

# Information Systems Management

*Governance, Urbanization  
and Alignment*

**Daniel Alban, Philippe Eynaud  
Julien Malaurent, Jean-Loup Richet  
and Claudio Vitari**

**ISTE**

**WILEY**



## Information Systems Management



*Series Editor*  
*Jean-Charles Pomerol*

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## Foreword

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We all live and think in boxes, or starting from boxes. It may be those of our practices, our personal lives or our working lives. The same applies to knowledge. Modern science – and therefore techniques – is so specialized that neighbors in a biology laboratory, for example, do not understand each other's work, or only at the cost of lengthy and patient studies. Yet by their own admission, scientists who would like to take an interest in the work of colleagues with slightly different specialisms from their own do not do so, due to lack of time. This observation can easily be made more generalized: we do not take an interest in other people's work due to lack of time, time that flies more and more quickly and nips in the bud our desire to properly understand what is happening in our world and to help ensure that its future is as bright as possible for everyone.

We are all capable of talking about what is going on in the world. Talking about it as non-specialists, talking about it superficially, at the local bar. We can all come up with theories on what *should* be done to make the world a better place, and set the world to rights. When it comes to putting theories into practice, that is a different matter, because changing our practices based on specific problems is a very big ask, and it seems insane – especially, of course, if we would be trying to do this on our own. The effort must be made by a number of people. Changing our practices based on well-expressed theories is a collective or political effort, in the strong sense of the term, encompassing the history and stories of women and men with all their inconsistencies, their chaotic progress and their possible sense. Policy is a position at the point where thought and action meet. In other words, the world progresses towards satisfactory solutions for the dual question of effectiveness and sense without a collective commitment, which

consequently must be multidisciplinary and transversal. Until we understand the need to take the time to genuinely share our practices, knowledge and understanding of the world (not just say that we do), we will not be able to genuinely change things to make the world better.

However, there is an urgent need to do this. Developments in science and technology and the subsequent social developments are such that if we do not tackle certain key issues, including the relationship between man and machine, we will soon be overwhelmed not by the machines themselves but by the lack of structured dialog and thought about them. If we do not succeed now in taking control of a minimum of technological development, which is not so much due to the technologies themselves and their manufacturers (on this point, moreover, the issues are more to do with economics and politics rather than science and technology), but rather, it is due to our failure to think about them. We let ourselves be fascinated by technology and the promises of prophets with their visions, such as those of the transhumanists. To put it bluntly, it is all very well to start considering the rights of robots, but that means forgetting the rights of the real live men and women whose numbers are far greater and whose living conditions are morally, socially, economically and politically unacceptable. Developing robust, rigorous and fertile thinking, practice-based and clear on the material conditions of the lives of women and men, in relation to new technologies, is a crucial issue if our humanity and our lives, and those of our children, are to remain meaningful. This is where complex thinking makes a decisive contribution.

This book reflects the authors' preoccupation with the *concrete practice* of the organizational stakeholders on the ground in their day-to-day work. There are stakeholders whose function is indeed, within organizations and businesses, to manage *the* "information system" *of* the organization, *of* the business, etc. Thus, the authors' starting point was the concrete, everyday life of managers of organizations' information systems. But they do this by integrating the said information system "in its complexity" into the manager function. That is, in its context, taking into account as far as possible all the parameters involved in and via the life of the information system of any kind of organization based on a three-phase approach: via stakeholders, territories and projects. In other words, they step back to get the necessary perspective to relevantly, usefully and meaningfully problematize the issues now being raised by the most routine management of an information system. They thus show, at the most concrete level possible in the daily life of business, how

irrevocable relationships are inevitably woven, for the worse if we do not take heed, but for the best if we are careful, between machines and men, between technologies and questions of meaning, and between ownership of the machines by stakeholders and complex, living organizational systems. The usage made to this end of the concepts of governance, urbanization and information system alignment is very enlightening.

