

SURVEY RESEARCH IN THE IS FIELD: WHERE DO WE GET OUR DATA AND WHICH RESEARCH METHODS ARE WE USING?

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ABSTRACT

Survey research is a well-established empirical research method in the IS field. This exploratory research identifies the most prevalent sources of data in IS research; the most commonly used analytical research methods and the associated statistical tools. A review of 749 survey-based research articles published between 1990 and 2010 in 9 mainstream IS Journals reveals that IS researchers, rarely, explicitly state the analytical research method and/or software tools used in data analysis and that SEM is the most popular empirical research method while LISREL and PLS are the most popular statistical tools.

Keywords: Information systems, research methods, statistical techniques, survey research, empirical research.

INTRODUCTION

In the recent past, the field of Information Systems (IS) has seen a steady rise in the number of new research methods and tools for data collection and analysis. However, research studies utilizing self-report measures, such as surveys, as the primary or secondary data collection research method (Palvia et al., 2007; Pinsonneault and Kraemer, 1993) are still common due to the simplicity and face validity accorded these methods. Survey research is generally characterized by three intertwined key elements namely the research design, the sampling procedure, and the data collection phase (Dillman, 1978; Pinsonneault and Kraemer, 1993). For this study, the focus is on the latter element although the research extends beyond data collection stage to encompass the data analysis phase.

BACKGROUND

Survey research method is believed to be well understood and has been applied consistently in the IS field for quite some time now (Palvia et al., 2003; Pinsonneault and Kraemer, 1993). A number of researchers have explored various aspects of IS research orientations with some specifically investigating a range of issues of survey research methodology (Alavi and Carlson, 1992; Culnun and Swanson, 1986; Palvia et al., 2007; Pinsonneault and Kraemer, 1993; Straub, 1989).

The goal of this study is to replicate, validate, and extend the works of previous researchers by assessing the quality of existing research methodologies in IS while concurrently identifying the areas that need more attention. The rest of this article is organized as follows. The next section explains the research methodology; the following section presents an overview of the criteria used in selecting the journals and articles for review. Next there is a detailed discussion of the procedures employed in extracting the data followed by the presentation of the results of the content analysis. A discussion of the findings and some recommendations to researchers in the IS and related disciplines follows. The paper concludes by discussing avenues for further research.

RESEARCH METHOD

Journals and Articles Selection

The study is based on IS research articles that appeared in prime peer-reviewed IS journals. The journals that were selected for this research are *Management Information Systems Quarterly (MISQ)*, *Information Systems Research (ISR)*, *Journal of Management Information Systems (JMIS)*, *Communications of the Association for Information Systems (CAIS)*, *Journal of the Association for Information Systems (JAIS)*, *Decision Sciences (DS)*, *Management Science (MS)*, *Journal of Information Systems (JIS)*, and *Communications of the Association for Computing Machinery (CACM)*.

These journals were selected because they were ranked among the top in IS research by various researchers (Walstrom, Hardgrave, and Wilson, 1995; Hardgrave and Walstrom 1997; Lowry, Roman, and Curtis, 2004; Rainer and Miller, 2005). In order to understand where IS researchers get their survey data and the statistical methods and tools they use, articles in these nine journals were reviewed. To start with, the full text of all articles from these journals was obtained via the ABI/INFORM database and analyzed with particular emphasis given to the methodology and data collection sections. The coding was done by the authors and where disagreements arose, they were resolved through a consensus. The inter-rater reliability statistics are well above the 0.8 which is considered substantial (Cohen, 1960; Landis and Koch, 1977). These values were preceded by a pilot test that harmonized the coding before the full sample was analyzed.

RESULTS

We now present the findings from a methodological review of IS research literature. The purpose of our review is to investigate the sources of survey research in IS studies and the research methods deployed in analyzing these data. We identified 749 articles within the review period that met our criteria. The process of identifying the type of research method and the specific software employed was very challenging. This was because in many studies, there was seldom any reported information concerning the research method or specific software utilized.

