



Discovering the Causes of IT Project Failures in Government Agencies

Mark R. Nelson and Diana Thomas

Lally School of Management - Summer Undergraduate Research Fellow

Rensselaer Polytechnic Institute

110 8th Street, Pitt 2216 -Buck 3001, 1999 Burdett Avenue, Troy, NY 12180

Phone: 518-276-2768, Fax: 518-276-8661

nelson@rpi.edu, thomad@rpi.edu

ABSTRACT

This project used an extensive collection of longitudinal project-related documents to gain a better understanding of project failure in large-scale government IT projects. The study focused on the Tax System Modernization (TSM) project at the U.S. Internal Revenue Service (IRS), primarily from 1986 to 1997. During that time period, the agency spent over USD \$3.5 billion on the TSM project, which was terminated at the end of the time period having failed to achieve several major objectives. Using a qualitative approach and working with a large volume of project-related documentation, this study found factors not previously reported in the literature that may inhibit the success of large-scale IT projects in government agencies. The findings from the study introduce several new questions for future research.

INTRODUCTION

This project focused on large-scale systems implementation. In this study we examined measures of IT project success and failure across a set of government documents using formal research methods and specialized software tools. While we were unable to completely code the entire data set during the time we had available, we were able to identify several hypotheses that are both new to the literature and suggest the need for further research in this area. Although the IRS experienced technical difficulties that resulted in problems for the Tax Systems Modernization Project (TSM), it is important to note that their lack of system advancement could be symptomatic of deeper-rooted problems. The source of these problems could be management practices and the organizational structure resulting from years of hierarchical structure changes and changes in top management control. However, there appears to be another phenomenon that is occurring as it relates to information capacity. The IRS is continuously being bombarded with recommendations from external agencies and committees, who may prove to be more harmful than helpful to large-scale IT projects.

RESEARCH QUESTION AND SIGNIFICANCE

Project Context: The Internal Revenue Service (IRS), like many government agencies, deals with massive amounts of information associated with different individuals and organizations. For example, a person's basic data such as his/her name, address, telephone number, are just a few of the many bits of data that compile one's identity in the whole scheme of tax collecting. In addition, like many agencies, the IRS has an antiquated data and system architecture, consisting of over 50 databases across several platforms, some of which date back to the 1950s! Audits by the General Accounting Office (GAO) have uncovered serious weaknesses within the agency's financial systems, including cumulative discrepancies in excess of \$30 billion in a given year. The situation seems inevitable as humans and technology interact for a common purpose, only to find that their goal has been distorted by human error in numerous forms, or technical disintegration. Whatever the case, the IRS has attempted to implement IT projects that would remedy the problem, such TSM which began in 1986 and ended in 1997. The IRS required the modernization to keep pace with a growing volume of tax returns. Unfortunately, after costing up to \$3.5 billion after ten years the project failed to meet its intended goals and was largely considered a failure in most documented sources.

Practical Significance: The IRS scenario is not uncommon in federal and state government agencies where the aggregate costs of failed IT projects

are estimated to be over several billion dollars (CSTB, 2000). In fact, an estimated 70 percent of large-scale IT projects fail, many before implementation is completed (CSTB, 2000). We now face an exciting challenge to find a cure for a recurring "disease" that presently seems dangerously incurable. Indeed, the IRS or other federal agencies cannot stop their functions while this research goes on, but must continue to operate as a federal agency. However, by studying the past attempt to solve this problem through the research that has already been done on the Tax System Modernization project, we are trying to find new ways of implementing large-scale IT projects that ultimately will be effective.

Academic Significance: Most of the existing research on IT project implementation fails to capture the process-based and contextual dimensions that lead to success or failure (Montealegre, 1996). The lack of process-oriented, longitudinal studies and case-studies in this area has recently been noted by an NSF-appointed panel as a critical shortcoming of existing research on large-scale systems implementation (CSTB, 2000). The study reported in this paper was designed to specifically address issues raised by the NSF study by focusing on an individual case with a longitudinal data set. In doing so, we hope to build new understanding of how factors present in the case change in relation to one another, in relation to major events and episodes during the lifetime of the TSM project, and in relation to a standard set of project outcome metrics.

