

Research Methodology: Use of Information Technology in Research Methods

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Abstract – Information Technology (IT) and research activities have driven growth and progress in IT. In terms of other efforts in science in other fields, IT has shown that it has one of the organizations and governments' most financed research investments. This is because IT and its services have now been a key driver of profits and growth for many organizations.

This article would aim to explore and address the methods of testing methodologies employed in IT Project Management studies. This paper also describes the strategy of the doctoral program for the management of information technology in a course in IT study methodology (DMIT).

Keywords: Research Methodology, Information Technology, Research Methods;

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INTRODUCTION

While the "e-era" of innovation proceeds to unabated advances in IT and IT (IS), companies have gradually become reliant on IT and IS while trying to add value, streamline business operations and optimize their competitive edge. Today, most profitable companies conduct or endorse IT-based business processes, implementing strategies for one or more business processes. The performance of system implementations and changes in business processes has been increasingly needed to be validated, best practices adopted and lessons learnt to maximize the chance that further investments can generate anticipated returns.

Vendors, service agencies, academic consulting organizations, higher education and the military undertake many IT and IS research programs. This analysis area can be referred to as IT research but it covers sub-domains of IT and IS. As IT research covers technological tools, managers and skilled staff, market processes in the corporate value chain and policy and structures limiting IT programs, the field for the IT study varies equally. IT study is also multi-disciplinary in university graduate programs, with joint ventures in technological, administrative, industry, informatic, engineering's and non-technical colleges.

As IT is now central to the contemporary company, various approaches have been extensively investigated and published for IT analysis. Some IT

study efforts have a theoretical nature, whilst others concentrate on applying theoretical ideas to practical challenges, both inside a company and in a product. Researchers also established a research literature classification system with IT as one of the main groups. In order to explain the research challenge, the researcher analyzed the case study as a research tool based on planning and evaluating case studies. He differentiates between case studies for theoretical and theoretical development.

IT PROJECT MANAGEMENT

The problem Project Management (PM) is the summary of all the procedures, processes and methods used to deliver a service or good, as described by Project Management Institute (2004). Through carrying out programs, IT implementation and its associated services are demonstrated. IT projects have long been affected by challenges, resulting in a high failure rate although those projects have been completed successfully (Standish Group, 1998). Measuring the performance of an IT project also takes into account the extent to which the project has complied with such success criteria such as schedule, time limits and specifications (Standish Group, 1998). In an attempt to reduce such a high incidence of IT errors, several IT and PM specialists and scholars performed study and test work to identify a number of guidelines for project management to efficiently and safely handle

projects. These scholars and analysts have used various methods and tools in analysis to reach their findings.

The rest of this paper would concentrate on the discussion and analysis of the various science methodologies and methods used for IT project management by scientists.

RESEARCH METHODOLOGIES IN IT

Depending on several variables, it is essential that the study approach is selected. The decision as to which testing approach to apply in an analysis is based according to Bancroft et al. (1998) on the degree of control the researcher has over the test and the subject or phenomena to which it deals. The 155 IT review papers written between 1983 and 1988 were reviewed by Orlikowski & Baroudi (1991). They suggest, because the use of a specific technique of study can be limiting, that IT research does not include a single research methodology. In conclusion, 96.8% of all IT review papers chosen for the analysis, the positivist methodology of science controlled the IT research initiative. Orlikowski & Baroudi (1991) The interpretative approach of analysis was followed by 3.2 percent of all IT research papers they chose for review. This opinion is also shared by Minger (2001) who says that the positivist paradigm is the prevalent IT study technique. IT study could be dominated by the positivist form of research on the one hand by a number of scientific, societal, mental and realistic explanations.

OVERVIEW OF DMIT PROGRAM

In a quest for comparative edge, companies now proactively utilize IT. This is achieved by innovative industry initiatives and innovations, especially others with the ability to provide more efficiencies and better performing goods and services. This can be done through different tactics and trends. With new research concepts being transferred through corporate and manufacturing systems to optimize the functioning and performance of the industry at all stages, the expertise current in the IT research field evolves continuously.

The DMIT PhD programme, which is delivered at the management university in a private university in Michigan, is targeted at practitioners employed primarily in IT organizations of nearby companies with high standards of administrative, scientific and analytic knowledge. The aim of the programme, by incorporation of IT in industry and industrial processes, is to bring advanced learning experience based on leadership to achieve higher levels of business performance and quality. At the time of publishing, there are 48 pupils, most of whom are funded by their universities, and half at the study level.