This kind of effort towards a concrete understanding of organizational complexity was, of course, embarked on long ago, in particular by Jean-Louis Le Moigne in his *General Systems Theory*, in the context of Morin's complexity thinking. Many subsequent publications have continued the work, and yet, management sciences have still not sufficiently taken ownership of the concepts pertaining to complexity for it to become a central topic in the preoccupations of researchers and teachers on the one hand, and practitioners on the ground on the other hand, ideally in permanent correlation. The task is challenging. It calls for perseverance, the ability to step back, concrete knowledge of businesses and organizations, and tenacity towards the question of the sense of our practices and our knowledge. It is achieved by unflinching keeping sight of the bigger picture in every concrete situation by leveraging the most productive characteristics of complexity (non-linearity, uncertainty, self-organization, etc.). Through this book, the authors also show how taking stock of stakeholders, territories and projects on the ground requires continuous learning based on trial and error on a daily basis, taking a stance that these days we would call "agile". In other words, a sufficiently flexible stance to lead stakeholders not only to do but also to think about what they are doing. And this, in real life, is not easy for anyone.

*Information Systems Management* is therefore enlightening. Not only because it takes a fresh look at the concrete, taking as its starting point the tools of complex thinking, which is the essential challenge embarked on by Le Moigne and Morin and to be continued going forward, but because it offers a number of essential elements of the *methodology* of doing this. The best way to thank them is to leverage their work to extend its spirit and its application to all fields that may appear relevant.

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Holder of the Edgar Morin Chair on Complexity



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## Introduction

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The purpose of this work is to raise awareness among managers in organizations (businesses, administrative bodies, associations and groups of individuals within a collaborative economy) on the issues raised by information systems. This book does not set out to try to cover all the questions raised by information systems, or to offer an exhaustive list of ready-made answers. The authors' intention is rather to provide a framework for analysis and the keys to a coherent understanding, to help information systems stakeholders to deal with questions that are rich in diversity and constantly evolving. Information technologies are by nature difficult to pin down. They are paradoxical in nature. On the one hand, they are forward-looking, and indispensable in that they pave the way to innovations full of potential (Big Data, artificial intelligence and connected objects). On the other hand, they are vectors of major vulnerabilities (cyber security, digitization and loss of privacy), and it is still difficult today to gauge their scope and consequences. This is why the study of information systems is both necessary and fascinating. Beyond the purely operational issues [ALB 09], we can clearly see that information systems management has to do with ethical questions and the complexity of the world. Insofar as they structure the processes of business departments and increasingly condition the relationships between the stakeholders in a value chain, decisions taken about information systems have strategic impact. Insofar as they are no longer confined to the world of work, but increasingly offer a continuum to personal spaces, decisions about information systems also have an impact on everyone. This book is pedagogical in nature, aiming to make a contribution towards ensuring that issues relating to information systems are not left exclusively to the experts in this field.

To approach the topic of information systems management, we propose to jointly associate and consider three key concepts of information systems science: governance, urbanization and alignment.

*Information systems governance* entails the implementation of a certain number of resources, bodies and procedures in order to better manage the information system. Governance aims to handle questions such as: How should decision-making for information systems stakeholders be structured? How can value creation be measured? How can stakeholders be involved in value creation? How can all information resources be integrated into a single approach? How can internal and external challenges be coordinated?

*Information systems urbanization* uses visualization methods to help the manager take stock of the different organization levels of an information system and their coherence. Urbanization detects the constraints, opportunities and contradictions that are acting upon the information architecture and can provide the decision-makers with tools to help them envision the continuous development of the information systems construction process. Urbanization thus answers the following questions: How can information flows be organized? How can their fluidity be improved? How can they be adapted to current and future changes?