METHODOLOGY USED

For this project, we used an in-depth case study approach and used grounded theory guidelines described by Strauss and Corbin (1990) to assist with the analysis. Prior to starting our work on the SURF project, over 750 project-related documents spanning the lifetime of the IRS TSM project were collected. We began our process by selecting "potentially important" variables from the literature, specifically from two studies: Lytinen and Hirschheim (1987) whose study focused on defining failure notions and failure types; and, Willcocks and Griffiths (1994), which defines a set of outcome measures applied to large-scale projects in the public sector. Because the study was exploratory and theory-building in nature, an effort was made to work, as Eisenhardt (1989:536) described, "as close as possible to the ideal of no theory under consideration and no hypotheses to test."

To ensure increased reliability among our findings, we conducted coding experiments and came to "negotiated agreement" as to the proper way in which to code the variables in the data set. To facilitate the coding process, we used a software package called NVivo, which is specifically designed to support the grounded theory approach to qualitative data analysis. In addition, consistent with recommendations by Strauss and Corbin (1990), we kept journals throughout the project to identify observations of patterns in the data that might lead to new hypotheses or theories about what makes large-scale IT projects succeed or fail in the public sector. We had frequent meetings to discuss our observations, to classify and interpret our analyses, and to verify that our coding of concepts remained consistent among the researchers.

The result of this approach to research is a set of hypotheses and suggestions for future research. We did not attempt to validate the hypotheses at this stage, as that would require additional data, and more case environments at a minimum. The IRS TSM project was selected initially because of the easy access to documentation from a variety of sources, the public interest and

attention to this particular IT failure, and the fairly universal agreement among different sources that this project was indeed a failure along most measures. From this project we hoped to gain some new insight into possible causes of failure in large-scale IT projects in federal government and learn which sources of documentation are most useful in studying these projects. In subsequent research we hope to validate these hypotheses and confirm the generality of the current findings. To date, we have identified nearly a dozen similarly documented large-scale projects that are failing or have failed across a variety of federal and state agencies that should be useful in the validation process.

FINDINGS AND DISCUSSION

Based on the research conducted, we observed several factors that may have contributed to the failure of the Tax Systems Modernization Project. Overall, the findings were consistent with current literature, which suggests that the most significant challenges to large-scale IT projects are more managerial and organizational than technical in nature. Most of the issues identified related to the basic management of IT projects, with the added twist of complexity and overload introduced by project size and duration. While reviewing the coded outcome variables and searching for patterns, some unexpected issues arose from the data set. Among the issues we found most interesting is the potential impact that the General Accounting Office (GAO) has on project failure. Gaining a better understanding of these issues and phenomena may help federal agencies like the IRS, as well as other organizations, better manage large-scale IT projects.

One theme that persists throughout the documents is the inability of IRS to manage large-scale and long-term IT projects. Documents generated by the GAO continuously emphasize the need for the IRS to be able to plan, prioritize and schedule projects so that they do not run over budget and over time. Therefore, we can hypothesize that project failure is due in part to the inability of management to organize projects and treat them as meaningful investments. However, this surface observation has an underlying pattern that raises question about the role that the GAO plays in the success or failure of the TSM project. Indeed, patterns show that GAO points out the same managerial faults of IRS across different projects. Furthermore, paired with their observations are a series of recommendations, which sometimes conflict with one another, that could possibly add to the information overload and complexity that the IRS already faces on the TSM project. In reality, despite the numerous suggestions that the GAO has made on different projects, IRS has not shown significant improvement in managing them.