Source of Data

In survey research, investigators seek data and information from various sources. These sources include manufacturing and service firms, universities, websites, and consumers/customers. These sources may be confined to one country or span a population in multiple countries. In this study, source of data refers to the setting or environment where the research study was conducted or researchers obtained their research data. A number of categories were identified and for many of

the articles, researchers explicitly stated the source of their data. The top five categories are shown in the table below.

Table 1: Source of Data

	MISQ	JMIS	MS	ISR	DS	CACM	JAIS	CAIS	JIS	Total	%
US firms	65	111	39	45	83	21	5	4	9	382	62.0%
US Universities	14	10	2	6	12	28	6	6	1	85	13.8%
International firms	8	7	15	5	13	5	0	0	1	54	8.8%
Asian firms	10	9	0	4	5	8	5	0	9	50	8.1%
US consumers	7	7	2	5	4	12	3	4	1	45	7.3%
Total	104	144	58	65	117	74	19	14	21	616	100%

US firms included for instance US manufacturing firms, banks, retail outlets, IT based organizations, and professional associations affiliated with IS scholars and practitioners. International firms included surveys that targeted firms in the Forbes and Fortune magazines as well as surveys that included responses from more than three countries (for instance, organizations in the US, Australia, Norway, Hong Kong and Switzerland). US Universities comprises studies that used students, either at the undergraduate or graduate level, as respondents.

Level/Unit of Analysis

According to Bariff and Ginzberg (1982), there are usually four levels of analysis in behavioral IS research namely: individual, group, organizational and inter-organizational, or society. In this research, we made efforts to classify the levels according to the most dominant type. To identify the level of analysis for each article, we examined the relevant sections of the article such as the abstract, introduction, and the methodology section. Some articles contained explicit statements about their levels of analysis while others were 'hidden' in the content and the information was extracted after careful reading of the articles and reaching a consensus between the coders. The most dominant units of analysis were individual, firm, business unit, project, team, and inter-firm dyad.

Individual included systems users, employees, senior management, and students while business unit targeted for instance a specific section such as an IT department within an organization. The two major units of analysis in IS studies are individual (45.9%) and firm (40.1%). However, there seems to be a steady increase in the number of studies that have projects and inter-firm dyad as the unit of analysis.

Responders

From the above mentioned sources of data, investigators target various subjects and seek to solicit their feedback in order to shed more light and answer the research questions of the phenomenon under investigation. The predominant category of responders was managers (49.9%) and this grouping includes CEOs, IT leaders (CIOs, CTOs, IS directors, IT project administrators), bank account managers (from financial institutions), procurement managers, and other members of the top management teams. However, IT leaders were the majority in JMIS and MISQ accounting for 66% and 52% of the total number of all surveys of managers respectively.

Under the individuals' category, we included responders who were not affiliated with any organization or university. Examples include users of e-government web-sites, users of PCs in home settings, users of business to consumer web pages, and heads of households. The large number for survey research with managers as responders may imply that IS researchers are still trying to understand the organizational level phenomena.

Software

In testing or confirming the hypotheses, researchers use different statistical software packages. The choice of the software programs may be based on what the researchers know or are familiar with, what is accepted or recommended by the editors, the efficiency of the program, cost of the program, ease of use, and access or availability of the statistical programs. The type and size of the sample space may be a determinant of the software program (though implicit) as a number of articles related the choice of statistical software program to data sample size. Overall, 46.7% of the articles provided information on the type of the software the researchers used. LISREL (15.9%) was the dominant overall followed closely by PLS (14.9%). Other software packages that were used, although to a lesser extent, include LIMPED, SYSTAT, R, and MPLUS and accounted for 4.1%. Additionally, there were some articles that used multiple software tools. For instance, the use of SAS and AMOS or PLS and AMOS was observed.

