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The Rational and Political Roles of Methods in Information Systems Development

Bruce Rowlands
Griffith University

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Bruce H. Rowlands

School of Computing & Information Technology
Griffith University
b.rowlands@griffith.edu.au

Abstract—

Textbooks and considerable normative research implicitly assume that Information Systems Development Methodologies (ISDMs) are used and are useful. Evidence suggests that methodology use is problematic. This work-in-progress paper reports on an in-depth case study seeking to identify rational and political roles leading to why a methodology is used in an IS department within a large Australian bank. Guided by a framework to study the use of methods the analysis demonstrates the plausibility of a portion of the framework thereby contributing to a phase of the theory building process.

Key Words— information systems development methodology, methodology use, case research.

INTRODUCTION

Information Systems Development Methodologies (ISDMs) or formalised methods are promoted as a means of improving the end product of the software development process by specifying the activities and the documentation to be produced. Other alleged benefits are standardisation of the process and consistency from one development project to the next. The assumption of desirability has been reflected in research that has emphasised methodology design, the comparison of technical features, and methodology selection. However, the research literature that emerged in the 1990s suggests that methodologies have not always been used, and if used, not always in the way they were intended (Fitzgerald et al, 2002).

In research addressing the issue of methodology use, Fitzgerald, Russo & Stolterman (2002) proposed a framework to investigate the complex nature of systems development and the use of methods in practice. The framework has been constructed on the basis of detailed investigation of the ISD literature, and empirical research (Fitzgerald, 1997, 1998; Russo & Stolterman, 2000; Wynekoop & Russo, 1995, 1997). The framework is depicted in Figure 1, and each element is explained briefly in Section 3. The research focus is to refine an existing theory (the method-in-action framework) by establishing and demonstrating its plausibility to illuminate an under-researched aspect of information systems practice.

This paper examines and seeks evidence to support one component of the framework: the Roles of Method, and *aims* to develop theory by offering confirming or disconfirming evidence relating to (i) a set of rational roles and rationale behind the use of methods, and (ii) a set of covert political roles that methods may play. Additional research on the remaining components is being conducted, while this paper represents a work-in-progress report.

A REVIEW OF RELATED RESEARCH

The terms *methodology* and *methods* are used inter-changeably and have become blurred by common usage, and now seem largely fused concepts in information systems parlance. For the purpose of this paper, a information systems development methodology (ISDM), as defined by Iivari *et al* (1998), is a codified set of goal-oriented procedures which are intended to guide the work and cooperation of the various parties (stakeholders) involved in the building of an information systems application. Typically these procedures are supported by a set of preferred techniques and tools, and guiding principles

A small, but growing body of research has been conducted on the specific topic of methodology use. Wynekoop & Russo (1995) conducted a survey of the literature on systems development methodologies and concluded that most research had focussed on the development of new methodologies and frameworks for the selection and understanding of methodologies, rather than on their evaluation or use in practice. Fitzgerald (1998) reported that practitioners have been somewhat reluctant to use methodologies or that practitioners rarely utilise ISDMs in the way that they were originally intended. It has also been reported that methodologies only offer transient regularities in work practices (Truex *et al*, 2000); and that development methods artificially structure and interfere with the development process (Baskerville & Stage, 2001). In reality, according to Fitzgerald (1997; 2003), practitioners do not adopt methodologies they adapt or tailor fragments of methods to the contingencies of a development situation.

An alternative viewpoint situates systems development as being 'amethodical' (Truex *et al*, 2000). That is, the management and orchestration of systems development without the predefined sequence, control, rationality, or claims to universality implied by much of the methodological thinking. This alternative, supported by Baskerville & Pries-Heje (2001) from their study of Internet development, found that the constraints of time and ambiguity are at odds with the elements of recent methodologies.

