2008

Development and support of complex information systems in emergent organizations: structures, processes and governance

Richard Kingsford
University of Wollongong

UNIVERSITY OF WOLLONGONG
COPYRIGHT WARNING

You may print or download ONE copy of this document for the purpose of your own research or study. The University does not authorise you to copy, communicate or otherwise make available electronically to any other person any copyright material contained on this site. You are reminded of the following:

This work is copyright. Apart from any use permitted under the Copyright Act 1968, no part of this work may be reproduced by any process, nor may any other exclusive right be exercised, without the permission of the author.

Copyright owners are entitled to take legal action against persons who infringe their copyright. A reproduction of material that is protected by copyright may be a copyright infringement. A court may impose penalties and award damages in relation to offences and infringements relating to copyright material. Higher penalties may apply, and higher damages may be awarded, for offences and infringements involving the conversion of material into digital or electronic form.

Unless otherwise indicated, the views expressed in this thesis are those of the author and do not necessarily represent the views of the University of Wollongong.

Recommended Citation
NOTE
This online version of the thesis may have different page formatting and pagination
from the paper copy held in the University of Wollongong Library.

UNIVERSITY OF WOLLONGONG

COPYRIGHT WARNING

You may print or download ONE copy of this document for the purpose of your own research or
study. The University does not authorise you to copy, communicate or otherwise make available
electronically to any other person any copyright material contained on this site. You are
reminded of the following:

Copyright owners are entitled to take legal action against persons who infringe their copyright. A
reproduction of material that is protected by copyright may be a copyright infringement. A court
may impose penalties and award damages in relation to offences and infringements relating to
copyright material. Higher penalties may apply, and higher damages may be awarded, for
offences and infringements involving the conversion of material into digital or electronic form.
Development and Support of Complex Information Systems in Emergent Organizations: Structures, Processes and Governance

A thesis submitted in fulfilment of the requirements for the award of the degree

Doctor of Philosophy

from

University of Wollongong

by

Richard Kingsford
MInfoTech (Hons) (Wollongong), MA (WAust), BA, BSc (Qld)

School of Information Systems and Technology

2008

Copyright Richard Kingsford 2009
ACKNOWLEDGEMENTS

I am indebted to my supervisors, Professor Joan Cooper, Associate Professor Helen Hasan and Dr Leone Dunn for their guidance and support for this research project. I would like to express my gratitude to them for their advice and constructive comments during the preparation of the thesis, and for their suggestions related to information systems and information technology. I would also like to thank my family for their consistent encouragement during the project.
Development and Support of Complex Information Systems in Emergent Organizations: Structures, Processes and Governance

ABSTRACT

This thesis examines issues related to the effective development and ongoing support of complex computer-based information systems (IS) in emergent organizations. An emergent organization is one in which features of its internal and external environments are emergent—that is, continually changing, but generally not as a result of deliberate strategy. On this basis many organizations are emergent. Emergence assumes that the business requirements for information systems change continually, and that systems are regularly adapted to their changing environments.

The thesis explores the structures, processes and IS governance which can result in optimum system development and support in emergent situations. It includes a case study which investigates the development and technical support of systems in an emergent organization with diverse business operations. The thesis draws attention to the role of system maintenance within the support function, and this can represent a large investment of skilled human resources. It was found that knowledge of complex information systems also plays a key role in effective development and support processes.

The case study used mainly qualitative research methods and adopted an interpretive approach. It was found that in the organization studied, certain structures, processes and modes of thinking related to information systems had evolved over many years. These were in harmony with, and reinforced the generation and use of the largely tacit knowledge of systems gained through long experience. These structures and processes included an implicit IS governance framework. In turn they provided effective support for system development and support, and hence for the business of the organization. The associated knowledge processes and understandings formed a key part of the organizational culture in relation to information systems and IS services.

During the study, the enterprise implemented substantial changes to its organizational IS structures and processes. These changes initially appeared to be soundly based, and were intended to improve the efficiency and quality of IS services to customers. The interrelated changes included the introduction of rigorous processes for project management; a goal of
having an adaptable and portable IS workforce; and the structural separation of system
development from system maintenance.