As a result of the GAO recommendations, IRS often formed committees to alleviate the problems raised. However, the birth of committees appears to be an easy solution to a large mass of technical and business requirements that are not being met by the existing or planned information systems. These committees are thought of as taking care of the situation, but in reality may further diminish the agency's information capacity by making additional recommendations that are also rarely put into practice. Therefore, these groups may act as a deterrent to future progress of TSM.

Ultimately, the weaknesses that GAO continuously points out about management cannot be ignored. In our research, we observed that bureaucracy runs deep within IRS culture. Indeed, we believe that the IRS tried to implement a new organizational structure without establishing new rules to support the changes. Consequently, critical players were not empowered to make valuable decisions that would affect the planning and budgeting of TSM, which resulted in the changes being somewhat ineffective and futile.

DIRECTIONS FOR FUTURE RESEARCH

A goal of our research was to identify possible explanations or hypotheses as to why large-scale IT projects fail, since existing literature in this area is sparse and incomplete. From the discussion above, we have identified several important directions for further research.

First, information overload and project complexity negatively affect the success of large-scale IT projects. We termed this concept "information capacity" to suggest that there is a certain amount of information and complexity that can be processed in relation to an agency or a project, and when that is exceeded, the likelihood of project success decreases. However, we are not yet certain as to *how* this relationship plays out specifically in the IRS context.

Second, the processes by which agencies like the IRS incorporate or fail to incorporate recommendations into their project management techniques,

particularly in cases where recommendations are to change existing management practices, are not well understood and appear to be ineffective. It would be important to see why those changes are not being implemented and who is responsible for driving those changes in the agency. If these recommendations could be used in management methods perhaps it can improve the overall efficiency of the IRS, and further facilitate the success of large-scale IT projects.

Third, the role that the GAO plays as an oversight agency in large-scale IT projects in federal agencies may have some negative consequences for the success of these projects. It is important for future research to take a closer look at the roles that GAO and other oversight organizations play in large-scale IT projects in federal agencies like the IRS. Although they are external to the IRS, do they take on a more internal role as they become more involved in the culture of the IRS? And if they do, how does it affect their evaluation of the IRS and consequently their recommendations? It would be worthwhile to know exactly how they operate and how they actually affect large-scale IT projects like TSM.

Fourth, the role of agency internal committees in the management and resolution of recommendations and problems should be studied further. It would be useful to know why they are formed and if they are useful to the IRS in managing projects like TSM, since evidence in the documentation suggests this may not be the case. For both committees and the GAO, we believe there may be detrimental effects to the IRS's information capacity and likelihood of project success.

RESEARCH AND PROJECT LIMITATIONS

It is hard to pinpoint the exact causes of the problems that surrounded the TSM project failure. The enormity of such a task with endless amounts of information and people involved suggests many different reasons for its failure. From a research perspective, there have also been drawbacks to studying potential causes for failure. Firstly, the limited timeframe handicapped our efforts to code and analyze the entire data set. Therefore, our hypotheses are limited to a subset of the available data. In addition, some researchers involved in this study did not have time invested in fully understanding and learning the background of the IRS. This yielded a narrow view of the organization, which is just based on the documentation, which affected the way we chose variables for the coding scheme.

Secondly, although we spent a good deal of time creating and negotiating a coding scheme and structure, we did not achieve the amount of inter-rater reliability that we would have liked for select variables. Consequently, it made it more difficult to detect patterns with the data set that could have potentially weeded out problems. This also could have been a result of some researchers in the study lacking background knowledge of the IRS.

Lastly, since most of the documents were intended for public view and consumption, there are details that may be missing from the reports. As a result, the data may be biased in order to make it presentable to such a wide audience. In reality, a lot of truth about what happened at those specific times may have been left out of the picture. For these reasons, we were only able to form general hypotheses at this point which will require further research to validate.