DISCUSSIONS AND CONCLUSION

In this study, the goal of the researchers was to revisit the issue of survey research in IS research and extrapolate this line of research by investigating the various units of analysis, sources of data, types of respondents, research methods, and statistical software programs adopted by researchers in IS research. The research revealed that IS journals do not have a strict editorial restriction on the research methods or statistical software programs that researchers can adopt. As such, the main objective of this study was to identify dominant research methods and software programs used in IS research; as well as to determine these relationships based on the unit of analysis, source of data, response rates, and type of responders.

The lack of strict editorial restrictions on the research methods and software programs by IS journal editors may be attributed to the need to promote innovative research methods. On the other hand, this may be contributing to the fragmentation of IS research. This research adds on the IS research progression, which as a discipline has a well-established tradition of well-defined concepts, definitions, theories, paradigms, and methodologies, which traits considered to be main elements in yielding a direct and cumulative research tradition (Keen, 1988).

The results also show that about 53% of all the survey-based articles did not specify the statistical software package used. Hence, it is recommended that editorial policies be more specific to encourage the reporting of, both, the analytical method and statistical tools to aid in replicating, validating, and extending the resultant findings with the aim of legitimizing and improving profoundly the quality of IS survey based research.

We have analyzed 9 journals, and although this is a good beginning, future studies should include conference proceedings to capture more variability. Furthermore, future studies should investigate whether there is any relationship between the usable sample size, research method adopted in analyzing the data and the specific statistical tool(s).

REFERENCES

- Alavi, M., and Carlson, P. (1992). A review of MIS research and disciplinary development. *Journal of Management Information Systems*, 8(4), 45-62.
- Bariff, M. L. and Ginzberg, M. J. (1982). MIS and the behavioral sciences: research patterns and prescriptions. *Database*, 14(1), 19-26.
- Cohen, J. (1960). A coefficient of agreement for nominal scales, *Educational and Psychological Measurements*, 20, 37-46.
- Culnun, M., and Swanson, E. (1986). Research in management information systems, 1980-1984: points and reference, *MIS Quarterly Executive*, 10(3), 289-301.
- Dillman, R. (1978). *Mail and telephone surveys: total design method*, New York: John Wiley.
- Hardgrave, B. C., & Walstrom, K. A. (1997). Forums for MIS scholars", *Communications of the ACM*, 40(11), 119-124.
- Keen, P. G. W. (1988). *Competing in time: using telecommunications for competitive advantage*. Cambridge, MA: Ballinger.
- Landis, J. R., and Koch, G. G. (1977). The measurement of observer agreement for categorical data, *Biometrics*, 33, 159-174.
- Lowry, P. B., Romans, D., and Curtis, A. (2004). Global journal prestige and supporting disciplines: a scientometric study of Information Systems Journals, *Journal of the Association of Information Systems*, 5(2), 29-80.
- Palvia, P., Mao, E., Salam, A. F., and Khalid, S. (2003). Management Information Systems Research: what's there in a methodology?" *Communications of the Association for Information Systems*, 11 (16), 289-309.
- Palvia, P., Pinjani, P., and Sibley, E. H. (2007). A profile of information systems research published in *Information and Management*. *Information and Management*. 44(1), 1-11.
- Pinsonneault, A., and Kraemer, K. (1993). Survey research methodology in management information systems: An assessment, *Journal of Management Information Systems*, 10(2), 75-105.
- Rainer, R. K., & Miller, D. M. (2005). Examining differences across journal rankings, *Communications of the ACM*, 48 (2), 91-95.
- Straub, D. W. (1989). Validating instruments in MIS research, *Management Information Systems Quarterly*. 13 (2), 147-169.
- Walstrom, K. A., Hardgrave, B. C. and Wilson, R. L. (1995) Forums for management information systems scholars, *Communications of the ACM*, 38(3), 93-107.