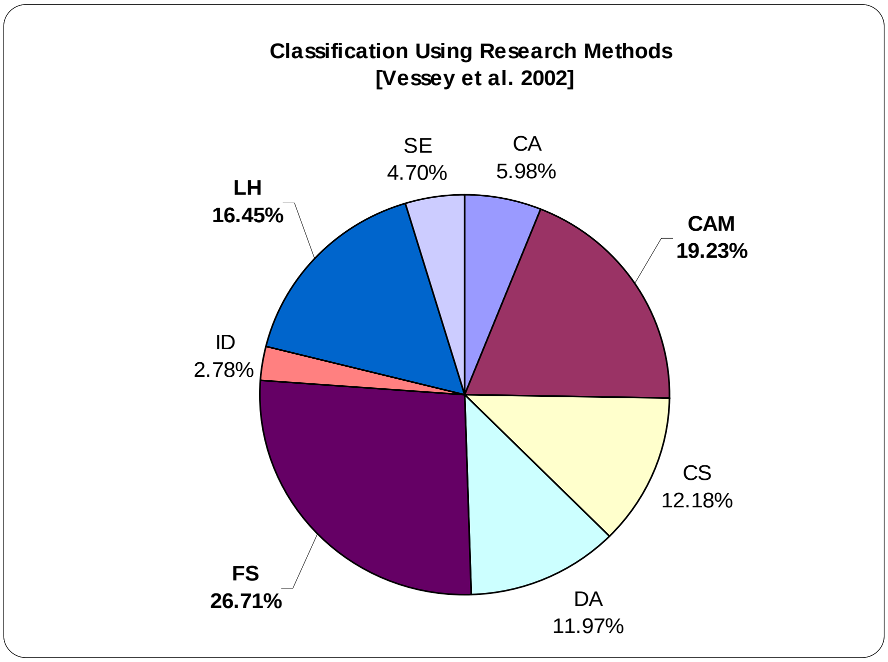

Figure 3. Classification Using Research Methods: All Three Journals

In the case of *MISQ*, 39.37 percent of the articles adopted an ensemble view of IT, 50.28 percent studied IT capabilities and practices and 31.11 percent employed FS (Field study and descriptive/exploratory survey) for method. However, these results only present part of the whole picture. In subsequent sections, we extend our analysis to show the relationships among the categories in our classification scheme using cluster analysis and association rule mining.

Table 6. Percentage Breakdown for Research Methods by Journal Type

Method	Description	*ISR*	*JMIS*	*MISQ*	Total
CA	Conceptual analysis	4.17%	4.76%	9.63%	5.98%
CAM	Conceptual analysis/mathematical	**34.03%**	17.99%	5.19%	19.23%
CS	Case study, action research, ethnography, and grounded theory	2.78%	10.05%	25.19%	12.18%
DA	Data analysis and literature review	10.42%	11.11%	14.81%	11.97%
FS	Field study and descriptive/exploratory survey	20.14%	**28.57%**	**31.11%**	26.71%
ID	Instrument development	6.25%	1.06%	1.48%	2.78%
LH	Laboratory experiment (human subjects) and protocol analysis	17.36%	19.05%	11.85%	16.45%
SE	Field experiment, systems evaluation, laboratory experiment (software), concept implementation (proof of concept), and simulation	4.86%	7.41%	0.74%	4.70%
Total		100.00%	100.00%	100.00%	100.00%

For the research topics using ICIS tracks [see Table 7], we find that larger proportions of the articles in *ISR* can be related to “Economics and Business Value of Information Systems” (24.17 percent), “Approaches to Information Systems Development” (12.5 percent), “Design Science”(10 percent), and "Human-Computer Interaction" (10 percent). For *JMIS*, we find the tracks "Economics and Business Value of Information Systems" (32.43 percent), "Approaches to Information Systems Development" (10.27 percent), as well as "Knowledge Management" and "Social and Behavioral Aspects of Information Systems" (11.89 percent each). For *MISQ*, we find the tracks, "Economics and Business Value of Information Systems" (18.02 percent), "Approaches to Information Systems Development" (18.02 percent), "Social and Behavioral Aspects of Information Systems" (18.92 percent), and "Human-Computer Interaction" (10.81 percent). Overall, "Economics and Business Value of Information Systems" (26.02 percent), and "Approaches to Information Systems Development" (12.98 percent) are the two tracks in which most articles are identified with across the three journals.