*Information systems alignment* evaluates the information system's capacity to make a significant contribution to the organization's strategy. In a context of rapid technological change and highly competitive markets, alignment enables responsiveness and aims for proactivity. It is a vector for creativity and promotes the emergence of comparative advantage. Because it requires a concrete response and rejects intangible, standardized answers, strategic alignment recognizes the diversity of organizations and issues to be taken into account: How can we make the information system responsive to strategic agility? How can we facilitate the adaptation of tools and humans in the face of changing objectives?

From a pedagogical perspective, the book sets out to make the link between the theory of information systems and the theory of organizations. Thus, we link the three specific information systems concepts mentioned above (information systems governance, information systems urbanization and information systems alignment) with three other, more generic, keys: stakeholder, territory and project.

*The stakeholder* is the crucial element that makes it possible to envision governance, because they are the source of value creation. However, the human stakeholder engages in collective action via sociotechnical interfaces and systems. The interweaving in information systems is so strong that it is sometimes difficult to differentiate, within the organized activity, what is human in scope and what stems from computer applications. It is thus possible – as the sociology of innovation proposes [LAT 07] – to think of technical artifacts and information systems in particular as agents.

The territory is the operative field embraced by a self-regulating information system. Territory is a key concept of the urbanization process and is characterized by a multiplicity of levels: geographic, functional, virtual, represented, etc. This means that thought must be given to maintaining coherence between the various territorial levels of the information system, in the face of the disruptive influence of the context.

*The project* is an important element in information systems strategy. Management of the project portfolios allows an implementation of strategic alignment. Once the management direction has been set, the projects will define the path towards the target information system. These projects feed into each step of the information system upgrade: acquisition, processing, storage and distribution of information.

Using these three concepts, we propose to define the information system as: “A set of actors (human and/or non-human) that are interdependent, interacting via socio-material systems on a plurality of territories in the framework of an information management project (acquisition, processing, storage, distribution)”.

The great challenge of our three-dimensional proposal (stakeholders, territories and projects) is how this can be turned into a system. To do so, we must, behind this didactic breakdown, open an analysis of the overlaps, intersections and cross-influences. In doing this, the danger is then that the manager will feel overwhelmed by the challenges. Taking these three perspectives into consideration simultaneously can indeed seem tricky, if not impossible. How should it be addressed? What methodology should be used? Is it reasonable to try to bring these three aspects together in sync? To meet these challenges, we propose the adoption of an operational approach based on complexity thinking [LEM 90, MOR 90].

For the sake of clarity, the book introduces each of the three aspects in turn before seeking to combine them in the final part. The book thus has a four-part construction:

– *Part 1: stakeholder governance.* We offer strategic managers our insights on how their profession has developed, by sketching the portrait of the stakeholders involved. Nowadays, these stakeholders are in great demand to drive change in organizational, decision-making and regulatory mechanisms. It is especially important to take stock of these issues in order for them to be given priority status on organizations' strategic agenda. We show that the issue of governance makes reference to assessments in terms of transaction costs, cost-sharing and hidden costs.

– *Part 2: territorial urbanization.* Beyond the urban metaphor, in this part, we consider the modalities of conducting a breakdown of the information system and the vision induced by the information systems planner. The issue of the territory is a complex concept. Territory is often referred to in terms of its macro-economic aspects. Our proposal is to open up a consideration of information systems management at the meso level, which seems to be the appropriate observational level of the extended organizational framework.

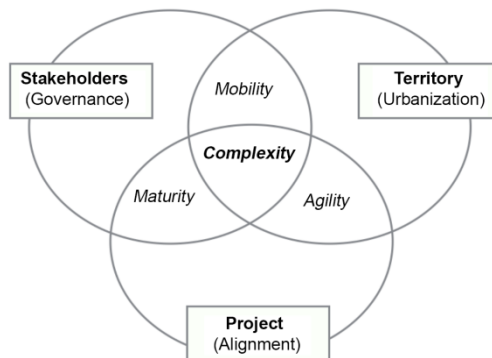
– *Part 3: project alignment.* In this part, we approach the issue of aligning the information systems project to the general strategy of the organization. In a competitive environment, there are many changes in strategy and organizations are obliged to adapt to technological developments that quickly render the solutions that have already been implemented obsolescent. The management of IT project portfolios enables strategic agility and innovation.

