

Chapter 7

Information–As–System in Information Systems: A Systems Thinking Perspective

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ABSTRACT

This article investigates the complex nature of information in information systems (IS). Based on the systems thinking framework, this study argues that information in IS is a system in its own right. A conceptual model of information-as-system is built on the systems thinking perspective adopted from Gharajedaghi's holistic thinking rooted from Ackoff systems approach, which is developed through Peirce's semiotics with the validity support of Metcalfe and Powell's perspective of information perception, Mingers and Brocklesby's schema of situational actions, Toulmin's theory of argumentation and Ulrich's theory of systems boundary. The proposed model of information-as-systems is described in terms of triads—on the structure, function, and process, all interdependent—in a context of information-as-system in IS.

INTRODUCTION

Information is the central object in several fields of information-related studies (Tuomi, 1999), including information systems (IS). Drucker (1999) argued that one of the challenges of managements in the next century is just information, which is not relating to technologies, but focusing on how to satisfy information requirements for knowledge

workers and business managers in various societies and organizations.

Lee (2004) stated that information itself is the very rich phenomenon of subject matter distinct from organizations' or information technology's one. Therefore, IS researchers should pay more attention to the nature of information, which so far is less studied than the problems of technologies, organizations, or systems. Meanwhile, Ulrich (2001) recommended that we need to

consider not only the ways of using ISs but also, more basically, the ways information is defined and becomes very important socially. Similarly, Lauer (2001) proposed that information-oriented perspective is essential to IS; Metcalfe and Powell (1995) argued that the area that IS may claim as its very own one is just the information.

Unfortunately, little research has been paid to how to conceptualize the information itself (Lauer, 2001). It is warned that understanding the nature of information is even more important than the process of IS design (Metcalfe & Powell, 1995) because IS may not exist without information (Mingers, 1996). Likewise, to understand what the information is and how to use it shall support us to solve the problems of requirements engineering of ISs (Goguen, 1996). To these researchers, knowledge of the nature of information is non-trivial, but there is still no agreement on what information is.

Recently, several studies have attempted to construct conceptual models of information. For example, Callaos and Callaos (2002) proposed a systemic notation of information, which is based on a dialectic process, consisting of two components—data and information—as well as of two respective relationships—perceptions or sensations and actions. The data component represents the objective side of information and the information component represents the subjective side of data. Meanwhile, Buckland (1991) suggested that information in IS is just information as thing. In this sense, information may be a tangible form to represent objects and events and it is in nature situational, consensus-led evidence. From a different view, Mingers (2006) proposed a comprehensive theory of semantic and pragmatic information, in which information, an object of IS, is associated closely with meaning, an object of human cognition.

This article is an exploratory study of the nature of information in IS. The key thesis is that the information in IS is a system, or specifically, a meaning system (Mingers, 1995), a human activity

system (Checkland, 2000), an inquiring system (Churchman, 1971), or an open system (Emery, 2000) in its own right. Based on Gharajedaghi's (2005) holistic thinking developed from Ackoff's systems approach (1974), a conceptual model of information-as-system is developed through the pragmatism semiotics (Peirce, 1931) with the validity support of the perceiver-concerns model of information (Metcalfe & Powell, 1995), the schema of situational actions (Mingers & Brocklesby, 1997), the argumentation theory (Toulmin, 1964) and the theory of systems boundary judgment (Ulrich, 2003). The proposed model is described in terms of triads on the structure, function, and process and context of information in IS. The main research questions are both whether or not information could be seen as system and what would be the system's model of information?

The article is organized in the following manner. First, we discuss the complex phenomenon of information in information related studies, including IS. Second, a brief discussion of Peirce's semiotics is presented. Third, we propose a systems model of information-as-system based on Gharajedaghi's systems thinking framework. Next we make some comparisons of our model with others, especially with Mingers' comprehensive theory of semantic and pragmatic information to discuss the implications of our model. Finally, the article's findings as well as several theoretical and practical contributions are presented in the conclusion.

INFORMATION IN INFORMATION SYSTEMS

While IS researchers mostly investigate organizational contexts to develop computer-based systems relying on functions or roles of individuals in various organizations (Ellis, Allen, & Wilson, 1999), studies of information in IS focus on the pragmatic aspects and information related applications, particularly how information is used

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