Table 7. Percentage Breakdown for Related ICIS Tracks by Journal Type

ICIS Tracks	***ISR***
Economics and Business Value of Information Systems	24.17%
Approaches to Information Systems Development	12.5%
Design Science	10%
Human-Computer Interaction	10%
Not Applicable	5.00%
All other tracks	38.33%
ICIS Tracks	***JMIS***
Economics and Business Value of Information Systems	32.43%
Approaches to Information Systems Development	10.27%
Knowledge Management	11.89%
Social and Behavioral Aspects of Information Systems	11.89%
Not Applicable	4.32%
All other tracks	29.20%
ICIS Tracks	***MISQ***
Economics and Business Value of Information Systems	18.02%
Approaches to Information Systems Development	18.02%
Human-Computer Interaction	10.81%
Social and Behavioral Aspects of Information Systems	18.92%
Not Applicable	3.60%
All other tracks	30.63%

In Table 8, we provide similar information for the SIGs. We find that larger proportions of the articles in *ISR* as well as *JMIS* can be identified with "E-Business," "Decision Support, Knowledge and Data Management," and "Systems Analysis and Design" groups. For *MISQ*, we find the SIGs, "Adoption and Diffusion of Information Technology," "Decision Support, Knowledge and

Data Management," and "Systems Analysis and Design." We also observe that comparable proportions of the articles in each journal could not be identified with any of the SIGs (i.e., the "Not Applicable" category). Not surprisingly, this is because the main purpose of SIGs is to open a special opportunity for specialty topics in IS research, which may not fit with the scope of these journals.

Table 8. Percentage Breakdown for Related Sigs by Journal Type

SIGs	***ISR***
E-Business	21.37%
Decision Support, Knowledge and Data Management	13.68%
Systems Analysis and Design	11.97%
Not Applicable	13.68%
All other SIGs	39.30%
SIGs	***MISQ***
E-Business	25.31%
Decision Support, Knowledge and Data Management	24.07%
Systems Analysis and Design	7.41%
Not Applicable	14.81%
All other SIGs	28.40%
SIGs	***JMIS***
Decision Support, Knowledge and Data Management	16.16%
Systems Analysis and Design	13.13%
Adoption and Diffusion of Information Technology	21.21%
Not Applicable	13.13%
All other SIGs	36.37%

VI. DIVERSITY- FACT FINDING

In order to extend our findings beyond the descriptive statistics, we also conducted cluster analysis and association rule mining using WEKA, an open-source data mining tool [Witten and Frank 2005]. For these analyses, we used the articles in each journal where the two independent coders agreed across all the dimensions of our classification scheme (i.e., conceptualization of IT, position within the IT nomological net, research method, ICIS track and SIG). Out of 549 articles, 153 (about 28 percent) are identified.

We first conducted cluster analysis in order to organize our data into meaningful structures and develop segmentation from our coding results. Cluster analysis seeks to identify homogeneous groups of instances in a data set in a way that the degree of variation between two objects is minimal if they belong to the same group and maximal otherwise (i.e., groups which both minimize within-group variation and maximize between-group variation). We conducted the K-means clustering analysis, which produces *k* different clusters of greatest possible distinction in the data, where *k* is user-specified number [Hartigan 1975; Witten and Frank 2005]. The K-means algorithm uses distance measures (e.g., Euclidean distance) to measure within-cluster and between-cluster variations and seeks to minimize within-cluster variance and maximize variability between clusters. Initial cluster centers are chosen randomly in a first pass of the data, then each additional iteration groups instances based on nearest distance to the mean (*centroid*) of the cluster. The algorithm implemented in WEKA reports "within cluster sum of squared errors" for evaluating the quality of the cluster formation for different sizes of *K,* along with the number and percentage of instances (clustered instances) grouped in each cluster out of the total number of instances analyzed. We tried different sizes of *K*, and we present the results obtained for *K*=3 in Table 9. In this particular result, it is interesting to note that we find each cluster containing one of the three journals examined.