CONCLUSIONS

Despite the limitations of the data set, there were patterns that emerged from the research that were notable. For example, the role of external agencies like the GAO may prove to play a critical role in the outcome of large-scale projects because of its overwhelming auditing presence in the IRS. The GAO is constantly providing suggestions for improvement to the IRS who in turn takes the time to agree or disagree with the recommendations, but no worthwhile change has occurred. Therefore, the recommendations may prove to be in excess and may even slow down IRS functions as the information capacity of the project and agency managers becomes overwhelmed. The same idea can also be applied to the creation of committees whose formation may just be a justification for resolving some of the IRS's project problems. Furthermore, among these problems may be the organizational structure and bureaucratic culture that deters top management from leading critical project ideas and acting as a stimulus for proper planning and budgeting for IS projects. These findings and observations are insufficiently explained and discussed in the existing literature and represent potentially important ideas worth further investigation.

As an exploratory research effort focusing on one in-depth case study, we were successful at identifying some new hypotheses and ideas around what leads to project failure in large-scale IT projects in the public sector. In subsequent stages of this research, we hope to further demonstrate the generality of the findings and verify their contribution to the success or failure of large-scale IT projects.

REFERENCES

CSTB, *Making IT Better: Expanding Information Technology Research to Meet Society's Needs*," Committee on Information Technology Research in a Competitive World, Computer Science and Telecommunication Board, National Research Council, National Academy Press, 2000.

Eisenhardt, K. "Building Theories from Case Study Research," *Academy of Management Review*, (14:4), 1989, pp. 532-550.

Lyytinen, K. and Hirschheim, R. "Information systems failures—a survey and classification of the empirical literature," *Oxford Surveys in Information Technology*, (4), 1987, pp. 257-309.

Montealegre, R. "What Can We Learn from the Implementation of the Automated Baggage-Handling System at the Denver International Airport?" 1996 Americas Conference, Association for Information Systems, Phoenix, AZ, August 16-18, 1996.

Strauss, A. and Corbin, J. *Basics of Qualitative Research: Grounded Theory Procedures and Techniques*, Newbury Park, CA: Sage Publications, 1990.

Wilcocks, L. and Griffiths, C. "Predicting Risk of Failure in Large-Scale Information Technology Projects," *Technological Forecasting and Social Change*, (47), 1994, pp. 205-228.

0 more pages are available in the full version of this document, which may be purchased using the "Add to Cart" button on the publisher's webpage:

www.igi-global.com/proceeding-paper/discovering-causes-project-failures-government/32210

Related Content

Requirements Prioritization and Design Considerations for the Next Generation of Corporate Environmental Management Information Systems: A Foundation for Innovation

Matthias Gräuler, Frank Teuteberg, Tariq Mahmoud and Jorge Marx Gómez (2013). *International Journal of Information Technologies and Systems Approach* (pp. 98-116).

www.irma-international.org/article/requirements-prioritization-design-considerations-next/75789

Fuzzy Rough Set Based Technique for User Specific Information Retrieval: A Case Study on Wikipedia Data

Nidhika Yadav and Niladri Chatterjee (2018). *International Journal of Rough Sets and Data Analysis* (pp. 32-47).

www.irma-international.org/article/fuzzy-rough-set-based-technique-for-user-specific-information-retrieval/214967

Virtual Standardized Patients for Assessing the Competencies of Psychologists

Thomas D. Parsons (2015). *Encyclopedia of Information Science and Technology, Third Edition* (pp. 6484-6492).

www.irma-international.org/chapter/virtual-standardized-patients-for-assessing-the-competencies-of-psychologists/113106

Social Media Use and Customer Engagement

Aurora Garrido-Moreno, Nigel Lockett and Víctor García-Morales (2018). *Encyclopedia of Information Science and Technology, Fourth Edition* (pp. 5775-5785).

www.irma-international.org/chapter/social-media-use-and-customer-engagement/184278

Optimization of Cogging Torque Based on the Improved Bat Algorithm

Wenbo Bai and Huajun Ran (2023). *International Journal of Information Technologies and Systems Approach* (pp. 1-19).

www.irma-international.org/article/optimization-of-cogging-torque-based-on-the-improved-bat-algorithm/323442