Preface

The serious difficulties facing the developer of international information systems (i.e. supporting business functions in different countries) are widely known and their propensity to catastrophic failure has been acknowledged among practitioners for quite some time. Despite the often pivotal importance that such systems generally have scholarly research in this field has been surprisingly sparse. Information technology applications with a global range and reach are still largely unstudied and under-explored. Subsequently there is a distinct dearth of theoretical frameworks for dealing with them.

After a career in information technology line management I have been involved with multinational enterprises and their information systems for over a decade as a consultant, working in Africa, the UK, continental Europe, North America and Australasia. It was on joining a university in the early nineties that I discovered the near-vacuum in this field of research. When I decided to make international information systems my field of research it became clear that fairly fundamental work needed to be done.

I started the project described further on more than 10 years ago. It turned out a fairly difficult, necessarily broad based and, eventually, longitudinal research. The final research results presented here are now about half a decade old – and on the cusp of being revisited, extended and updated. This follow-on research needs to investigate if (and how) the sea changes in technology experienced over that time have influenced the content of the theories developed – although most of them deal with organization and management more than with technology per se.

On the other hand, the research method I had to assemble to deal with the specifics of large, very different and dispersed organizational cases has proved to be a lasting benefit from this demanding project. And not just for me: ever since I first published about it at the turn of the millennium I had requests for tutorial-type seminars about the methodology for academic researchers at a considerable number of universities internationally. And recently a number of people

suggested that a detailed report would be useful that set out the way this research project had progressed and that puts a strong emphasis on the adaptations to the Grounded Theory methodology and the derived practical method. This volume attempts to do this. Interested readers could be among

- scholars embarking on the study of large and complex technology cases;
- researchers who are tackling Grounded Theory on a larger scale for the first time; and
- anybody who is interested in the description of a fundamental research undertaking in the Grounded Theory tradition; from its foundations in the philosophy of science paradigms to the adaptation of the classic method for organizational cases and the practical details of the method; together with a diary of the conceptual journey, including the many blind alleys; and in witnessing the evolution of theory as it slowly emerges from the data.

To keep the volume readable the case story, analysis and theory chapters are of necessity abridged to focus on the essential elements of both data and analysis. A more detailed record of the case and the analysis is, however, provided on a companion website. Please contact[1] the author for access.

This research project uses a case analysis method in the grounded theory tradition in order to establish the theoretical foundations for a better understanding of the factors that influence the design, creation and implementation of international information systems.

Establishing theoretical foundations requires theory building research methods. The paucity of research into the nature and dynamics of international information systems means that there is an insufficient base from which to derive hypotheses for use with verification research approaches. Grounded theory was chosen because it does not require pre-formulated postulates.

However, traditional grounded theory was developed for homocentric applications in the social sciences. In this form it was not applicable to the study of technology use in organizational cases. These cases are a hybrid, shaped by the interplay of individual, social, organizational and technological entities. For this reason, the grounded theory approach was adapted to work with cases. The resultant two-step method preserves the grounded theory principles of joint coding and collection, constant comparison and theoretical sampling for additional data.

This adaptation of a method, originally developed for sociology, turned out to be a useful tool for generating theory in information systems research. This, together with the acknowledged paucity of theory in this field,[2] were the reasons for setting out this book in a way that can provide a demonstration of the method.

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[2] Already two decades ago (in 1989) Bob Zmud, then Editor-in-Chief of MISQ, issued a call for more 'theory building' contributions to the journal to counterbalance the predominantly empirical, theory-testing character of the submissions received. In 2003 Ron Weber had to re-iterate this plea because there still had been 'much more… written about theory testing than theory building.'

Three cases were used in the study. The data included some 120 hours of intensive interviews, transcribed onto 1,200 pages and a further 2,500 pages in the more than 150 notes, memos and documents of supporting internal and external information.

The first case, a large land based production co-operative with a widespread global subsidiary network, yielded 13 core 'categories'.[3] They were richly interrelated and fell into two interacting domains. The contrasting next case, a Danish shipping line, added another 4 core categories. In addition to these 'primary' categories, the comparison of the cases led to the formulation of two derivative categories. The third case, again in contrast to the first two in a number of attributes, is a large, Switzerland based corporation in the freight forwarding industry. More 'primary' categories were added and a number of cause-and-effect relationships were refined.