Despite the identified divergence between the intent of methodologies and concrete practice, researchers still have very little descriptive understanding of how practitioners use methodologies in their day-to-day work. The work that has been published is limited in its ability to consider the complex social and organisational context of methodology use. For instance, Wynekoop & Russo (1997) in a survey of the existing literature on ISDMs revealed that over half of the 123 research papers examined consisted of normative research in which concept development was not based on any empirical grounding, but merely on the authors' speculations or opinions. Most field research on methodology use (with the noted exception of Fitzgerald *et al*, 2003; Kiely & Fitzgerald, 2003) has a method engineering and tool orientation that brings focus to structural aspects of the methodology, but without any consideration of organisational issues. Few studies have been conducted in order to identify how ISDMs are selected or adapted, or how they are used. There also appears to be few practice demonstrations or case studies illustrating the method-in-action process. Clearly, the lack of field research in this area precludes a full understanding of how ISDMs are used. Researchers have long called for research on methodologies in real life organisational situations (Iivari & Maansaari, 1998) and they continue to do so (Beynon-Davies, 2003).

A FRAMEWORK FOR CONCEPTUALISING METHODOLOGY USE

This section examines the usefulness of a framework for studying ISDM use. The framework, involving six components (depicted in Figure 1), is derived from Fitzgerald et al (2002), and is briefly described in the following paragraphs.
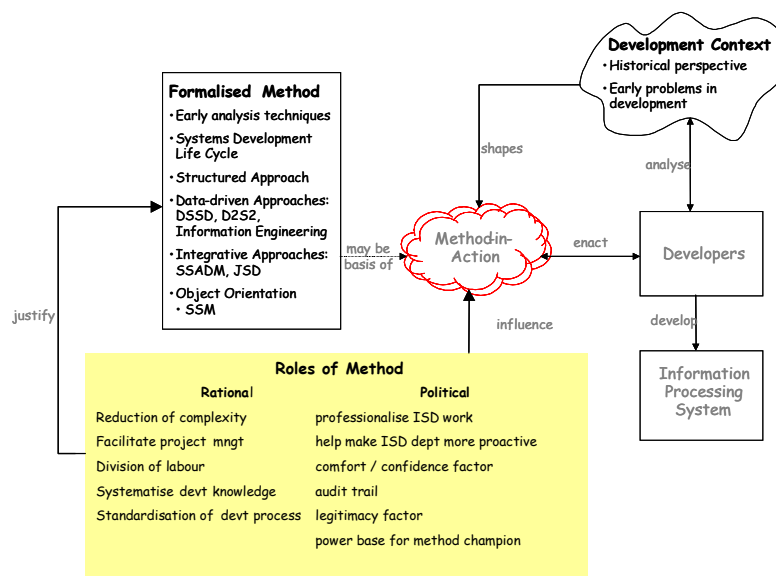

Figure 1. A Framework for ISD Method Use (c.f. Fitzgerald et al, 2002)

Formalised Methods or Systems Development Methodologies. In the IT industry today, formal methods or methodologies can be commercial (sold or recognised outside a single organisation), home-grown (developed and used within a single organisation), or adapted (that is, tailored to suit the local contingencies of the task at hand). *Method-in-Action* is the actual use of the methodology (formalised method) and can be uniquely enacted by the developers. The unique enactment is reflected in the framework in Fig 1 by the fuzzy, cloudy outlines. *Roles of Method* include two broad, but diametrically opposed categories of roles that methods can play in the development process. First, there are a set of **rational** or intellectual roles forming part of the conceptual basis and rationale behind the use of methods. These roles include, for example, the reduction of complexity of systems development, facilitation of project management & control, the division of labour, systematisation of development knowledge, and standardisation of the development process. These roles are countered (as alleged by Fitzgerald et al, 2002) by a set of **political** roles that are more covert in nature. These roles include: professionalising ISD work, help make ISD more proactive in strategy formulation, a comfort/confidence factor, an audit trail, legitimacy factor, and a power base for a methodology champion. *Development Context* is

represented by the cloud shape in Fig 1 reflecting the fact that development and maintenance takes place in a unique real context, and that this context cannot be easily analysed to produce a neat and regular specification of user requirements. *Developers* is a term used in a broad sense to cover the multiplicity of stakeholders, systems users, analysts, designers, programmers, clients and problem owners. The developer is accorded a central role in the framework, thus reflecting the fact that it is people, not methods, who develop systems. According to the framework, the developer analyses the development context and uniquely enacts the method-in-action to develop an information processing system. *Information Processing System.* Just as the development context is not always the same, the information processing systems being developed are not all alike. According to Fitzgerald et al (2002), a number of families of systems can be identified, and depending on the different characteristics of each family, serves to affect the method-in-action that will be needed to develop them.

