

A Review of Survey Methodology Employed in IT Outsourcing

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Abstract—The purpose of this paper is to provide an overview on methodological aspects of the information technology outsourcing (ITO) surveys, in an attempt to improve the data quality and reporting in survey research. It is based on a review of thirty articles on ITO surveys and focuses on two commonly explored dimensions of ITO, namely what are outsourced and why should there be ITO. This study highlights weaknesses in ITO surveys including lack of a clear definition of population, lack of information regarding the sampling method used, not citing the response rate, no information pertaining to pilot testing of survey instrument and absence of information on internal validity in the use or reporting of surveys. This study represents an attempt with a limited scope to point to shortfalls in the use survey methodology in ITO, and thus raise awareness among researchers in enhancing the reliability of survey findings.

Keywords—ITO, information technology outsourcing, survey methodology

I. INTRODUCTION

OUTSOURCING originated in the 1950s and has been widely adopted in organizations since 1980s [1]. However, ITO is differentiated from many other organisational functions such as legal services, logistics, etc. because the impact of IT on an entity is not just local but it permeates an entire organisation [2]. It is an innovative tool for Information Systems management in both private and public sectors [3]. ITO activities have shown a steady growth since 1980s and according to Gartner Consulting's estimate [4], the IT market worldwide is projected to reach US\$3,304 trillion in 2010. It is argued that the rise in IT outsourcing is not a fad but an irreversible trend [5]. As the magnitude of the ITO literature demonstrates the topic has received considerable academic interest [6].

The survey approach refers to a group of methods which emphasize quantitative analysis, where data for a large number of organizations are collected through methods such as mail questionnaires, telephone interviews, or from published statistics, and these data are analysed using statistical techniques [7], [8]. Survey research is commonly applied by management information systems scholars. The major weaknesses of survey method include unsystematic and often inadequate sampling procedures; low response rates; weak linkages between units of analysis and respondents [8].

This paper reviews the literature on ITO with a special focus on IT functions outsourced and reasons for outsourcing along with methodological issues identified in IT outsourcing surveys with a view to provide insights for future studies to

improve the use of survey method. The current study's objectives are as follows:

- 1) Critically review ITO survey literature to check if there is incoherence in questionnaires formulated particularly with respect to 'what IT activities are outsourced' and 'why should there be ITO';
- 2) Review and report whether ITO survey articles adequately address the following issues:
 - a) has population or sampling frame been described?
 - b) whether sampling has been employed?
 - c) has sampling method been cited where a sample has been used?

If survey instrument has been pretested

- a) has response rate been reported?
- b) has response error been addressed?
- c) has item non-response been addressed?
- d) has non-response bias been checked
- e) has internal validity been addressed?

II. METHODOLOGY

The domain of this study is limited to survey articles on ITO published in English language in academic journals from January 1992 to January 2010. In this study, we identified thirty articles that specifically focused on what IT activities are outsourced and reasons for IT outsourcing. This study further analyses survey articles' use of methodology (i.e., pilot testing of the questionnaire, sampling frame, sampling method, response rate, response error, non-response bias, and internal validity).

The sources of information for this study include ScienceDirect, Proquest and Google Scholar, databases. The thirty articles included in the current paper are presented in chronological order in Appendix 1; Reference from [21] to [50] for the details of the selected articles. Only published articles in academic journals from 1992 through January 2010 were considered. We cannot guarantee that our study has covered the entire list of related articles but major ones are all included.

III. DISCUSSION

What to outsource?

The surveys that focused on "what IT activities are outsourced?" are listed in Appendix 2. Although some activities are similar, many surveys conducted to date have hardly made it clear what actually are outsourced. A close

look at the findings shown in Appendix 2 reveals that fifty-four different (although some show similarities) areas that have been identified as IT activities being outsourced. Even a comparison of IT functions outsourced in the same country within a short time frame fails to provide a clear picture. It should be noted that most questionnaires did not provide an “others” option to respondents. Lacking of an ‘others’ option has potential to bring about a response error. In the survey conducted by [41] for example 40 per cent of respondents ticked the others option.

In addition, survey instrument either has not been pretested or pretesting has been conducted without being reported.

