

# Chapter X

## The Theory of Deferred Action: Informing the Design of Information Systems for Complexity

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### ABSTRACT

*The problem addressed is how to design rationally information systems for emergent organization. Complexity and emergence are new design problem that constrains rational design. The reconciliation of rationalism and emergence is achieved in the theory of deferred action by synthesizing rationalism and emergence. Theories on designing for normal organisation exist but most of them are borrowed from reference disciplines. The theory of deferred action is based in the information systems discipline and is presented as a theory to inform practice to improve the rational design of information systems for emergent organisation. It has the potential of becoming a reference theory for other disciplines in particular for organisation studies. As emergence is a core feature of complexity, the base theory for the theory of deferred action is complexity theory. The theory of deferred action explains the effect of emergence on the rational design of information systems. As a theory to inform practice it provides guidance in the form of design constructs on how to design rationally information systems for emergent organization.*

### INTRODUCTION

We have been designing, developing, and using information systems in business organizations using computers and lately information tech-

nology for nearly sixty years. But what is our understanding of an information system? The practice of information systems has been driven by the invention of digital technology, computers, information technology and lately information

and communication technology. Many advances in our knowledge of how to develop information systems have come from practitioners. Practitioners have also built actual information systems that have become the object of study for researchers. These include transaction processing systems, decisions support systems, expert systems, and recently ebusiness systems and enterprise resource planning systems.

Some advances in our understanding have come from researchers. Early understanding of an information system as a technological system improved with knowledge of information systems as socio-technical systems, acknowledging the human social context in which information systems are developed and used. Researchers now define an information system as composing people, organisation and information technology. Some theories on information systems have been proposed (Walls, et al., 1992). Markus, et al., (2002) propose , a design theory for systems that support emergent knowledge processes, (179-21). But we lack good theoretical understanding of information systems.

What is a simple information system and what is a complex information system? When is it simple to design information systems for a business organisation and when is it complex? It is simple when there is no design uncertainty. Possibly when what is wanted is perfectly known, and when complete and predictable information and knowledge is available to organize the available resources to achieve it. Information on available resources should be complete too. This kind of simplicity is not available to designers because there is much design uncertainty in organizations. Designers do not have complete and perfect information and knowledge about the artifact they design because organizational members themselves lack the knowledge. Designers work with incomplete knowledge of what is wanted, imperfect information about how to design and develop, as well as incomplete information on available resources and how to organize them. The

cause of this design uncertainty is complexity.

The predictive capacity of designers is central. Prior to design the purpose of the organisation is knowable to a large extent but it can and does change unpredictably after the organisation has been setup. Commercial companies' purpose of maximizing shareholder value has changed to consider the impact on the natural environment. Consequently, new information on carbon accounting is obtained by adding new information systems or making adjustments to existing ones. An information system is simple when the organisation and the information required to manage it can be predetermined, its design and development is also relatively simple. When design is predictable there is an absence of complexity. Uncertainty about the information required to manage the organisation arises when aspects of the organisation cannot be predetermined. The core of this uncertainty is highly unpredictable situations that arise in the course of organizational life. The absence of the predictive capacity of designers is the essence of design complexity.

Business organisation as a social system is complex. The functions of information systems for a business organisation are far from simple. Functionality is complex not only because of design uncertainty but also because the social system itself is complex (unpredictable). Structure and resources of the organisation are unpredictable (Feldman, 2000; 2004). Patterns of communication between humans within the organization, and between humans and information systems, cannot be completely predetermined for design purposes. As patterns of human communication within the organisation are highly complex it is not simple to determine the necessary information flows. Patterns of information flows between the organisation and its environment are similarly not pre-determinable completely. Also the situations in which information will be used are not pre-determinable exhaustively.

The question of whether the business organisation needs a simple or complex information

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