In sum, the framework illustrates the nature of IS development, and some significant aspects and factors that need to be considered, including the concept of method-in-action. It needs to be re-stated that the framework is a conceptualisation of the systems development process, making it possible for researchers to reflect on ISD as a complex process influenced by all the framework components and their interactions.

RESEARCH DESIGN

Due to the lack of prior empirical research on the topic, a theory refinement research design was chosen. Using the logical sequence of phases from theory exploration to theory refinement to theory testing, this research is situated in the middle ground, and seeks to illustrate the framework's capacity to illuminate a phenomenon in new or better ways. A qualitative approach based on an in-depth case study of one organisation in the financial services industry was considered appropriate given the sensitive nature of the data needed.

The Case. The study focussed on an Australian bank. The banking and financial services sector was chosen because of the extremely important role that IT plays in the success of companies in this industry, and the bank selected has extensive experience and use of an in-house developed ISDM. The selection of the case site was based on a combination of accessibility (to the company's IT managers and project members), and interestingness (in the sense that the chosen bank is one of Australia's top 4 banks, and it's IT organisation is considered to be a leading player in providing state-of-the-art IS solutions to customers). The paper uses the pseudonym The Bank for the purpose of maintaining anonymity and confidentiality to the case study participants. The unit of analysis for the case study were IT professionals (IT managers and systems professionals) within the systems support and systems development division.

Data Collection & Analysis This research is using the following procedures: purposeful sampling, in-depth semi-structured face-to-face interviews as the primary data source with observations and documents being minor sources of data, the conduct of a pilot study, the development of a coding scheme, the management of data using the latest QSR qualitative research software (NVivo v2) which is specifically designed for indexing, searching and theorising on qualitative data, within case analysis using techniques such as a content summary form, displaying data in summary tables, the identification of critical incidents, and lastly the combining of the qualitative responses into narratives or decision 'stories'. A total of 30 interviews were conducted with 25 informants from different projects and at varying levels in the organisation. The levels and project types of the respondents are shown in Table 1.

Table 1. Interviews by Title within The Bank, and Project Type

Project Type or Function	Job Title			
	Project Manager	Senior Consultant	Consultant	Total
Support / maintenance	2	8	6	16
Development	2	4	3	9
Auxiliary Management	3	2	0	5
	7	14	9	30

INTERIM FINDINGS

The Bank is large in terms of Australian corporation size and is old, traditionally stable and bureaucratic. It tries very hard to be seen as good community member and is pro-active in many ways. The particular site selected for study is a large-scale IT division carrying out development and software maintenance. The IT division has developed and documented an internal methodology applicable for development and maintenance tasks. The

methodology is based on traditional 'waterfall' lifecycle phases, commencing with a feasibility study and concluding with testing and implementation. Maintenance is not seen as a phase of the lifecycle, but an iteration of software evolution. The methodology is also aligned to an in-house project management methodology. New versions of the in-house methodology are being updated and introduced on a regular basis as development approaches evolve. The in-house methodology covers all new development, package acquisitions and any planned changes to existing systems, except urgent fixes. An intranet site including the manual and templates of all the documents required at different stages of the lifecycle is made available to all IT staff.

The Bank's IT division consists of approximately 700 people, half working in application support. Although, there is not a clear distinction between new development and support (i.e. maintenance); staff in support teams undertake minor development work given that new systems necessarily interface with existing systems. In these instances the development expertise is very often within the maintenance team. Each development and support team has a project manager who reports to a business unit department manager.