A. Why to outsource?

Gauging the success of outsourcing arrangements is contingent upon whether the originally envisaged objectives have been attained. Therefore it is important to get to know motivations of IT outsourcers. The reasons that entities indicated why they outsource are given in Appendix 3. There are seventy-three reasons indicated with the cost saving the most common reason. The next popular reason is to access to high quality employees. Even some of the reasons are close by definition, the incoherence in choices that researchers have put in front of the respondent appears clear. It would be helpful to come up with a somewhat uniform or coherent list of outsourced items. The lack of coherence also makes it difficult to make meaningful comparisons from one year to another and across nations.

The key issue behind this fuzzy picture is either the failure to provide ‘others’ option or lack of pretesting, or both. Forcing the respondent to choose only among the options provided can result in response error.

B. Survey methodology issues

The problem this study seeks to examine and highlight is the pitfalls in the design and/or reporting of survey methodology. The problem is more to do with the administration and/or reporting of survey methodology than the method itself.

Appendix 1 presents the articles in chronological order and records the characteristics for each study reviewed: country, survey method, population/sampling frame definition, population/sampling frame surveyed, sampling method employed, pretesting of survey instrument, research questions specified, sample/sampling frame size, response rate, item non-response error, non-response bias and internal validity.

Research objectives and questions listed in ITO surveys

The specific research question is a prerequisite for determining appropriate research method. As [41] argue, a specific research objective helps avoid inappropriate selection of samples and the use of irrelevant questions. Please refer to Column 5, Research Method specified in Appendix 1.

Population, sampling frame definition listed in ITO surveys

Sampling frame refers to the list of elements from which the sample is actually drawn [10]. Population definition and sample selection are critical and the accuracy of the researcher’s inference depends on how representative the sample is of the population. Only 18 articles (60%) report a target population. Please refer to Columns 6-9 in Appendix 1.

Most surveys appear to have been mailed out to the entire survey population but it may not adequately represent the intended target population to which the hypothesis testing results are generalised.

Sampling listed in ITO surveys

For a higher external validity, in terms of features, the sample chosen should be representative of the population and the sample size should be determined statistically.

Unrepresentative samples have potential to affect the external validity of conclusions. Therefore appropriate sampling method is essential. In addition, inclusion / exclusion criteria need to be specified.

Although a popular method for gathering data, disadvantages of questionnaires include low response rates, respondent attentiveness.

Pretesting the survey instrument listed in ITO surveys

The major purpose of pretesting the questionnaire is to detect weaknesses (i.e. clarity of questions, question sequence, how to address reactions of respondents, and the time it takes to complete, etc.). Pretesting is an essential step before actual data gathering begins.

Pilot testing of the survey instrument is important to establish the content validity of the questionnaire and to improve questions, format and scales [11].

Self-administered questionnaires should ideally be administered on potential respondents, colleagues and users of the data [12]. Probably, the best way to test a self-administered questionnaire is in person with a group of potential respondents. Only 12 articles (40%) in our sample indicated that they pretested their survey instruments.

Bias in Samples listed in ITO surveys

The degree to which bias is absent from the sample and the precision of estimate are the two cornerstones of the validity of a sample [13].

When reporting results, the researcher must inform readers who were or were not given a chance to be selected and to what extent it is known how those omitted were distinctive. Few articles (15 or 50%) provide detailed sampling plans.

The absence of “others” option in the questionnaires has potential to push respondents to ticking one of the provided options although they have another answer for the question. In Serapio’s study [40], for example, forty per cent of respondents ticked the “others” column when asked to identify reasons why companies choose international outsourcing, and the proportion of respondents that ticked the “others” option relating to the type of IT activity being off shored reached eighteen per cent.

As [14] argue, response error emanating from uninformed response does affect the data quality. In order to elicit meaningful response from respondents it is imperative that “others” option should be provided to respondent to circumvent a response error.

Response rates listed in ITO surveys

It is important to know the details of the way response rates are calculated. Differences in the way they are calculated can make comparisons difficult.

Questionnaire non-response listed in ITO surveys

This situation occurs when all the questionnaires have not been returned.

It is essential that the researcher assures that no significant differences exist between responses received and response from non-respondents.