Table 9. Cluster Analysis: K=3: Within Cluster Sum of Squared Errors: 468.0

Cluster 1	Clustered Instances: 82 (53.6%)
Journal	ISR
IT artifact & nomological net	IT Usage and Impact
Conceptualizations of IT	Proxy
Method	Conceptual analysis mathematical
ICIS Track	Economics and Business Value of Information
SIG	E-Business
Cluster 2	Clustered Instances: 47 (30.7%)
Journal	JMIS
IT artifact & nomological net	IT managerial, methodological, and operational practices and capabilities
Conceptualizations of IT	Ensemble
Method	Case study; Action research; Ethnography; Grounded theory
ICIS Track	Approaches to IS Development
SIG	Systems Analysis and Design
Cluster 3	Clustered Instances: 24 (15.7%)
Journal	MISQ
IT artifact & nomological net	IT managerial, methodological, and operational practices and capabilities
Conceptualizations of IT	Ensemble
Method	Data analysis; Literature review
ICIS Track	Approaches to IS Development
SIG	Systems Analysis and Design

The resulting information in two of the three clusters is also interesting to note [see Cluster 2 and Cluster 3 in Table 9]. The clusters indicate certain amount of specialization among these three journals. Clusters representing *JMIS* and *MISQ* are identified mostly with the same research topics, “Approach to System Development” and “System Analysis and Design.” However, while *JMIS* articles frequently employ the CS (case study; action research; ethnography; grounded theory) research method category, *MISQ* articles often employ the DA (data analysis; literature review) research method category. This clearly shows the diversity in methods used by our leading journals to address the same research topics and/or similar research issues. This may also indicate a trend in IS research toward an ideal of “disciplined methodological pluralism” proposed by Landry and Banville [1992].

Next we conducted association rule mining in order to identify co-occurrences among the different categories with in the dimensions of IT artifact, research methods, and topics. In association rule mining, rules are formed in an "if-then" form, that is, "If *X*, then *Y*," indicating the co-occurrences of the items *X* and *Y* in an instance. We used the *apriori* algorithm implemented in WEKA, along with the *lift* metric to rank order important association rules that occur other than by random chance [Witten and Frank 2005]. The *lift* metric compares the chances of having *Y*, given *X*, to the chances of having *Y* in any random instance. Thus, a *lift* value greater than 1.00 shows an association that occurs other than by random chance and the higher the *lift* value, the higher the degree of the association. Based on our analysis, Table 10 presents the most common associations or co-occurrences of categories extracted for the minimum *lift* value of 1.00.

The co-occurrence with the highest lift value of 6.95 in the first row of Table 10 shows error of inclusion/exclusion associated with nominal conceptualization of IT. This implies that most articles that were found to present a nominal conceptualization of IT were also judged to be in the error of inclusion. If we compare these results with the results presented in Tables 4 and 5, we find that more than 30 percent of *JMIS* articles were coded to present a nominal conceptualization of IT and an error of inclusion/exclusion. The second most notable association with a lift value of 4.51 represents the “ensemble view of IT,” “IT practices or capabilities,” and research topics of “Approaches to Information Systems Development” for ICIS track, and “systems analysis and design” for SIGs.

