

A real-world approach to real-world research: appropriateness in situation, appropriateness in method

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Abstract

Working with 'real-world' problems is at the centre of the RAMESES research project which focuses on Small - Medium Enterprises (SMEs). In designing the study care had to be taken to ensure the relevance of the research techniques to be used.. This paper outlines the benefits of using a combination of qualitative and quantitative research methods within the bounds of a multi-disciplinary research team to enable effective exploration and investigation. The concept of the research life-cycle has developed the notion of appropriateness in method and approach: this is discussed against the values of the critical and realist paradigms.

Keywords:- qualitative, quantitative, research life-cycle, small to medium sized enterprises

1. Introduction

Organisations often find that their desire for change, in either business process or IT strategy, is impeded by their legacy (existing) systems. The factors which affect the relationship between existing IT systems and business processes, and which will therefore affect the risk of changing either of these are the subject of our current work. The project through which this work is being carried out, RAMESES (**R**isk **A**ssessment **M**odel: **E**valuation **S**trategy for **E**xisting **S**ystems) is funded by the EPSRC, as part of its "Software Engineering for Business Process Change" programme. The particular context for our work is risk of change in SMEs (Small-to-Medium Sized Enterprises, defined as employing 250 staff, or less): the main goal is to develop a model which will aid the managers of SMEs to assess this risk. In the RAMESES project we have adopted a socio-technical systems approach to legacy systems [1] since the interaction between the human and automated aspects of a business process can aid the identification of potential risks.

1.1 A Dichotomy of Viewpoints

Positivist science tends to look at an area of study, identify variables, isolate them and study each in isolation, and then model the way in which these act together. In this way, hypotheses are accumulated and are articulated as a theory. In the study of organisations, it is possible to identify the variables that bear upon a particular situation, and often to have some feel for their relative importance, but to isolate them is not meaningful. To decontextualise a process or an operator in order to study them, is to take away their meaning or *raison d'être*. Positivist scientists feel that an experiment should be "controlled": i.e. all extraneous factors should be removed, in order to better observe the working of the variable under study. By contrast, many interpretivists believe that there is no such thing as an extraneous factor. If you try to remove some of the factors that operate on a situation, then you are removing context and meaning. It can be seen then that any problem with a social element will ramify greatly [2]. Just as the interconnection of variables is endless, so are the implications of any change or posited solution. Most applied research, however, is conducted under the realist paradigm. The realist approach as embodied by the critical theorists requires a combination of both positivist and interpretivist approaches in order that an adequate understanding be reached [3]

1.2 Real World Research and Multi-Disciplinary Teams

The 'real' world aspect of situated research demands an approach which can remain meaningful in both a positivist and an interpretive sense. The solution within this project resides firstly, in adopting a combination of

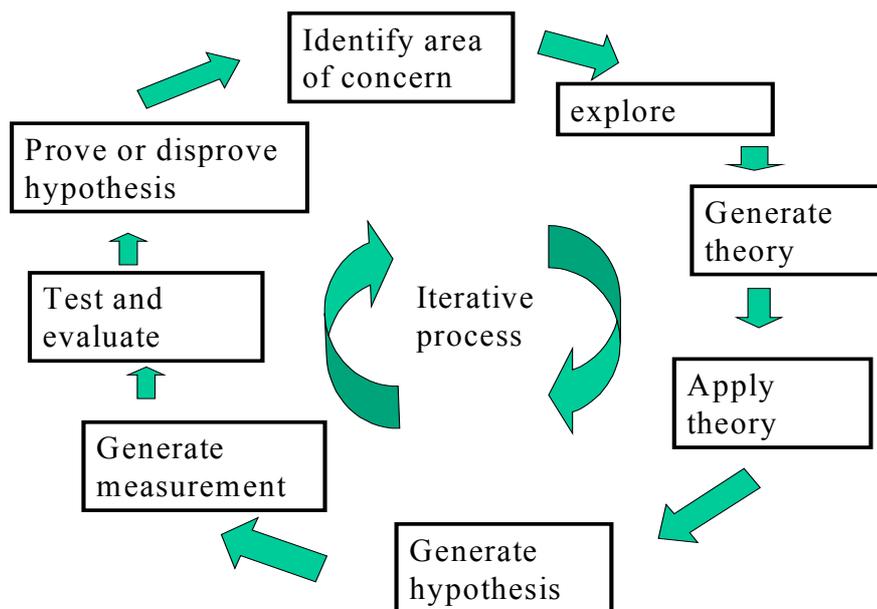
quantitative and qualitative research methods, within the bounds of a multi-disciplinary research team. The second key factor in successful multi-disciplinary research is to choose a method which is an appropriate tool for the outcome at each stage of the project. The substantive understanding of research methods from specific disciplinary training within the project (consisting of a sociologist, mathematician, business strategist, production engineer and a software engineer) has aided the identification of methods appropriate to each stage within the project. The concept of a research life-cycle has aided the progress of the RAMESES project. This paper having identified the problem domain and related the domain to the concept of multi-disciplinary work, will describe both the research life-cycle and its implications for IT projects.

