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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

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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

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