Non-sampling error listed in ITO surveys

Non-sampling error refers to error caused by non-response and measurement problems not associated with the sampling process and this is the major contributor to the total survey error [15].

Internal validity listed in ITO surveys

One of the major concerns of researchers is to employ a research instrument that is capable of measuring what is intended to be measured – which is referred to as ‘internal validity. [15] consider non-sampling error, which is related to internal validity to be the most severe contributor to total survey error. Internal validity encompasses face validity, content validity and constructs validity.

Non-response bias listed in ITO surveys

Non-response bias is concerned with the possible effect of non responses on survey estimates [16]. As little or nothing is known about non-respondents [17], non-response bias is always an issue in mail surveys [18]. Non-response bias forms one of the major disadvantages of written questionnaires.

There is evidence that non-sampling error (i.e., error caused by non-response and measurement problems not associated with the sampling process) is the major contributor to total survey error [15].

Most of these thirty articles did not address non-response bias. Obviously the higher the response rate, the lower the non-response bias will be. Given the generally lower response rates achieved in surveys, it becomes important to determine and report the non-response bias.

In consideration of declining response rates obtained in mail surveys, it becomes important for researcher to handle non-response bias by reporting it accordingly.

Our analysis of thirty survey articles on IT outsourcing it is evident that in practice researchers either did not attempt to measure non-response bias or did attempt but chose not to report it.

Response error listed in ITO surveys

Response error occurs when respondents do not answer all questions which results in missing data or when questions are not answered correctly. It is obvious most researchers did not address this issue.

IV. CONCLUSION

A. ITO survey limitations

From an analysis of published research, this paper has identified that for surveys on IT outsourcing there is a significant lack of inconsistency in IT activities outsourced and reasons behind IT outsourcing.

B. Significance of this study

Survey design and administration determine the internal and external validity of mail survey research. A well-targeted mailing list along with steps to maximize response rate and assess non-response bias will help ensure external validity. A clear, concise, well-designed questionnaire will help assure internal validity [19].

Although recognising the difficulty in some cases of ascertaining the relevant details of the subjects that form part of a sampling frame, reporting the sampling frame or at least enumerating the difficulties as a limitation would reduce the external validity threat to the survey.

From critical readers’ point of view, it is important that there is sufficient detail in the article to assure those readers of the rigour and reliability of their study. [20] argues that a research cannot be considered a success unless readers have confidence in the tools employed and the results reported.

The analysis of Appendix 1 reveals that item non-response (missing data analysis), response error, internal validity and non-response bias are tests most commonly ignored by researchers. However, it should be added here that this review is based only on the information contained in the article. There is of course a possibility that respective researchers might have performed such tests but for some reason did not report. However, inclusion of such crucial information will enhance both the information quality and the reliability of surveys.

In the past five years, the focus of ITO has also been shifting from “what” and “why” towards aspects of “trust” and “cost analysis”. Therefore, there are new research areas on ITO yet to be explored and future research may also align with these new areas of interest.