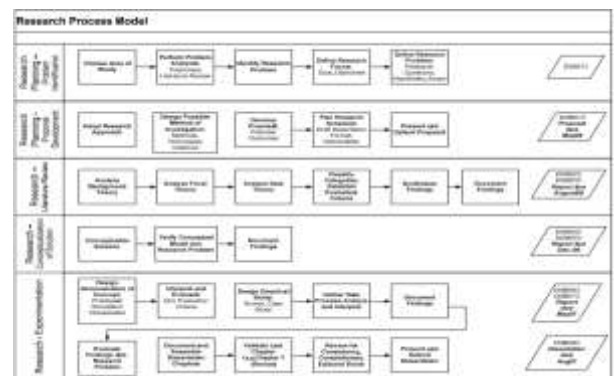
The IT area comprises all the tools, machinery, technology and process services of the IT framework that aims to bring value to the organization's business processes. cursory and thesis testing elements of the DMIT program. Three tracks deliver courses: 2) the research methodology track which offers broad coverage of quantitative and qualitative methods of research and 3) the track minors for which training is provided in a cognate domain. 1) the main track with an emphasis on state-of-the art expertise in key IT subfields; Research in the DMIT programme, in line with "Theory and practice" the university slogan, focuses on innovative responses to real life problems (Steenkamp and DeGennaro, 2004). DMIT research endorses ISR editorial declaration and guidance (2002) which states that IT/IS research is intended to "further information to help human organizations and their management to implement IT productively".

THE DMIT RESEARCH PROCESS MODEL

The DMIT thesis reflects the program's learning environment, incorporating the instructional material of the DMIT curriculum, previous academic expertise and the experience of the recipient. The students of DMIT are motivated to check out an advanced, technological breakthrough, specific technology implementation, or a business method dependent on technologies in a real-life context. As practically observed questions may be drawn from applied research topics and a cooperation arrangement is concluded between researchers and the funding firm. A supervisor who leads the student's dissertation committee conducts a DMIT thesis project. A primary stakeholder or domain specialist from the funding company may be a member of the dissertation committee and play an important position in the study effort.

A scalable model of research processes that permit the iteration between processes and facilitate the management of the research projects is essential for the design of applied research in the area of IT management. The model, for instance

Table 1. Research Process Model for DMIT Research



Requires the team to return to previous choices as experiences are learned as the project moves on. The model can also take the different approaches utilized in the study ventures into account. In order to provide the shared basis for cooperation between students and faculty during the dissertation study phase, a research process template was developed for the DMIT program. Each step is connected with one or more theses 'courses.' This arrangement supports the dissertation and student assessment committee in the course of the study project. Students will be registered for one or more three credit hours per semester and will then be entitled to the next "seminar" in thesis until the condition of the study project at the close of each term is supported by all representatives of a dissertation committee. Usually, procedures in the study stages are sequentially performed with iteration and feedback loops based on research observations. Table 1 outlines and summarizes the findings and contributions of each of the study processes.

Research Planning – Problem Identification

A study of questions in the field of science is conducted here. Problems usually occur inside companies where students are engaged and an investor that has a personal interest in the remedy sometimes finance a study project. When focused on a specific subject and its challenges, the student must show insight into the field of application and understanding of the relevant teaching.

Research Planning – Proposal Development

Initially, the project would produce a study plan that describes the issue to be studied, the complexity of the project, the approach to analysis to be pursued, the mode of research and the projected project date. In addition, the proposal contains a preliminary review of literature on other responses to the problem. The following elements are contained:

The background hypothesis is considered a declaration that describes the field and meaning of the research, including relevant ideas.

- The emphasis of the subject and the principles or theories on which it is built is called the central theory.
- The issues relating to the subject are established and certain study issues are identified. There are one or two theories or suggestions that drive the remainder of the research. This part of the plan must be supported by some main literature sources in the history and focal hypotheses.
- The research methodology, research architecture and mode of research, such as observational research utilizing qualitative, quantitative or hybrid approaches, to be

practiced. After the literature review is over, the approaches and procedures followed are refined.

- Suggested list of thesis chapters to record the results of the study.
- The tentative timeline for the execution of the inquiry. The timetable is developed in consultation with the Dissertation and Dissertation Committee.

RESEARCH - LITERATURE REVIEW

The student's theoretical skills are used here to assess and understand others' work on the investigation problem and issue (s). The student synthesizes thoughts, practices and personal experience through an approach to the problems of science. In refinement of research questions and course, the researcher is also more knowledgeable about the topics under consideration through a certain degree of iteration. This will result in the study design being updated for the remainder of the research project.

Research - Conceptualization of Solution

The researcher formulates a theoretical assumption during this process that provides a possible logical answer to the issue. The conceptualization may be an analytical generalization graphic model, a mathematical format describing the conceptual approach, or a summary of an established principle. An inductive study method is appointed as a founded theory which enables the researcher to produce a theoretical description of the subject while simultaneously "building" the definition in empirical observations or facts. The main variables and their interdependence and relationships are described and expressed as model.