Table 10. Common Co-Occurrences Extracted Using Association Rule Mining

Co-Occurrences of Categories in the Classification Scheme		Lift Value
IT artifact and nomological net {Error of Exclusion/Inclusion}	Conceptualizations of IT {Nominal}	lift: (6.95)
ICIS {Approaches to Information Systems Development}; IT artifact and nomological net {IT managerial, methodological, and operational practices}	SIG {Systems Analysis and Design}; Conceptualizations of IT {Ensemble}	lift: (4.51)
Conceptualizations of IT {Proxy}; Journal{ISR}	ICIS {Economics and Business Value of Information Systems}	lift: (3.75)
ICIS {Economics and Business Value of Information Systems}; IT artifact and nomological net {IT Impact}	Conceptualizations of IT {Proxy}	lift: (3.26)
IT artifact and nomological net {IT managerial, methodological, and technological capabilities}; Journal {JMIS}	Conceptualizations of IT {Ensemble}	lift: (2.66)

Co-Occurrences of Categories in the Classification Scheme		Lift Value
IT artifact and nomological net {IT managerial, methodological, and technological capabilities}; Journal {MISQ}	Conceptualizations of IT {Ensemble}	lift: (2.34)
IT artifact and nomological net {IT managerial, methodological, and technological capabilities}	Method {Case study; Action research; Ethnography; Grounded theory}	lift: (1.95)
IT artifact and nomological net {IT Impact}	Conceptualizations of IT {Tool}	lift: (1.90)
Journal {ISR}	Method {Conceptual analysis mathematical}	lift: (1.88)
Journal {JMIS}	Method {Field study; Descriptive/exploratory survey}	lift: (1.31)
Journal {MISQ}	Method {Field study; Descriptive/exploratory survey}	lift: (1.28)
Journal {ISR}	IT artifact and nomological net {IT Impact}	lift: (1.23)
IT artifact and nomological net {IT Impact}	Method {Field study; Descriptive/exploratory survey}	lift: (1.21)

VII. CONCLUSIONS AND FUTURE RESEARCH

This study contributes to the IS field diversity and crisis debates by providing publication evidence from three leading IS journals (*MISQ, ISR, JMIS*) during the period of 2000-2006. Our results provide an update on the findings in previous studies on IT artifact and its consideration in IS publications. As indicated in our results, a number of articles published in our top journals are classified, according to Benbasat and Zmud [2003], as excluding critical IT-related constructs or including non-IT constructs in their research models. These papers often fall into a category Benbasat and Zmud [2003] define as "error of inclusion" as well as under the "nominal" cluster defined by Orlikowski and Iacono [2001]. Benbasat and Zmud [2003] report finding 20 percent errors of inclusion or exclusion in their sample of articles from *ISR* and *MISQ* for the years 2001 and 2002. This study found a total of 18.77 percent errors of inclusion or exclusion, where 7.69 percent are in *MISQ*, 8.6 percent in *ISR*, and 34 percent in *JMIS*. Of course, neither Benbasat and Zmud [2003] nor Orlikowski and Iacono [2001] regard these papers as having no scholarly value. Our observation is not contrary to this, as these articles do make contribution to the research topics they address. Some of the articles in this group also appear to be relevant to academicians in other non-IS business fields.

The volatile nature of our field combined with overlapping interests by reference disciplines may have contributed to the fact that articles in our leading journals could be considered outside of Benbasat and Zmud's IT nomological net. For example, in our cluster analysis, Cluster 1 reveals an important body of work related to the topic of e-business. This topic represents a recent development in our field as the field of IS is closely related to technological developments. Web2002, the first workshop on e-business was conducted at the ICIS 2002 conference. E-business represents an example of a topic that generates interest from the fields of both IS and marketing. Similarly, economics and business value of IT presents overlapping interests from the fields of IS and economics. A possible outlet for these articles, therefore, is to publish them in a special issue of an IS journal in cooperation with another non-IS journal, as suggested by Lee [1999] in his *MISQ* editorial comments and echoed by Wade et al. [2006]. Another possible outlet for this type of research, following Wade et al. 's [2006] line of argument, is for the IS researchers to pursue publication opportunities in top-tier, non-IS journals that cover more appropriate groups of audience that will be more likely to use the published results. Certainly, these "champion" papers [Wade et al. 2006] published in top-tier, non-IS journal and having references to other IS research would help increase the audience of our research and strengthen the stature of IS as a reference discipline.