– *Conclusion: management in complexity.* To conclude, we focus on the areas of confluence between the three aspects identified for an analysis of information systems management. We show how the coming-together of stakeholders and territories raises the need to take into account increased stakeholder mobility in an organizational context where the organizational boundaries are pushed back significantly, or even broken down. We analyze the coming-together of territories and projects and the development of the agility made necessary by new customer expectations. We also look at the coming-together of stakeholders and projects around the quest for organizational maturity widely supported by the development of norms and international standards for information systems management. At the intersection of the issues of governance, urbanization and information systems alignment, there lies complexity management. The use of this term is an

indication not of a problem, but rather of a solution. In line with the etymological origin of the word (*complexus*: something that is woven together), it entails focusing on the complementarities and continuations between the various points of view.

Finally, this book is a follow-up to a book published in French by Hermès-Lavoisier in 2009: *Le Management opérationnel du système d'information* (operational management of the information system). Its purpose is to address a wide audience: students (business schools and their masters of science in business and masters of business administration) and professionals working in information systems management.

Its target is to describe and analyze organizational information systems with reference to the problems encountered in businesses and also the problems (always more numerous) that emerge from public, not-for-profit organizations.



**Figure I.1.** *Manager in complexity*



## PART 1

# Governing the Stakeholders



---

## Introduction to Part 1

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The first part of this book sets offers information systems stakeholders a reflective contribution to the possible future developments in their roles and responsibilities. In this part, we will sketch a portrait of the stakeholders in information systems (IS) governance. We will show how today's stakeholders are driven to seek shared mechanisms for organization, decision-making and audits in order to anticipate successive technological innovations. This sharing is particularly important, to the extent that it is considered a priority in the strategic agenda of organizations. We will show that IS governance encompasses the complexity of the issues arising within organizations (value creation, skills sharing, capitalization of knowledge, etc.).

In Chapter 1, we will address the issue of technological change and describe its impact on the collective organization of IS stakeholders. We will highlight, in particular, the semantic shifts in the job title of this function, which provides evidence both of the growth in opportunities provided by technology and of the acknowledgment of its strategic importance within the organization. Chapter 2 will show the link between global organizational governance and IS governance. We will identify three separate theoretical approaches that enable us to take stock of the issues related to information systems management. We will then consider information systems through, in turn, taking stock of transaction costs [WIL 81], the concept of a hybrid coalition organization [AOK 01, AOK 10] and the prospect of the coming together of an organization's stakeholders [FRE 10a, FRE 10b]. Chapter 3 will conclude this first part with a consideration of the practicalities of

implementing IS governance. We will describe the organizational forms of governance and good practice benchmarks relating to IS, which are most frequently used as guidelines during implementation and whilst achieving compliance.

---

# Information Systems Stakeholders

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## The Fundamentals

1) Technological developments stimulate change to organizational models while at the same time changing production models.

2) The issues raised by information systems (IS) involve all the human actors within organizations, because they are at the heart of every goods and services production and distribution process.

3) The interface between human actors and technical tools calls for a complex, global approach to IS.

The ubiquitousness of digital tools in both our professional and our personal environments makes the concept of IS stakeholders difficult to grasp. Indeed, a corollary of the widening scope of digital transformation is the increase in the number of stakeholders involved. Thus, when we talk about IS stakeholders, we are referring not only to those responsible for the creation and maintenance of information services. We are also referring to all users whose roles and significance have grown steadily along with the development of information and communication technologies (ICT). By facilitating horizontal operating models, ICT has brought about a profound change in the relationships between the human actors within organizations. ICT has led to a greater decentralization of operations, a peer-to-peer operating model and a decrease (or even disappearance) of middle management who in theory are responsible for supervising those involved in production. We may have talked about the “flattening” of organizations through the generalized use of ICT, with a reduction in the number of reporting levels required. IS users (no matter what their role is