APPENDIX I

Methodological review

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Reference No	Year published	Author (s)	Country	Survey method	Population definition / Sampling frame	Population (P) or Sample (S) surveyed	Sampling method cited	Pretesting of instrument	Research questions specified	Sample/ SF size	Response rate	Response error	Item non-response	Non-response bias	Internal validate
[21]	1992	Loh and Venkatraman	USA	Mail	Yes	S	Yes	No	Yes	226	70.4%	No	No	Yes	Yes
[22]	1994	Arnett and Jones	USA	Mail	Yes	S	Yes	No	Yes	252	17.0%	No	No	No	No
[23]	1994	Grover, Cheon & Teng	USA	Mail	Yes	P	N/A	Yes	Yes	1,000	18.8%	No	No	Yes	Yes
[24]	1995	Sobol & Apte	USA	Mail	No	S	Yes	No	Yes	149	32.0%	No	No	Yes	No
[25]	1995	Collins and Millen	USA	Mail	Yes	P	N/A	Yes	No	500	25.0%	No	No	No	No
[26]	1996	Grover et al.	USA	Mail	No	S	Yes	Yes	Yes	1,000	Yes	No	No	Yes	Yes
[27]	1997	Apte et al.	USA	Mail	No	S	Yes	Yes	Yes	149	32.2%	No	No	No	No
[28]	1997	Hurley and Schaumann	Australia	Not reported	No	No	No	No	No	No	No	No	No	No	No
[29]	1997	Saunders, Gebelt and Hu	USA	Telephone	Yes	S	Yes	No	No	129	26.0%	N/A	N/A	N/A	N/A
[30]	1998	Ang and Straub	USA	Mail	Yes	S	Yes	Yes	Yes	285	63.1%	No	No	Yes	Yes
[31]	1999	Laios & Moschuris	Greece	Mail	No	S	Yes	Yes	Yes	300	28.3%	No	No	Yes	No
[32]	2000	Lacity and Wilcocks	USA	Mail	Yes	S	No	No	No	500	13.0%	No	No	No	No
[33]	2000	Hancox & Hackney	UK	Interview	Yes	S	No	No	Yes	13	No	N/A	N/A	N/A	N/A
[34]	2001	Barthelemy	USA	Mail & interview	No	S	No	No	Yes	50	No	No	No	No	No
[35]	2003	Khalfan and Alshawaf	Kuwait	Mail & Interview, case	No	S	No	Yes	Partly	No	No	No	No	No	No
[36]	2003	Lin and Pervan	Australia	Mail	No	P	N/A	No	Yes	500	13.8%	No	No	No	No
[37]	2004	Beaumont and Sohal	Australia	Online	Yes	S	Yes	Yes	Yes	2,000	7.5%	No	No	No	No
[38]	2004	Lee, Miranda and Kim	South Korea	Mail	Yes	P	N/A	No	Yes	1,000	31.1	No	No	Yes	Yes
[39]	2004	Claver, Gonzalez, Gasco & Llopis	Spain	Mail	Yes	P	N/A	Yes	Yes	47	74.5%	No	No	No	No
[40]	2005	Serapio	USA	Interview	No	No	No	No	No	40	N/A	N/A	N/A	N/A	N/A
[41]	2005	Barthelemy and Geyer	France Germany	Mail	Yes	P	N/A	Yes	Yes	500 F 500 D	16.0% D 12.2% F	No	No	Yes	No
[42]	2005	Park and Kim	S Korea	Mail	No	S	No	No	Yes	119	90.0%	No	No	No	No
[43]	2006	Fish and Seydel	USA	Email	No	P	No	No	No	5,000	3.6%	No	No	Yes	No
[44]	2006	Whitten and Leidner	USA	Mail	Yes	S	Yes	No	Yes	615	26.0%	No	No	Yes	Yes
[45]	2006	Whitten, Wakefield	USA	Mail	Yes	S	Yes	Yes	Yes	3,000	16.7%	No	No	Yes	Yes
[46]	2008	Mao, Lee and Deng	Japan China	Interview, delivery by hand	Yes	S	Yes	Yes	Yes	110	No	No	No	No	Yes
[47]	2008	GooHuang	USA	Delivery by hand	Yes	S	Yes	Yes	Yes	150	61.3%	No	Yes	No	Yes
[48]	2009	Thouin, Hoffman, Ford	USA	From other survey	No	S	No	No	Yes	1,444	No	No	No	No	No
[49]	2009	Beasley, Bradford, Dehning	USA	From other database	Yes	S	Yes	No	Yes	103	N/A	N/A	N/A	N/A	Yes
[50]	2010	Whitten, Chakrabarty, Wakefield	USA	Mail	Yes	S	Yes	No	Yes	163	26.0%	No	No	Yes	Yes

