Chapter I

A Systemic Approach for the Formalization of the Information Systems Concept: Why Information Systems are Systems?

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ABSTRACT

In the new economic context, based on Information and Knowledge resources, the concepts of Information Systems and Information Technology (IS&IT) are fundamental to understand the organizational and managerial process in all levels: strategic, tactic and operational. From an academic and practitioner perspective, we pose that the correct use of the concept of IS&IT, and in specific of Information Systems, is critical. First ones need to study the same object and second ones need to use the same common conceptual knowledge about what are Information Systems. Nevertheless, uniquely informal and semiformal definitions of Information Systems have been reported in the literature and thus a formal definition based on core systemic foundations is
missing. For these reasons, the conceptualization and formal definition of what are Information Systems acquires a relevant research and praxis status. This chapter addresses this problematic situation posing a formal definition of the term Information Systems based on core theoretical principles of the Systems Approach. For that, we firstly review the foundations of Systems Approach to establish the basis for our conceptual development. Then, an updated formal definition of the core concept System originally developed by Gelman and Garcia (1989) and that incorporates new insights from other systemic researchers is presented. With these theoretical bases, we proceed to review the contributions and limitations of main informal and semiformal definitions of the term Information Systems reported at the literature. Then the new formal definition of this term is developed using the updated formal definition of the term System. We continue with a discussion of how the definition posed formalizes systemic concepts of previous definitions, of how these are partial cases of the new definition and of how it can be used to model and study Information Systems in organizations. Finally, we conclude with main remarks and implications of this definition and with directions for further research.

INTRODUCTION

Information Systems and Information Technology (IS&IT) are essential components of organizations. Their role for providing support to the business operational processes, as well as to the management activities performed on tactical and strategic levels has dramatically increased in the last 15 years (Alter, 1996; McNurlin & Sprague, 1998; Mora & Cervantes, 1999). Furthermore, the industrial-based economy has suffered a shift to a new Information and Knowledge based economy (Drucker, 1988; Nolan, 1991; Nonaka, 1991). In this new economic context, IS&IT have become core concepts for understanding the management process in organizations, and their right conceptualization is critical for assuring their acceptance and use, as well as for improving their design and management. From an academic and practitioner perspective, we pose that the correct use of the concept of IS&IT, and in specific of Information Systems, is critical. Researchers need to study the same object, and practitioners need to use the same common conceptual knowledge about what are Information Systems. Benefits for researchers are the improvement of the overall understanding about how organizations operate, integration of disperse knowledge related with how IS&IT leverage the management process and the establishments of standard bases for the comparisons of research findings. Benefits for practitioners are the gains of common knowledge to promote, plan, design, develop, implement, evaluate, update and, in its
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