According to the framework, a key aspect influencing use involves the so-called *rational roles* of the methodology. Therefore, the interviews were designed to explore and identify a range of rational factors including conditions and events. Respondents were asked to describe factors and conditions that influenced their use of the methodology. From the transcripts, a range of organisational factors were identified from the interviews and coded according to the coding scheme. In this paper, a code is defined as an abbreviation or symbol applied to a segment of words (e.g. a sentence or paragraph) that captures the description of the phenomenon. Coding, then, is labelling fragments of data by identifying key points, as opposed to coding by micro-analysis of the data, word-by-word, or line-by-line. The selection of key points accords with Miles & Huberman's (1994:57) recommendation as a protection mechanism against data overload, and Glasser's (1992) concern of over-conceptualisation. Table 1 illustrates the occurrence of rational factors in each interview, with the coding totals in the last column. According to Miles & Huberman, (1994), the counting tactic is relevant in content analysis to verify hunches, and to keep the researcher analytically honest. Qualifications follow the table displays, but space limitations prevent the inclusion of supporting narrative evidence.

Rational Factors Interview #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	Total
Reduction of complexity [R-comp]		✓								✓					2
Facilitate project mngt [R-proj]	✓	✓		✓	✓	✓				✓		✓		✓	8
Division of labour [R-lab]					✓										1
Systematise development knowledge [R-know]	✓	✓		✓			✓			✓	✓	✓			7
Standardisation of devt process [R-stand]	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	14

Table 1. Round 1 Participants citing Rational factors relevant to their use of the methodology.

Another key aspect influencing participation are the *political roles* of the methodologies. Respondents were asked to describe the political-related factors and conditions that influenced their use of the methodology. From the transcripts, a range of organisational factors were identified from the interviews and coded according to the coding scheme depicted in Table 2.

The table summaries show that the framework is adequate in representing the *Roles of Method* factors for and against methodology use. Rational factors identified as most influential and fitting within the roles framework include [R-proj] the influence of business users control thorough the sign-off process, and [R-stand] standardisation of the development process across all projects within a large organisation. Prominent political factors that served to influence the derivation of the method-in-action include: [P-comfort] method use provides for new IT professionals some reassurance that proper practices are being followed; [P-audit] providing an audit trail of the development process to afford protection if design decisions turn out wrong in the future; and [P-prof] insulating developers from conceding to unreasonable deadlines and demands from business users. Moreover, the absence of support for any part of the roles framework (such as P-power) does not invalidate it – it simply means that it was not applicable in any or all interviews.

DISCUSSION & CONCLUSION

One case study providing analysis of 14 interviews is not enough. The findings are not suggesting that we can use the case as a definitive test of the framework. However, the case succeeds in establishing the plausibility of the Fitzgerald et al (2002) framework by providing evidence of its capacity to illuminate factors accounting for the use or otherwise of the methodology. The findings also provide initial evidence suggesting that research proceed to the next phase of theory development where the framework is specified further into a testable form.

This is the second paper in a series of papers (Rowlands, 2004) describing the process of researching methodology use in a large Australian bank. For the author of this paper, the next phase will involve (i) analysing the remaining interviews, and if the findings further support the plausibility of the framework; then (ii) the research program will commence operationalising the factors by adding greater precision to the framework, and then possibly the development of testable propositions. In this theory specification phase, the researcher proposes to take the framework again to the field with a further set of interviews with the intention of generating a set of propositions explaining the method-in-action process. On the other hand, given the iterative nature of case research, additional analysis may produce conclusions that argue against the framework's plausibility, thereby forcing a new round of theory specification research.

Political Interview # Factors	1	2	3	4	5	6	7	8	9	10	11	12	13	14	Total
Professionalise ISD work [P-prof]		✓	✓			✓		✓					✓		5
Make ISD more proactive [P-proact]				✓		✓				✓		✓			4
Comfort / confidence [P-comfort]	✓				✓	✓		✓	✓		✓	✓			7
Audit trail [P-audit]		✓		✓			✓			✓		✓		✓	6
Legitimacy factor [P-legit]			✓	✓							✓	✓			4
Power base for method champion [P-power]															0

Table 2. Round 1 Participants citing Political factors relevant to their use of the methodology.

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