APPENDIX II

What activities of IT services outsourced

Reference Number	[21]	[22]	[23]	[24]	[25]	[27]	[28]	[32]	[33]	[36]	[39]	[40]	[41]
Year published	1992	1994	1994	1995	1995	1997	1997	2000	2001	2003	2004	2005	2006
Analysis and strategy							√						
Application and analysis											√		
Application development / programming	√		√		√		√		√				√
Applications centre management					√								
Applications maintenance					√		√		√				√
Asset management							√						
Back office clerical tasks	√			√		√							
Client/server & PCs								√					
Data centre	√			√	√	√	√		√				√
Data communication network	√			√		√							
Data entry	√			√		√							
Desktop services							√						
Development of an integrated system	√			√		√							
Disaster recovery				√		√		√					
Electronic commerce	√												
End-user support			√					√	√		√		
ERP system development												√	
Hardware maintenance							√				√		
Hardware support	√			√									
Helpdesk services	√						√	√					
Information centre management					√								
Internal IT maintenance												√	
IT applications/software development												√	
IT project management								√		√			√
IT strategy								√					
Mainframe		√						√					
Network administration	√				√								
Network management		√					√	√	√		√		
Operation										√			
OTHER				√									
PC acquisition													√
PC maintenance		√											√
Procurement								√					
Programming		√									√		
Security											√		
Software development						√							
Software maintenance	√			√		√					√		
Software support		√			√								
Support operation	√					√							
Systems analysis								√					
Systems architecture								√					
Systems design								√					
Systems development	√									√			√
Systems implementation													
Systems integration		√			√						√		
Systems operation			√								√		
Systems maintenance													√
Telecommunications/ LAN	√		√						√	√			√
Telephone support of customers				√		√							
Transaction processing	√			√		√							
User support										√			
User training and education				√	√	√					√		
Web development												√	

APPENDIX III

Why IT outsourcing

Reference Number	[21]	[22]	[24]	[25]	[26]	[27]	[28]	[29]	[30]	[32]	[35]	[36]	[39]	[40]
Year published	1992	1994	1995	1995	1996	1997	1997	1997	1998	2000	2003	2003	2004	2005
Access to high quality employees	√				√		√			√				√
Access to technology	√			√	√		√	√		√	√		√	√
Achieving innovation and continual improvement					√									
Adhere to Government ideology														
Assist cash flow problems										√				
Avoidance of obsolescence risk					√									
Balanced processing loads										√				
Better management control	√									√				
Better quality service														
Cash infusion								√						
Catalyst for transformational change														
Changed fixed asset basis							√							
Competitive advantage												√		
Conserving capital														
Contract renewal (no reason not to)								√						
Cost production			√							√				
Cost savings	√		√	√	√	√	√	√		√	√	√	√	
Cost reduction (some)										√				
Cost reduction (significant)														
Cost (IS) stabilisation				√										
Data centre consolidation							√							
Defined service levels							√							
Economies of scale in human resources					√									
Economies of scale in technological resources					√									
Enhanced efficiency								√				√		
Enhanced reliability														
Enhancement of IT staff expertise											√			
Extend hours/coverage														√
Faster application development											√			
Flexibility				√			√			√	√		√	
Flexibility (Business)										√				
Focus on core competence					√		√			√	√			
Growth														
Improve efficiencies														
Improve industrial relations problems														
Improve labour flexibility	√			√										
Improved customer service														
Improved quality							√			√		√	√	
Improved customer relations														
Improved performance parametres							√							
Improved use of IT resources										√				
Increase efficiency							√							
Increased availability of vendors			√								√			
Increased range of functions								√						
Increasing speed to market														
Internal IT maintenance, support and consulting				√										√
Less professional staff			√											
Localisation														√
Lower labour costs													√	√
Mandated by central office/acquired by another company								√						
Match competitors														√
Meeting customer requirements														√

Reference Number	[21]	[22]	[24]	[25]	[26]	[27]	[28]	[29]	[30]	[32]	[35]	[36]	[39]	[40]
Meeting parent company's requirements														√
Midrange operations										√				
Other (improving safety performance)				√										
OTHERS							√							√
Politics								√						
Providing alternatives to in-house iS													√	
Quicker development of applications														
Reduced capital investment			√	√		√								
Reduced need to hire IS professionals						√								
Reduced technological obsolescence risk				√										
Re-engineer process														
Rapid pace of technological change											√			
Re-focus in-house IT staff										√				
Resources not available internally											√			
Satisfy personal objectives														
Service levels							√	√						
Shortage of technical staff											√			
Software development														√
Staff augmentation														√
Strategic considerations								√						
Understanding of business needs and objectives														

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