Methods for Understanding IS Failures

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INTRODUCTION

Researchers with a keen interest in information systems failures are faced with a double challenge. Not only is it difficult to obtain intimate information about the circumstances surrounding such failures, but there is also a dearth of information about the type of methods and approaches that can be utilised in this context to support such information collection and dissemination. The purpose of this chapter is to highlight some of the available approaches and to clarify and enhance the methodological underpinning that is available to researchers interested in investigating and documenting phenomena in context-rich and dynamic environments. The chapter concludes by introducing a new range of antenarrative approaches that represent future developments in the study of IS failures.

BACKGROUND

Contemporary software development practice is regularly characterised by runaway projects, late delivery, exceeded budgets, reduced functionality, and questionable quality that often translate into cancellations, reduced scope, and significant rework cycles (Dalcher, 1994). Failures, in particular, tell a potentially grim tale. In 1995, 31.1% of U.S. software projects were cancelled, while 52.7% were completed late, over budget (cost 189% of their original budget), and lacked essential functionality. Only 16.2% of projects were completed on time and within budget; only 9% in larger companies, where completed projects had an average of 42% of desired functionality (Standish Group, 2000). The 1996 cancellation figure rose to 40% (Standish Group).

The cost of failed U.S. projects in 1995 was $81 billion; in addition, cost overruns added an additional $59 billion ($250 billion was spent on 175,000 U.S. software projects; however, $140 billion out of this was spent on cancelled or over budget activities; Standish Group, 2000). In fact, Jones (1994) contended that the average U.S. cancelled project was a year late, having consumed 200% of its expected budget at the point of cancellation. In 1996, failed projects alone totalled an estimated $100 billion (Luqi & Goguen, 1997). In 1998, 28% of projects were still failing at a cost of $75 billion; while in 2000, 65,000 of U.S. projects were reported to be failing (Standish Group).

The Standish Group makes a distinction between failed projects and challenged projects. Failed projects are cancelled before completion, never implemented, or scrapped following installation. Challenged projects are completed and approved projects which are over budget, late, and with fewer features and functions than initially specified. Lyytinen and Hirschheim (1987) identify: correspondence failures (where the system fails to correspond to what was required), process failures (failure to produce a system or failure to produce it within reasonable budgetary and timescale constraints), interaction failures (where the system cannot be used or is not satisfactory in terms of the interaction), and expectation failures (where the system is unable to meet a specific stakeholder group's expectations). Many situations contain behavioural, social, organisational, or even societal factors that are ignored, and therefore the definition of failure needs to encompass a wider perspective. The general label *system failures* is often utilised in order to embrace a wider grouping of failures, including ones with undesirable side effects which may impact other domains and the organisational context (see, for example, Fortune & Peters, 1995). As information becomes more embedded in other domains, the scope and impact of failure becomes more wide-reaching. This was clearly evident from the extensive effort to minimise the impact of the "year 2000 bug" from any system containing computers and underscores our interest in utilising the term *IS failure* to describe a wider class of systems failures that impact on individuals, organisations, and societal infrastructure.

IS failure investigations start with extensive attempts to collate relevant evidence. However, in most cases the researcher is exposed to specific information post hoc, i.e., once the failure is well established and well publicised and the participants have had a chance to rationalise their version of the story. Most of the available sources are therefore already in place and will have been set up by agencies other than the researcher.

The purpose of a forensic investigation is to explain a given failure by using available information and evidence. The term *forensic* is derived from the Latin *forensis*, which is to do with making public. Forensic science is the applied use of a body of knowledge or practice in determining the cause of death, nowadays extended to include any skilled investigation into how a crime was perpetrated. Forensic systems engineering is the postmortem analysis and study of project disasters (Dalcher, 1994).

