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Network, Smart and Open

Three Keywords for Information
Systems Innovation

Lecture Notes in Information Systems and Organisation

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Editors

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Three Keywords for Information Systems
Innovation

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Business Information Systems in a Networked, Smart and Open Environment

Rita Lamboglia , Andrea Cardoni , Renata Paola Dameri 
and Daniela Mancini 

Abstract Network, Smart, and Open are three keywords that nowadays guide information systems (ISs) research. We discuss the relevance that these three topics, concerning technological and organizational innovations (i.e. cloud, smart technologies and networking), play for the development of accounting and management information systems. The aim is to investigate how these innovations could influence ISs, with a particular focus on accounting and management information systems, enhancing their information potentialities and their ability to support decision making processes, and improving accounting methodologies; performance measurement systems; data management; information systems architecture, external and internal reporting.

Keywords Network · Smart · Open data · Innovation · Accounting information systems · Management information systems

1 Introduction

The research works published in this book are a selection of the best papers—original double blind contributions—submitted at the XIII Annual Conference of the Italian chapter of Association for Information Systems (ItAIS 2016), which was

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held in Verona in October, untitled “ICT and innovation: a step forward to a global society”. The volume also include three invited paper presented at the European Conference of Information Systems 2016 (ECIS 2016).

This book presents a collection of original research papers that mainly concern the relationships between Information Systems and three currently relevant keywords, as network, smart and open.

The remainder of this contribute is structured as follows. The next section, written by Andrea Cardoni, discuss the relationship between innovation in information technologies (IT) and management information systems in business networks. The second section, written by Renata Paola Dameri, discuss the role of Web 2.0 and smart technologies in managing information and affecting relationships among firms, public administration, customers, citizens. The last section, written by Rita Lamboglia and Daniela Mancini, analyses innovation of accounting and management information systems in an open context.

2 Exploring the Impact of Innovation and the Role of Management Information Systems in Network Settings

Nowadays digital technologies and innovation are broadly recognized as disruptive driving factors of change, impacting on almost every aspects of daily human and organizational behavior [1]. One of the most visible and pervasive effect on the current socio-economic environment is the influence of technology on network reconfiguration of society, both at individual [2] and organizational level [3].

Indeed, even if the emergence of the knowledge economy [4] inaugurated the new era of “network society” [2] since few decades, the diffusion of web-based technology, platforms and devices [5] has radically accelerated the process of networking reconfiguration affecting people and firms [6].

In a broader perspective, this phenomenon led to a massive increase of interconnections. Digital networking technologies have allowed social and organizational networks to expand and reconfigure way beyond the complexity of traditional network forms [2]. The change brought about the networked information environment is defined deep and pervasive, leading to structural change in the nature of economic and social organization [7].

From a business perspective, the digital economy is radically influencing markets and business models. In the post-fordist reorganizing strategies that first emerged in 70s and 80s anticipating the diffusion of networking technologies, the new digital communications platforms are expanding the capabilities for fostering the networked organizing logic [8]. This is stimulating the firms operating at every dimensional level and competing in every industry to follow in a reactive or proactive manner the “network imperative” [9].

Performing a study of digital network business models through a multi-year, in-depth study based on wide range of qualitative and quantitative analyses, recent literature [9] proposes a classification of business in four different models: “asset builders” that deliver value through the use of physical goods making, marketing, distributing, selling, and leasing physical things; “service providers” that deliver value through skilled people hiring and developing workers who provide services to customers for which they charge; “technology creators” that deliver value through ideas developing and selling intellectual property, such as software, analytics, pharmaceuticals, and biotechnology; “network orchestrators” that deliver value through connectivity creating a platform that participants use to interact or transact with the many other members of the network. Each model is based on a specific form of capital asset, respectively represented by physical capital, human capital, intellectual capital and social capital. Adopting this framework for a quantitative study involving the S&P 1500 (a combination of the S&P large, mid, and small cap indices), network orchestrators obtained on average faster revenue growth and higher profit margins than companies utilizing the other three business models. This led to identify a relevant difference between the “firm-centric” and the “network centric” business models, highlighting the importance to change radically some founding management principles on technology (from physical to digital), asset investment (from tangible to intangible), strategy (from operator to allocator), information and measurement (from accounting to big data). The latter claims for a shift from basic accounting data, focused on the physical assets and with significant time delays, to big data analytics, that still measure all these dimensions but also track their external, intangible assets and use this data to improve the speed and quality of decision-making [10].