Even though many researchers are in favor of diversity in IS research to a certain extent, some have expressed concerns that too much diversity can be detrimental to our unique identity. Robey [1996] pointed out the danger of allowing diversity to dominate our research field to the extent of what he called “an anarchic, anything-goes attitude.” A concept called “disciplined methodological pluralism” proposed by Landry and Banville [1992] and advocated by Robey [1996] allows researchers to avoid the danger of “the extremism of methodological monism” and methodological anarchy. The cluster analysis and the associations rule mining illustrate the diversity of IS research, not only in terms of the consideration of IT artifact, but also in terms of the methods used to answer research questions. Mingers [2001] called for a pluralist methodology. The present results show that each conceptualization of IT was examined using a variety of methods and demonstrate the methodological rigor used to pursue these questions. DeLuca and Kock [2007] argue that relying on only one research method can lead to misunderstandings or incorrect conclusions. In addition to the primary research method, in most cases two or more methods were used in the research studied. Mingers [2001] also remarked on the near absence from the top IS journals of some specific methods such as participant observation, grounded theory, or soft systems methods. Our results, however, show that the primary method of 25.19 percent of *MISQ* papers was classified to be case study, action research, ethnography, or grounded theory. Despite the broad range of topics and research methods the articles covered for the period we examined, our analysis also reveals evidence of popularity on some topics and research methods (see, for example, the results summarized in Tables 6, 7, and 8).

Finally, this research has some limitations that we recognize. We limited our inquiry to the three journals and to the years 2000 to 2006, thus this research does not present a complete picture of IS research. It would be interesting to expand the analysis to other journals in the field and publications for a longer time period in the past. In addition, in this research we used *ICIS* tracks and *AIS* SIGs to represent IS topics. Future research can address similar issues using a more expanded classification scheme. Keeping these limitations in mind, we believe that our analysis and results offer insights into different aspects of diversity in IS research and the recurring debate concerning the nature and future of our discipline.

REFERENCES

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

Alavi, M. and C. Carlson. (1992). “A Review of MIS Research and Disciplinary Development,” *Journal of Management Information Systems,* 8(4), Spring, pp. 45-62.

Alter, S. (2003). “Sidestepping the IT Artifact, Scrapping the IS Silo, and Laying Claim to ‘Systems in Organizations,’” *Communications of the AIS,* 12(30), November, pp. 494-526.

Barki, H., S. Rivard, and J. Talbot. (1988). " An Information Systems Keyword Classification Scheme," *MIS Quarterly,* 12 (2), June, pp. 299-322.

Benamati, J., M. Serva, D. Galletta, A. Harris, and F. Niederman. (2007). “The Slippery Slope of MIS Academia: A Discussion of the Quest for Relevance in Our Discipline,” *Communications of the AIS*, 18(32), March, pp. 657 – 675.

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), June, pp. 183 – 194.

Benbunan-Fich, R. and K. Mohan. (2006). "Information Technology and Systems – III. Research Publications in Systems Development during 2000-2004," *Communications of the AIS*, 17(18), March, pp. 373-390.

Chua, C., L. Cao, K. Cousins, and D. Straub. (2003). "Measuring Research-Production in Information Systems," *Journal of the AIS,* 3(6), January, pp. 145-215.

Clark, J., J. Warren, and Y. Au. (2007). "Carnegie Classifications and Institution Productivity in Information Systems Research: A Scientometric Study," *Communications of the AIS* 19(21), April, pp. 478-512.

Davenport, T. H. and M. L. Markus. (1999). "Rigor vs. Relevance Revisited: Response to Benbasat and Zmud," *MIS Quarterly,* 23(1), March, pp. 19 – 23.

Dearden, J. (1972). "MIS is a Mirage," *Harvard Business Review,* 50(1), January-February, 90-99.

DeLuca D. and N. Kock. (2007). "Publishing Information Systems Action Research for a Positivist Audience," *Communications of the AIS*, 19(10), March, pp. 183-204.

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 AIS,* 4(7), December, pp. 360-373.