within the organization) become key stakeholders in IS governance. In the same way, ICT has helped empower end users by involving them in the production of IT services. The widespread adoption of the so-called “agile” methodologies can be cited as proof of this. But when considering IS stakeholders, we must also take into account the technological tools deployed within organizations. Because they are closely interwoven into the heart of production processes, information reporting and audits, these tools are fundamentally linked to the business activities of today’s organizations. As such, these tools have the potential to influence the cognitive capacity of the human actors and to change the way they perceive their environment. It can thus be seen that the concept of stakeholders in information systems, and how to define them, is complex. After describing the development of the technological environment of IS stakeholders, we will seek to show the impact of this development on organizational management. We will then be able to start categorizing IS stakeholders and define the unit of analysis required in order to conduct appropriate IS management.

### **1.1. The technological environment of IS stakeholders, and its development**

Four successive “technological waves” have marked out the history of IS. In the 1970s and 1980s, the IS was centered around what we call “proprietary systems” whose application code was inaccessible to the user. Workstations were slave terminals with no local resources, connected to a central computer (mainframe or “host”) on the master-slave model. This earliest period can therefore be described as “host-centric”.

The 1980s and 1990s were fertile in innovation. The integration of organizational IS led to new, networked patterns of work organization and production. These innovations included, for instance, the emergence of client–server (C/S model) applications. From that point on, the C/S model combined two approaches: client-centric (where resources are managed locally) and server-centric (where resources are centralized). The C/S model assumes implementation of departmental computer systems based on workstations connected to each other by a local network (the invention and rapid adoption of Ethernet technologies). The C/S model was also contemporaneous with the development of relational databases and their associated methodologies (entity-relationship model, SSADM, Prince, Merise methodology) and the advent of the first EDI (Electronic Data Interchange)

applications (the birth of Business to Business or B2B e-commerce) using extended networks. The development of EDI was a precursor to the progression of organizational IS into inter-organizational IS, supporting the coordination of logistical flows of increasingly networked businesses.

The 1990s and 2000s built upon the previous wave's widespread adoption of ICT. This marked the beginning of the network-centric era. This period was founded on the significant development of networking technologies and the coming of age of the Internet, already firmly established in academic circles. The era was characterized by the birth and growth of intranets (for internal communications and subsequently for all business processes) and extranets dedicated to the opening up of IS to external stakeholders on a massive scale (introduction of business portals). The environment became fully distributed, and the work on the internal integration of the company's IS was effected in the context of wide area networks, in terms of both technology (networks) and economics (networking), boosted by the widespread availability and massive adoption of Internet technologies. This period saw the appearance of entirely new and innovative relationships between the organization and all its stakeholders, in the form of the openness of IS and connectivity with customers (e-commerce with consumers, Business to Consumer – B2C), partners (B2B), partners as stepping stones to clients (Business to Business to Consumers – B2B2C), employees (Business to Employees, B2E), administration (Business to Administration – B2A) and so on, not forgetting shareholders and the general public, through dedicated institutional websites.

During 2000–2015, we saw the development of cloud computing. Using a combination of virtualization architectures and distributed operating models, these technologies led to growth of the market for advanced services. Packages on offer were varied and allowed for graduated outsourcing of services. The SaaS (Software as a Service) model is the best known, but other packages were available: Platform as a Service (PaaS) and Infrastructure as a Service (IaaS). The cloud-centric period is oddly reminiscent of the initial host-centric period. There is no need for the user to have significant local resources. The service provider supplies users with all the resources they need and centralizes them to satisfy the requirement for user integration, with the added conveniences of rolling out the service and providing basic training, which did not exist in the initial period, but which is now made possible by the higher speeds offered by telecommunications.