The work involves a detailed investigation of a project, its environment, decisions taken, politics, human errors, and the relationship between subsystems. The work draws upon a multidisciplinary body of knowledge and assesses the project from several directions and viewpoints. The aim of forensic analysis is to improve the understanding of failures, their background, and how they come about (Dalcher, 1997). The concept of systems is a central tool for understanding the delicate relationships and their implications in the overall project environment.

Forensic systems engineering is primarily concerned with documentary analysis and (post-event) interviews in an effort to ascertain responsibility lines, causal links, and background information. The primary mode of dissemination of findings, conclusions, and lessons is through the publication of case study reports focusing on specific failures. However, there are limited research methods to explore the dynamic and fragmented nature of complex failure situations. Lyytinen and Hirschheim (1987) noted that more qualitative research methods were needed for IS failure research as well as more extensive case studies that explored problems in more detail and viewed solution arrangements in light of what transpired. The same methods also need to account for group issues and cultural implications. Sadly, 16 years on, the same constraints in terms of methods are still in evidence.

DESCRIBING FAILURE

Making sense of IS failures retrospectively is difficult. In general, there is very little objective quantitative failure information that can be relied upon. This makes the utilisation of quantitative methods less likely until all relevant information is understood. Indeed, a specific feature of failure is the unique interaction between the system, the participants, their perspectives, complexity, and technology (Perrow, 1984). Lyytinen and Hirschheim (1987) pointed out that failure is a multifaceted phenomenon of immense complexity with multiple causes and perspectives. Research into failures often ignores the complex and important role of social arrangement embedded in the actual context. This is often due to the quantitative nature of such research. More recently, Checkland and Holwell (1998) argued that the IS field requires sensemaking to enable a richer concept of information systems.

Understanding the interactions that lead to failures likewise requires a humanistic stance that is outside the conventional positivist norm to capture the real diversity, contention, and complexity embedded in real life. Forensic analysis thus relies on utilising qualitative approaches to obtain a richer understanding of failure phenomena in terms of action and interaction.

The fact that a failure phenomenon is being investigated suggests that attention has already been drawn to the complexities, breakdowns, and messy interactions that such a situation entails (i.e., the investigation is problem-driven). Many such inquiries deal with subjective accounts, including impressions, perceptions, and memories. The aim of the researcher is to increase in a systemic way the understanding of a situation, yet do so from a position that takes in the complexity of the entire situation and incorporates the different perspectives and perceptions of the stakeholders involved.

Overall, the purpose of a failure research method is to enable the researcher to make sense of the complexity of detail and the complexity of interaction and chart the contributory role of different causes and issues in the buildup to failure. However, the armoury of research methods in this domain is often limited to case studies.

The term *case study* is an umbrella term used in different contexts to mean different things that include a wide range of evidence capture and analysis procedures. Yin (1994, p.13) defines the scope of a case study as follows:

"A case study is an empirical inquiry that:

- *investigates a contemporary phenomenon within its real-life context, especially when*
- *the boundaries between phenomenon and context are not clearly identified."*

A case study can be viewed as a way of establishing valid and reliable evidence for the research process as well as presenting findings which result from research (Remenyi et al., 1998). According to Schramm (1971), the case study tries to illuminate a decision or a set of decisions and in particular emphasise why they were taken, how they were implemented, and with what results. A case study is likely to contain a detailed and in-depth analysis of a phenomenon of interest in context; in our case, the failure scenario. Table 1 summarises some of the main advantages of using case studies.

The general aim of the case study approach is to understand phenomena in terms of issues in the original problem context by providing the mechanism for conducting an in-depth exploration. They often result from the decision to focus an enquiry around an instance or an incident (Adelman, Jenkins, Kemmis, 1977), as they are principally concerned with the interaction of factors and events (Bell, 1999). The combination of a variety of sources offers a richer perspective, which also benefits from the availability of a variety and multiplicity of methods that can be used to obtain new insights about this single instance. A case study allows the researcher to concentrate on specific instances in their natural setting and thereby attempt to identify the interacting perceptions,

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