After every case, the relationships between categories were formally subsumed into theoretical frameworks. After three cases the 3rd framework contained 25 major theorems, supported by some 102 theses and explanatory postulates. In a process of 'densification',[4] a final, substantive theory of the factors influencing IIS was formulated, consisting of 10 theorems and 23 supporting theses.

The theory that the research eventually yielded about some of the dynamics of international information systems explains their specific nature and architecture; what affects the way in which they are built; and why their users will accept or reject them.

The theory defines a *generic architecture, specific* for international information systems, consisting of two parts, namely a 'Central' part, containing shared systems, and 'Local' systems that are unique for each site. The systems configuration at each individual site is a mixture of 'Central' and 'Local' technology elements. *Synchronicity,* the degree to which systems require online, same-time use of identical data and information, determines what should be the 'Central' applications – and what can be left 'Local'. It further governs the configuration and technical architecture of the IIS.

What is under 'Central' control and what remains within 'Local' discretion can become an adversarial, often acrimonious and predominantly political issue. These antagonistic politics are acted out in an ever-present 'Force Field'. The two related variables that influence the intensity of the Force Field interactions are:

Utility of the system's functionality lowers the conflict potential all around;

using the IIS to increase central *Control* intensifies local management's resistance against invasion of their 'turf'.

The probability of *Acceptance* or *Rejection* of an international information system then depends on the net-balance of these opposing forces.

At a more sophisticated level, *User/IT Consensus Processes* are shown as effective instruments for neutering damaging faction politics. Furthermore, by

[3] Grounded Theory terminology for the abstracted concepts that interpret and explain the data.

[4] Grounded Theory terminology for the delimitation process to reduce the 'conceptual redundancy' of the theory; also known as 'Occam's razor'.

assembling all stakeholders they marshal and maximize the knowledge about the global operation that the IIS supports. This deep knowledge maximizes the *Utility* of the resulting system, whilst the consensus processes substitute any *Control* conflict with rational dialogue or amicable persuasion.

Most of the theory can be directly translated into a practical methodology for designing, building and implementing international information systems. Many parts of the theory, however, are still in an 'approximate' state and point to several future research projects, concerned with refining concepts, constructs and their relationships as well as further adapting and improving the extended grounded theory methodology. Funding is being obtained and planning has progressed to an advanced stage to launch a project that will use the same methodology, but aims to update and extend the reach of the conceptual constructs into a more comprehensive theory of the dynamics of international information systems.

Many people, in many ways, have helped me to carry out this research and write this book.

Brent Gallupe, of Queen's University in Kingston, Ontario, deserves the first vote of thanks. He encouraged me to begin this project – and has helped me with positive, focused and wise advice to continue and not give in to easy compromise when the going became difficult and momentum and enthusiasm waned. And not least, a sincere 'thank you' for inviting me to Kingston where I could start writing in earnest.

This by no means detracts from all the pastoral care and practical help I enjoyed from Justo Diaz, my local boss at Auckland University, New Zealand at the time. He allowed me to structure my varsity work such that I could set aside good chunks of time for the research – I could never have done it without that kindness. Thank you very much, Justo.

Neither of these professional acknowledgements, however, compares with the gratitude that I have for my children, for whom this project had become an object of wry resignation, as they often subsisted, for the last few years, on the border of serious paternal neglect. I will make it up to you, Peter and Anna, I promise.

The whole research, of course, would not be there save for the close on half a hundred men and women all over the globe who invited me into their business and technology, explained it to me and were instrumental for my understanding of 'what's really going on' with the information technology support for their complex enterprises. I have thanked them personally and individually over the course of the project.

Finally, very many thanks indeed for the generous support I received from Neil Levine and Matt Amboy from the Springer office in New York – I really needed that!

All that remains to be said now is that I hope you enjoy the book.

Wellington Hans Lehmann
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