INFORMATION SYSTEMS, WEB AND PERVASIVE COMPUTING SERIES

ADVANCES IN INFORMATION SYSTEMS SET

Volume 2

Information and Knowledge System

Pierre-Emmanuel Arduin
Michel Grundstein
Camille Rosenthal Sabroux

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ADVANCES IN INFORMATION SYSTEMS SET

Coordinated by Camille Rosenthal-Sabroux

Most common definitions of the information system fail to clearly separate the notions of information and knowledge, and these terms are generally used quite loosely. This is particularly the case for projects dealing with digital information systems (DIS) using applications of Web 2.0 and big data.

This book presents the inherent risks linked to this ambiguity and studies the notion of the Enterprise's Information and Knowledge System (EIKS). It specifies the limits and conditions within which knowledge can be considered as an object and treated as an object in a DIS. EIKSs allow data exchanges, but also ensure how they are interpreted. They become actual knowledge systems.

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Information and Knowledge System

Preface

Communication is an essential aspect of human life, and the opportunities provided by information and communications technologies are unprecedented. Information in various forms can now be transmitted across space and time. Paradoxically, to cite Feenberg [FEE 04], a distance has been created between individuals, of "disposable experiences, that can be turned on or off like water from a faucet". Individuals have thus become services, made available to others via a technical system, which can be activated or deactivated at will.

Originally, the computer was not intended as a means of communication. The Internet was not intended to serve as a conduit for this communication, and information technology was not intended for anything other than the automatic processing of information. Nevertheless, computers have become ubiquitous: information technology is everywhere, in our jobs, televisions, watches, telephones and even in our health. The quantities of information involved, unimaginable in previous decades, are now treated using concepts such as Big Data. Computers play an important role in our private lives, and our private lives themselves have become computerized; with data located at distant and unidentified points, they are in the clouds due to the use of techniques such as cloud computing.

Man thus makes use of all available tools to fulfill the essential need for communication. The use of information and communications technologies should not obscure the substance of these exchanges: information. Information which was previously passed from one person to another through human interaction is now exchanged via computer protocols, which aim to optimize systems interoperability without really considering human

interaction; these interactions involve the exchange of much more than simple information. Information alone is simply a transcription, in the same way as a prehistoric painting on the wall of a cave, hieroglyphs on a papyrus or the neumes of Gregorian chant in a hymnal. Historians of today are constantly confronted with the challenges involved in interpreting this transcribed information (see Figure 1).

Figure 1. *Information can only become knowledge for you if it has a meaning for you. "King Ptolemy, the ever-living, beloved of Ptah, the god Epiphanes Eucharistos, most gracious lord": extract from the Rosetta Stone [FER 68, p. 43] (source: National Library of France)*

This book aims to highlight the advantages offered by information and communication technology (ICT) both in terms of information exchange and ensuring that the correct meaning is transmitted, allowing beneficial interpretation and the creation of knowledge. Information systems thus become information and knowledge systems. Although an information system may be based on ICT, it cannot be reduced to these technological aspects: users themselves play a role, acting as system components in their own right. These users process, store and transmit information, but this data has a meaning for them, something which does not occur in the case of technological artifacts.

Any attempt to limit information exchange to the framework of a digital information system using computer technology, to the exclusion of human contact, would most probably be seen as "totalitarian" within any organization [FEE 04, p. 180]. However, the number and availability of technological devices, the ease of use and the social character they may acquire all lead to more direct, frequent and essential interaction between individuals and the digital information system. Moving beyond the information transmitted within an organization, this book introduces the concept of information and knowledge system, which highlights the role of

knowledge and the part played by individuals as holders of this knowledge. To do this, a clear distinction should be made between "information" and "knowledge"; moreover, it is crucial to be aware of the fact that information can have different meanings, leading to the creation of different knowledge for different individuals.

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Michel GRUNDSTEIN
and Camille ROSENTHAL-SABROUX
May 2015

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Introduction

An evolution, either in technology or in its use, can have a significant impact on affected organizations. For Tran *et al.* [TRA 13], the ability to differentiate between evolutions which "will take root within organizations, leading to change" and those which "are more ephemeral, or have a much lower potential impact" is a key factor in ensuring the success of any Chief Information Officer (CIO). This monitoring activity aims to direct investment in relation to a situation and a context, but cannot be reduced to technological evolutions, as use and the evolution of use should also be taken into account.

Information and communication technology (ICT) seems to evolve independently of organizational activities. It forms an important part of our daily and private lives, sometimes even to a greater extent than in our professional lives. Any technological innovation may generate new uses; these new uses may raise new legal concerns, although this aspect will not be considered in detail in this book. Over 20 years ago, Chambat [CHA 94], discussing new information and communications technologies (NICT)[1], noted that technical offerings do not necessarily respond to social demands, but can generate new demands and new uses. Even further back, in 1974, discussing the contemporary use of "invented machines", Le Goff stated that:

> Men use the machines they invent while retaining the mentality they had before the invention of these machines [LEG 74].

1 No distinction will be made between ICT and NICT in this book.

Nowadays, in 2015, this remark is no longer truly relevant: the relationship between technological evolutions and changes in use has undergone a fundamental shift. While the use was formerly presented as a hindrance to technological development, due to inertia [GUI 93], it now continues to evolve faster than organizations are able to adapt to new technologies. Use evolves in the wake of technological evolutions, but in advance of organizational evolutions; it is essential to be aware of this fact when considering the processing, storage and diffusion of information in an organizational information system. Information systems are intrinsically linked to digital technologies, a consideration that will be discussed further in Chapter 2.

Web 2.0 is an example of a technological evolution going hand in hand with evolutions in use. The term "Web 2.0" appeared for the first time in 1999 when Palm Inc. was developing the first personal organizer with integrated web browsing capacity:

> The Web we know now, which loads into a browser window in essentially static screenfuls, is only an embryo of the Web to come. The first glimmerings of Web 2.0 are beginning to appear, and we are just starting to see how that embryo might develop. [...] The Web will be understood not as screenfuls of text and graphics but as a transport mechanism, the ether through which interactivity happens. [...] The hardware will be different from device to device; compare the interface of the Palm Pilot with that of the Game-Boy, for instance [DIN 99].

Web 2.0 is dynamic in nature and designed for use with multiple devices. It is a means of producing interaction, and has been labeled as "the social Web". This technological evolution led to changes in use; users are no longer content to simply consult Web pages in a browser (Figure I.1), but want to add their own content, whether from home, from their workplace or while traveling. This content is information, which may be processed, stored and diffused through a digital information system (DIS). It can also be a source of knowledge, when interpreted by individuals who are able to give a meaning to the content. However, this content cannot be considered as knowledge in its own right.

Figure I.1. *Internet home page of the Paris Dauphine University in a) 1997 and b) 2014*

The domain of information systems will be discussed in Chapter 1. Chapter 2 will introduce the domain of knowledge management, while Chapter 3 is devoted to the information and knowledge system, using an example taken from a real company. Finally, the book concludes with a conclusion, offering perspectives for future developments.

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