2. The Research Life Cycle

The concept of the research life-cycle arose from the observation within the project that having commenced with a qualitative approach to the problem arena, issues began to arise where the qualitative approach no longer satisfied the situation. It became obvious to the research team that more quantitative data was required for the purposes of validation. The project life-cycle (as shown in Figure 1) was identified as follows:

1. Original thought to identify 'area of concern'
2. Explore using qualitative approach e.g. grounded theory, ethnomethodology, case studies
3. Generate theory via literature review, and alignment of area of concern with other disciplines, or other areas of concern
4. Apply theory to area of concern to generate hypothesis
5. Generate means of testing and measuring hypothesis
6. Test and evaluate hypothesis
7. Prove or disprove hypothesis
8. Test results against new area of concern

Fig.1 Research Life Cycle



This approach has resulted in an oscillation between the use of qualitative and quantitative research methods and techniques, needing both a level of understanding gained by the use of heuristics and results which can be measured in a more traditional fashion. The methods which have been employed at the different stages in the project are shown in Table 1 below:

Life cycle stage	Approach	Methods available	Methods applied in RAMESES
Identify area of concern	Interpretative	Observation Understanding	Observation Understanding
Explore	Interpretative	Grounded theory Ethnomethodology Case studies Participant observation	Grounded theory
Generate theory	Interpretative	Literature review Combined with knowledge gained from exploratory phase	Literature review Combined with knowledge gained from exploratory phase
Apply theory	Realist	Questionnaires Participant observation Interviews	Interviews
Generate hypothesis	Interpretative	Factorial design Controlled experiment	Coded information for emergent hypothesis
Test Hypothesis	Positivist	Nominal Ordinal Interval ratio	Hypothesis developed into questionnaires
Validate Hypothesis	Positivist	Inferential statistics Heuristic devices	Comparative statistical and heuristic analysis undertaken
Test result against new area of concern	Realist	Action research Case studies	Data collected from new case study for validation

Table 1: Populating the Research Life-Cycle in RAMESES

3. Methods or Madness

The research method chosen for the exploratory phase of the RAMESES project was grounded theory. This satisfied our need to use an approach that was both qualitative and inductive. This methodology was developed by Glaser and Strauss [4] and allows for the emergence of theory from an empirical investigation. The framework under which this occurs encourages a constant iteration between the collection and analysis of empirical data, and reflection on literary sources. This exploratory and inductive approach becomes increasingly pertinent within complex situations where it is difficult firstly to isolate variables and secondly to measure the cause and effect relationships between them.

3.1 The Relationship between the Research Method and the Problem Domain

The grounded theory approach matches the research problem of investigation in that it is situated within an environment which, to a large extent, has not been examined by the information systems field. In using grounded theory we can explore the concept of business process and IT change without imposing the generalisations gleaned from research focused on large-scale corporations. Understanding the specific needs of small businesses is the key to the development of the model which, is the focus of the RAMESES project. This research method also allows for the exploration of a complex and multi-faceted environment, this being an important aspect of any 'real world' scenario. Therefore, in summary, the choice of grounded theory for this work was based on the research method being:

- ♦ inductive
- ♦ qualitative

- ◆ flexible in terms of research techniques that can be used
- ◆ suitable for the time frame of the project
- ◆ investigative not prescriptive, and
- ◆ not reliant, in the first instance, on previously reported IS research

The process of validation required the development of measures that would stand up to comparative techniques if a risk assessment was to be developed. The measures we have adopted are mostly simple statistics which allow for a great deal of flexibility in the subsequent analysis. The quantitative measures allow for the revelation of trends and issues which, can lead to further focused analysis of the qualitative data previously collected or a new focus to re-interview and collect new data sets.

4. Conclusion

Research within the multi-disciplinary framework offers new perspectives in exploring differing research environments. The advantages of undertaking a project of this type are that a broader range of avenues are understood for investigation, supported by a greater depth of expertise than could be found in all but an exceptional individual. The ability exists within project teams to synthesis components with validity this can encourage additional novelty and innovation in the project outcomes and the identification of future work. The concept of multi-disciplinary research reflects the reality of both ‘real-world’ problems and research issues.

However, this approach does not develop without difficulties and strategies to aid the smooth running of projects need to be considered in advance. The emergence of conflicting viewpoints can be damaging to both progress and morale without the means to restore consensus needs acknowledgement. Conflict or dissonance may emerge in the first instance around the discourse of individual disciplines. Many words carry connotations above and beyond their dictionary definitions. It is possible to waste much time and effort in trying to reach and maintain some sort of glossary of meaning. The focus of projects may be skewed by the predominance of a single disciplinary actor, The prioritising of work can also be difficult when different perspectives are trying to be accommodated.

To summarise, the arena of study, i.e. the risk of change to IT or business process in SME’s requires the notion of both quality and quantity. Qualitative study aids the understanding of interconnectedness, whilst quantification makes for meaningful comparisons to aid decision-making. A multi-disciplinary team is the most effective way to bring together the understanding of both qualitative and quantitative techniques, which are required for thorough critical analysis.

5. References

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6. Acknowledgements

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7. Biographies

Gillian Mallalieu is a sociologist currently working as a senior research fellow in the School of Computing Engineering and Technology at the University of Sunderland, with specific interests in learning organisations, business process modelling and multi-disciplinary research.

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