Research – Experimentation

The remainder of the study project is designed in this process to explain the conceptual model and test proposal(s) or hypothesis(es). The below are typical approaches for demonstrating concept:

- concept design and development;
- simulation design and performance;
- Virtualization solutions design and development;
- Data collection and case studies development;

- Design, implementation, study and evaluation of a sample, statistical processing;
- assessment of results and hypotheses in terms of criteria;
- Validation of test results in the fields of research, hypotheses or proposals;
- Dissertation final writing and production;
- Analysis and dissertation submission arrangements.

The findings and results are reported in progress notes, draft dissertation chapters and drafts of scholarly papers during the study process. The end result is the thesis which the dissertation committee reviews and which serves as a guideline for selecting an applicant who is entitled to a PhD. In the graduate thesis project, there are three major milestones: the proposal protection; the defense of the dissertations and the ceremony of graduation. Over the whole study process, students retain constant communication with their mentors and have daily sessions. The supervisor determines the overall solution to the management of the dissertation process. The agenda and results and recommendations of all meetings should be recorded in all planned dissertation meetings.

Contributions received through the doctoral thesis project fall into many groups which take place during the research phases of the DMIT program dissertation. The information obtained from the study process model is summarized in Table 1 and a range of future research inputs.

Positivist vs. interpretive research methods

Any scholars who use the positive form of study argue that qualitative (interpretive) research is not science. Orlikowski & Baroudi, (1991) conclude that the positive techniques of study have been obvious and that certain inconveniences of scientific research have been neglected. In contrast, certain scientists who employed the interpretative analysis method argue that the positivist (quantitative) methodology is not valid in studying social processes.

The importance of the positivist approach resides in full compliance with guidelines, methods, mathematical research and checking for hypotheses. Investigators who use a positivist method to the world of complexity focused on fixed laws of triggers in their study. You agree that reductionism will tackle this complexity. Researchers who have a positive mindset also focus on objective analyzes, tests and deductions. This researcher is concerned with the prediction and clarification of causal interactions and the presumption of causal ties amongst observable phenomena.

Interpretation analysis mostly entails the use of qualitative approaches to grasp and understand the data gathered during the research effort. This does not mean that the only reason an interpretive analysis initiative is carried out is the form of data gathered. The underlying metaphysical principles are the most critical characteristic feature of an interpretive research effort. In interpretive analysis, one of the main tasks is to seek significance in contexts, which ensures that the object of the research must be set in its normal social environment. The ultimate objective of interpretive research is to learn and to understand how the representatives of the social community perform and interpret their own realities, as mentioned by Orłowski and Baroudi (1991). Orłowski and Baroudi (1991) further suggest that such an understanding is focused on the examination of their social processes, which are equal to their social activities, in terms of how these participants of a certain social community participate. The analysis of activities and responses to knowledge predefined by society and the theoretical correlation process of studied topics seeks to research researchers using the Interpretation research methodology. Researchers who have an interpretive method to science think that there is no common reality. Via their own views of the universe and their own frame of reference, the perception researchers address the analysis effort.

Experimental research

There are three key components for experimental research: study, isolated and contingent. The survey includes a selection of research subjects selected randomly from the population of subjects eligible. The factors that may affect the conduct of the participants in the survey are independent variables. As a consequence of a change in independent variables, the values of dependent variables can change. The variations are calculated and analyzed to explain interactions between the variables. Laboratory studies are usually carried out more regulated than the field.

It has been indicated that Jarvenpaa et al. (1985) may be restrictive for the researcher to use the experimental testing approach since such a research method cannot necessarily solve the correct problem in the area of IS. Jarvenpaa et al., (1985) also indicates that the use of such a testing tool is restricted, since it can be a challenging process to develop relevant and reliable measurements. Jarvenpaa et al. (1985) stated that data validity was divided between the consistency and variety of instruments used for experimental testing. Pinsonneault & Kraemer (1993) propose the usage of a broader range of sample sizes to improve accuracy in order to resolve the authenticity of data problems.

Darke et al. (1998) claim that the usage of the experimental testing approach leads to validity

problems. This approach is sensitive to the background, inspiration and effect of the researcher on the cases. Darke et al. (1998) claim that various methods of analysis will remedy those problems.

Jarvenpaa, S., Ives, B. (1991). Executive Involvement and Participation in the Management of Information Technology, *MIS Quarterly* 15:2

Survey research

The survey study is used when:

- Test an occurrence or experiment that is found in complex natural settings according to Pinsonneault and Kraemer (1993). What's going on and "if" it occurs and what happens were the principal concerns regarding the encounter or incident. The responses to these questions help to provide insight on whether such an experience or occurrence has happened.
- It is neither possible nor necessary to control independent and dependent variables.
- Experience or significance events in their usual environments shall be investigated and reviewed.
- In present or modern times, the experience or events of significance take place.