Farhoomand, A. F., and D. H. Drury. (1999). "A Historiographical Examination of Information Systems," *Communication of the AIS* 1(19), pp. 1-20.

Galliers, R. (2003). "Change as Crisis or Growth? Toward a Trans-disciplinary View of Information Systems as a Field of Study: A Response to Benbasat and Zmud's Call for Returning to the IT Artifact," *Journal of the AIS*, 4(6), November, pp. 337- 351.

Gray, P. (2003). "Editorial: Introduction to the Debate on the Core of the Information Systems Field," *Communications of the AIS*, 12(42), November, pp. 1-7.

Guthrie, R. (2003). "Defining the IS Core," *Communications of the AIS*, 12(35), November, pp. 557-561.

Hartigan, J. A. (1975). *Clustering Algorithms*, NY: Wiley.

Holland, C. (2003). "Information Systems Research And Practice: It Artifact Or A Multidisciplinary Subject?" *Communications of the AIS,* 12(40), November, pp. 599-606.

Ives, B. and S. Hamilton. (1982). "Knowledge Utilization among MIS Researchers," *MIS Quarterly,* 6(4), December, pp. 61 – 77.

Katerattanakul, P., B. Han, and A. Rea. (2006). "Is Information Systems A Reference Discipline?" *Communications of the ACM* (49:5), May, pp. 114-118.

Katerattanakul, P., B. Han, and S. Hong. (2003). "Objective Quality Ranking of Computing Journals," *Communications of the ACM,* 46(10), October, pp. 111-114.

Kling, R. and W. Scacchi. (1982). "The Web of Computing: Computer Technology as Social Organization," in *Advances in Computers*, Zelkowitz, M. (Ed.), Elsevier Science and Technology, Massachusetts, USA, Volume 21, pp. 1-90.

Landis, J., and G. Koch. (1977). “The Measurement of Observer Agreement for Categorical Data,” *Biometrics* (33:1), March, pp. 159–174.

Landry, M. and C. Banville. (1992). "A Disciplined Methodological Pluralism for MIS Research," *Accounting, Management and Information Technologies,* 2(2), April-June, pp. 77-97.

Lee, A. (1999). “Inaugural Editor's Comments,” *MIS Quarterly,* 23(1), March, pp. v-xi.

Lee, Y., Z. Lee, and S. Gosain. (2004). “The Evolving Intellectual Diversity of the IS Discipline: Evidence from the Referent Disciplines,” *Communications of the AIS,* 13(33), June, pp. 546-579.

Lowry, P., D. Romans, and A. Curtis. (2004). “Global Journal Prestige and Supporting Disciplines: A Scientometric Study of Information Systems Journals,” *Journal of the AIS,* 5(2), February, pp. 29-75.

Lyytinen, K. and J. King. (2004). “Nothing at the Center?: Academic Legitimacy in the Information Systems Field,” *Journal of the AIS,* 5(6), June, pp. 220-246.

Markus, L. and D. Robey (1988). “Information Technology and Organizational Change: Causal Structure in Theory and Research,” *Management Science,* 34(5), May, pp. 583-598.

Mingers, J. (2001). “Combining IS Research Methods: Towards a Pluralist Method,” *Information Systems Research,* 12(3), September, 240-259.

Myers, M. D. (2003). “The IS Core – VII, Defining the Core Properties of the IS Discipline: Not Yet, Not Now,” *Communications of AIS,* 12(38), November, pp. 582-587.

Neuendorf, K. (2002). *“The Content Analysis Guidebook*.” Sage Publications, Thousand Oaks, California, USA.

Neufeld, D., Y. Fang, and S. Huff. (2007). “The IS Identity Crisis,” *Communications of the AIS*, 19(19), April, pp. 447-464.

Orlikowski, W. J. and C. S. Iacono. (2001). “Research Commentary: Desperately Seeking the ‘IT’ in IT Research—A Call to Theorizing the IT Artifact,” *Information Systems Research,* 12(2), June, pp. 121-134.