It is shown that the organizational changes were not accompanied by full consideration of the
existing structures and processes which applied in the organization. These included relevant
‘knowledge’ principles related to the appropriate recognition and use of tacit knowledge, and to
the precepts of the implicit IS governance. Thereby the changes inadvertently acted to fragment
knowledge of information systems, and to undermine the effective utilization of IS tacit
knowledge. They also disturbed the implicit IS governance framework, and reduced the
effectiveness of support for systems and business operations. The changes served to underscore
the informal but critical role of knowledge of systems. This knowledge was effectively utilized
via long-standing organizational structures and processes which had engendered relationships of
knowledge sharing, collaboration and trust.

Inferences are drawn relating to structures, processes and IS governance in emergent
organizations which rely on complex information systems to support their business operations.
The thesis extends the level of knowledge in these areas. Some subsidiary inferences are drawn
relating to change management and human resource management in organizations that rely on
complex systems.

**Keywords**

information systems, system development, system maintenance, emergent organizations,
business-technology alignment, organizational structure, organizational culture, IS governance,
knowledge processes, tacit knowledge
TABLE OF CONTENTS

ABSTRACT ........................................................................................................................................... 4

TABLE OF CONTENTS .................................................................................................................. 6

LIST OF FIGURES .......................................................................................................................... 8

DEFINITIONS OF KEY TERMS ...................................................................................................... 9

ARRANGEMENT OF THE THESIS ................................................................................................. 14

CHAPTER 1 RESEARCH AIMS AND OVERVIEW OF THESIS ..................................................... 16

1.1 Introduction ................................................................................................................................ 16
1.2 Research Topic and Objectives ................................................................................................. 17
1.3 Overview of the Thesis ............................................................................................................ 21
  1.3.1 Scope of Thesis ................................................................................................................... 21
  1.3.2 Knowledge Processes ......................................................................................................... 22
  1.3.3 Outline of Case Study ........................................................................................................ 25
    1.3.3.1 Information Systems ................................................................................................... 26
    1.3.3.2 Organizational Changes ............................................................................................... 30
    1.3.3.3 Information Systems Governance ............................................................................... 32
  1.3.4 Summary ............................................................................................................................. 34

CHAPTER 2 RESEARCH APPROACH, DESIGN AND METHODS .................................................. 38

2.1 Research Problem and Research Questions ............................................................................... 38
2.2 Research Setting ....................................................................................................................... 39
2.3 Research Methodology ............................................................................................................ 40
  2.3.1 Qualitative Research Methods .......................................................................................... 40
  2.3.2 Case Study Approach ....................................................................................................... 42
  2.3.3 Interpretive Research ......................................................................................................... 44
2.4 Anthropological Concepts and Methods .................................................................................. 45
  2.4.1 Organizational Culture ..................................................................................................... 46
  2.4.2 Participant Observation .................................................................................................... 49
2.5 Techniques Adopted for the Case Study ................................................................................... 51
  2.5.1 Participant-Observer Techniques Used ............................................................................. 51
  2.5.2 Iterative Data Collection, Analysis, Literature Review and Write-Up .............................. 54
  2.5.3 Validation of Case Study Material .................................................................................... 60
  2.5.4 Generalizability of Case Study Findings .......................................................................... 61

CHAPTER 3 INFORMATION SYSTEMS GOVERNANCE .............................................................. 64

3.1 Introduction ............................................................................................................................... 64
3.2 Information Technology Governance ..................................................................................... 65
3.3 Information Systems Governance .......................................................................................... 67
3.4 IS Governance, Knowledge, Organizational Structure and Culture ...................................... 70
  3.4.1 IS Governance, Knowledge and Trust ............................................................................. 70
  3.4.2 IS Governance, Culture and Structure ........................................................................... 71
  3.4.3 IS Governance and Emergence ....................................................................................... 73
LIST OF FIGURES

**Figure 1.** Informal Organization (adapted from French and Bell 1999) ................................................ 47

**Figure 2.** Iterative Process of Data Collection, Analysis, Literature Review and Write-Up ............... 55

**Figure 3.** System Organization before Restructure (Simplified) ......................................................... 104

**Figure 4.** Structure of TPE, showing IT and IS Organizations ............................................................ 133

**Figure 5.** System Organization after Restructure (Simplified) ............................................................ 147

**Figure 6.** System Organization after Restructure (More Realistic) ...................................................... 158

Copyright Richard Kingsford 2009