Critical research in IT

The critical analysis approach was regarded by researchers and specialists in the field of IT as a suitable alternative against other types of research methodology currently used by IT researchers. The research framework for IT research has been developed since the beginning of the 90s. It offers a methodology for the analysis and evaluation of social knowledge structures. The importance of critical IT study is its potential to enhance comprehension and knowledge of the usage of social information systems. This importance is dependent on the quality and kind of knowledge available for the study of the researcher.

In order to gauge the effect of systems on the working and social environments of individuals, IT researchers who use the essential study methods. The primary goal of the investigator is to review current circumstances so that individuals are conscious and may turn existing social systems into different modes of social dominance.

The critical analysis approach does have its drawbacks, including its superiority over other research approaches. Any scholars claim the essential analysis approach as a research method is defective.

The idea that it considers the researchers' own observations about the events that could produce skewed conclusions is one of the attributes of the objective study. Moreover, important analysis shows that there is no objective description of the universe. This forces the researcher to perform the study on the basis of his own conclusions rather than ideals such as emancipation.

CONCLUSION

The primary purpose of the thesis was to explore and examine the dynamics and the various methods of analysis used by researchers in the area of IT. The three main theoretical study approaches embraced by IT researchers today according to Orlikowski & Baroudi were examined in terms of research patterns and methods (1991). The above are positivism, interpretivism and critical approaches in study.

The course in IT Study Methodology is a groundbreaking technique for teaching IT doctoral students research methods. The course profits from the direct involvement and perspective of the study method of supervising faculty members in the conduct of individual seminars.

One main finding in this study was that the IT literature is influenced by the positivist science methodology that uses surveys and tests as main research methods. This dominance of positive science has led some IT researchers to promote other techniques and strategies to disconnect the researcher from the research approach. Consequently, IT research has been tested as it has expanded to include social aspects in the other approaches to analysis, including interpretive science. These components have an impact on culture and the user on information structures. For IT researchers, some study approaches may enable the researcher and participants to be restricted more time compared with their conditioned previous research experiences.

REFERENCES

1. Project Management Institute. (2004). A guide to the project management body of knowledge, Third Edition (PMBOK). Upper, PA: Project Management Institute
2. Standish Group. (1998). Chaos. Retrieved on 8/29/2007, from the World Wide Web : www.standishgroup.com/chaos.html
3. Bancroft, N., Seip, H., Sprengel, A. (1998). Implementing SAP R/3: How to introduce a large system into a large organization. Manning publications CO: Greenwich, CT.

4. Orlikowski, W. J., & Baroudi, J. J. (1991). Studying information technology in organizations: Research approaches and assumptions. *Information Systems Research*, 2(1), pp. 1-28
5. Minger, J. (2001). Combining IS a research method: Towards a pluralist methodology. *Information Systems Research*, 12(3), 240259
6. Steenkamp, A.L. and DeGennaro, L. A. (2004). "Design and Implementation of Doctorate of Management in Information Technology." *Information Systems Education Journal*, Vol. 2, No.2.
7. Darke, P., Shanks, G. and Broadbent, M. (1998). Successfully Completing Case Study Research: Combining Rigor, Relevance and Pragmatism, *Information Systems Journal*, 8: pp. 273-289
8. Pinsonneault, A., & Kraemer, K. L. (1993). Survey research methodology in management information systems: An assessment. *Journal of Management Information Systems*, 10, pp. 75-105
9. Steenkamp, A.L. and Van, D. W. (2004), "An Approach to Teaching IT Life Cycle Processes." *Proceedings of ISECON 2004*, v 21 (Newport): 2443. ISSN: 1542-7382.
10. Galliers, R.D. and Land, F.F. (1987), "Choosing Appropriate Information Systems Research Methodologies." *Communications of the ACM*, Vol. 30, No. 11.
11. Creswell, J. W. (2003), *Research Design – Qualitative, Quantitative and Mixed Methods Approaches*. Second Edition, Sage Publications.
12. Davis, G.B. (1992), "Systems Analysis and Design: A Research Strategy Macro-Analysis." In Cotterman and Senn (eds.), *Challenges and Strategies for Research in Systems Development*, John Wiley & Sons
13. De Villiers, M.R. (2005), "Three approaches as Pillars for Interpretive Information Systems Research: Development Research, Action Research and Grounded Theory." *Proceedings of the 2005 Annual Research Conference of the South African Institute of Computer Scientists and Information Technologists on IT Research in Developing Countries*, pp. 142-151.
14. Zachariadis, M., Scott, S. and Barrett, M. (2013) *For Mixed methods Research*. *Management Information Systems Quarterly*, 37, pp. 855-879.
15. Zaidah, Z. (2007) *Case Study as a Research Method*. *Jurnal Kemanusiaan*, 9, pp. 1-6.

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