Peffers, K., and Y. Tang. (2003). “Identifying and Evaluating the Universe of Outlets for Information Systems Research: Ranking the Journals,” *The Journal of Information Technology Theory and Application,* 5(1), March, pp. 63-84.

Robey, D. (1996). “Research Commentary: Diversity in Information Systems Research: Threat, Promise, and Responsibility,” *Information Systems Research,* 7(4), December, pp. 400-408.

Vessey, I., V. Ramesh, and R. Glass. (2002). “Research in Information Systems: An Empirical Study of Diversity in the Discipline and Its Journals,” *Journal of Management Information Systems,* 19(2), Fall, pp. 129-174.

Wade, M., M. Biehl, and H. Kim. (2006). “Information Systems Is Not a Referenced Discipline (And What We Can Do about It),” *Journal of the AIS,* 7(5), May, pp. 247 – 269.

Weber, R. (1987). “Toward a Theory of Artifacts: A Paradigmatic Base for Information Systems Research,” *Journal of Information Systems,* 1(1), Spring, pp. 3 – 19.

Witten, I. H. and E. Frank. (2005). *"Data Mining: Practical Machine Learning Tools and Techniques,"* 2nd Edition, Morgan Kaufmann, San Francisco.

APPENDIX I. DESCRIPTIONS OF CODING CLASSIFICATIONS

Conceptualizations of IT	Definitions [Orlikowsk and Iacono 2001]
Tool: IT is viewed as: - a labor substitution tool, - a productivity tool, - an information processing tool, or - a social relations tool.	"Technology is the engineered artifact, expected to do what its designers intend it to do (…)" [idem, p. 123]. Technology is seen as "separate, definable, unchanging, and over which humans have control" [Orlikowski and Iacono 2001, p. 123].
Proxy: One of these key elements represents the IT artifact: - IT perception, - IT diffusion, or - capital.	The articles have a "focus on one or a few key elements in common that are understood to represent or stand for the essential aspect, property, or value of information technology" [ibid., p. 124].
Ensemble: IT is viewed as: - a development project, - a production network, - a embedded system, or - a structure.	IT is viewed as "one element in a 'package', which also includes the components required to apply that technical artifact to some socio-economic activity" [ibid., p. 125].
Computational: IT is viewed as: - an algorithm, or - a model.	Articles that "concentrate expressly on the computational power of IT" [idem, p. 127].
Nominal	References to IT terms are found in the article, but only incidentally or as background information.

IT artifact and nomological net	Definitions [Benbasat and Zmud 2003]
IT practice or capabilities	"The managerial, methodological, and technological *capabilities* as well as the managerial, methodological, and operational *practices* involved in planning, designing, constructing, and implementing IT artifacts" [Benbasat and Zmud 2003, p. 186].
IT usage or impact	"The human behaviors reflected within, and induced through both the (…) direct and indirect *usage* of these artifacts" (ibid., p. 186) and "as a consequence of use, *the impacts* (direct or indirect, intended or unintended) of these artifacts" [ibid., p. 186].
IT artifact	The IT artifact is conceptualized "as the application of IT to enable or support some task(s) embedded within a structure(s) that itself is embedded within a context(s)" [ibid, p. 186]. The focus of these articles was placed on the software (application, database, functionalities or user interfaces) or technology (computer or communication technology) itself rather than its usage, impact, practices or capabilities.
Error of exclusion: *Error of inclusion:*	"Neither the IT artifact nor elements from its immediate nomological net are explicitly present in the research" [ibid., p. 189]. "When IS research models involve the examination of constructs best left to scholars in other disciplines" [bid., p. 190].

APPENDIX II. RECENT ICIS TRACKS

ID	ICIS 2007 Tracks (http://business.queensu.ca/icis/themes.htm)	Year Offered		
		2005	2006	2007
I01	Approaches to Information Systems Development	Offered	Offered	Offered
I02	Breakthrough Ideas in Information Technology	Offered	Offered	Offered
I03	Design Science	Not Offered	Offered	Offered
I04	Economics and Business Value of Information Systems	Offered as "Valuing IT Opportunities"	Offered as "Valuing IT Opportunities" and "Economics and IS"	Offered
I05	Global Information Technology Issues	Offered	Offered	Offered
I06	Human-Computer Interaction	Offered	Offered	Offered
I07	Information Systems Privacy and Security	Offered as "Security and Assurance"	Offered as "Security and Assurance"	Offered
I08	Information Systems Strategy and Governance	Not offered	Not Offered	Offered
I09	Knowledge Management	Offered	Offered	Offered
I10	Research Methods	Not Offered	Offered as "Quantitative Research Methods"	Offered
I11	Social and Behavioral Aspects of Information Systems	Offered	Offered	Offered
I12	Web-based Information Systems and Applications	Offered	Offered	Offered
I13	General Topics	Offered	Offered	Offered
I14	Information Systems Education and Teaching Cases	Not Offered	Offered	Offered

APPENDIX III. AIS SPECIAL INTEREST GROUPS

SIG	AIS Special Interest Groups (source)
SIG-ASYS	Accounting Information Systems [http://www.sigasys.org/irsais/cfp.aspx]
SIGADIT	Adoption and Diffusion of Information Technology [http://www.sigadit.org/]
SIGABIS	Agent-Based Information Systems [http://www.agentbasedis.org/]
SIGDSS	Decision Support, Knowledge and Data Management [http://sigs.aisnet.org/SIGDSS/]
SIGEBIZ	E-Business [http://citebm.business.uiuc.edu/ebiz/]
SIGe-Culture	e-Culture [http://cis.gsu.edu/~emonod/e-culture/]
SIGED: IAIM	Education [www.sig-ed.org]

SIG	AIS Special Interest Groups (source)
SIGe-Gov	Electronic Government [http://www.informatik.umu.se/~gron/SIGeGov.htm]
SIGENTSYS	Enterprise Systems [http://www.aisnet.org/sigs.shtml]
SIGGIUIT	Global Improvements Using IT [http://www.aisnet.org/sigs.shtml]
SIGHCI	Human-Computer Interaction [http://sigs.aisnet.org/sighci/]
SIG IS-CORE	Information Systems - Cognitive Research Exchange [http://www.ou.edu/is-core/]
SIGISDC	Information Systems in Developing Countries [http://www.aisnet.org/sigs.shtml]
SIG ISO	IS Outsourcing [http://www.aisnet.org/sigs.shtml]
SIGISAP	IS/IT Issues in Asia Pacific [http://sigs.aisnet.org/SIGISAP/call.htm]
SIGHealth	IT in Health Care [http://www.aisnet.org/sigs.shtml]
SIGITProjMgmt	IT in Project Management [http://www.sigitprojmgmt.org/]
SIGITPM	IT Professional Management [http://www.business.uiuc.edu/ba/aisitpm/]
SIGLEAD	Leadership in IT [http://www.terry.uga.edu/cisl/siglead/index.html]
SIGMAS	Modeling and Simulation [http://www.aisnet.org/sigs.shtml]
SIGODIS	Ontology Driven Information System [http://aps.cabit.wpcarey.asu.edu/sigodis/]
SIGPhilosophy	Philosophy and Epistemology in IS [http://www.cis.gsu.edu/~emonod/philosophy/]
SIGPAM	Process Automation and Management [http://www.sigpam.org/]
SIGRLO	Reusable Learning Objects [http://sigs.aisnet.org/SIGRLO/]
SIGSEC	Security (http://mis.ubalt.edu/sigsec/)
SIGSEMIS	Semantic Web and Information Systems [http://www.sigsemis.org/]
SIGCCRIS	Special Interest Group on Cross-Cultural Research in Information Systems [http://sigs.aisnet.org/SIGCCRIS/]
SIGSAND	Systems Analysis and Design [http://nfp.cba.utulsa.edu/bajaja/SIGSAND/]

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Communications of the Association for Information Systems

ISSN: 1529-3181