It is then considered a key for innovative networked organizations to move beyond traditional forms of information and measurement, which have not kept up with the technologies and priorities of the market. With the rise of new assets (digital, intangible assets) new processes of information and measurement are needed [11, 12] as traditional systems focus almost entirely on the physical, they are internally focused do not support a timely decision-making process.

Consequently, in today environment the link between technology, business models, networked structures and information systems needs to be carefully investigated. In the attempt to frame all these changes in the theoretical view, the key principles of cybernetics [13, 14] help to understand the relationship between the digital age and the network society, evaluating the impact of digital innovation on organizational design [15] and information systems.

While technology disrupts, it can also be used to help cope with complexity. Networked IT enables forms of collaborative networked organisation that offer the sort of agility and flexibility hierarchically integrated businesses struggle to achieve [2]. It can also be used to capture and analyse intelligence about the environment (markets, customers, competitors) to support better decision-making about strategy and tactics. For cyberneticists such as Ashby [16], complexity can be understood in terms of the ‘variety’ exhibited by a system. Variety here refers to the number of distinguishable states a system (such as an organisation or organism) can assume.

Where a system can match the disturbances to its environment's states, it is said to have 'requisite variety'; that is, it can change its own internal states to respond to the world beyond [16].

The notion that 'only variety absorbs variety' is at the heart of work by Beer in his development of the Viable System Model (VSM) [13, 14]. The VSM identifies the functional requirements of an organization if it is to have the capacity for self-regulation, based on five component subsystems: System 1—*operations* that produce the organization's key outputs (such as products or services); System 2—*coordination*, which enables operational units to work together without clashes and oscillations; System 3 *delivery management* (including 3*, monitoring), which distributes resources between operations and support overall cohesion; System 4—*development management* (such as marketing, training and R&D), which prepares the organization for the future; and System 5—*policy and governance*—which sets overall direction and ensures there is a balance between operations and development.

In the process of erosion of the organizational and industrial boundaries occurred by the digitalization, a paradox encompassed by the opposed logics of stability and flexibility emerge [15]. Digital infrastructures need to be stable enough to allow the enrolment of new artefacts, processes and actors, but also assuring the flexibility to allow unbounded growth [17]. The critical issue involves the concept of 'control point' [8], that is how to define and control a set of connections in a socio-technical system that help determine behaviours and constraints for other elements in the system. Rooting the analysis of that paradox on the Viable System Model [13, 14] and Ashby's Law of requisite variety [16], networks are interpreted like complex structures in search for self-organization mechanism that helps to regulate the behaviour of the system and maintain its integrity within particular limit [13].

This is the context in which it is increasingly important to discuss the theoretical and empirical implications for accounting and management information systems (MIS) in the inter-organizational settings and networks [15]. The role of MIS has always been recognized as an important source of competitive advantage [18] but new challenges are emerging, as the MIS conceptualization, design and implementation, have to effectively integrate human and organizational structures, acting as 'control point' [8] and supporting the viable system coordination and monitoring mechanisms [13, 19].

Since the last decades of the past millennium, the management and accounting literature has deeply discussed the relationship between networks and MIS. One of the most relevant contribution [20] focuses on the strategic benefits of implementing an inter-organizational information system (IOS). The fundamentals of the IOS concept were developed in the 80s [20, 21] and the IOS term was first used by Barret and Konsynski [22] referring to systems that involve information "resources", like hardware, software, transmission facilities, rules and procedures, data/databases, and expertise, "shared between two or more organizations". Cash and Konsynski [23] finally adopted the term IOS defined as "automated information systems shared by two or more companies". Strong efforts have been undertaken in literature to explore the IOS subject in different perspectives [24] but a lack of a

generally accepted framework of analysis led to the proliferation of IOS typologies. Many researchers in the Information Systems (IS) field referred to institutional economics' concepts, while a literature review performed by Kern and Willcocks [25] reported that the IS research on inter-organizational relationships adopted four main conceptual models: the life cycle dynamics, the exchange theory, the resource dependence theory, the transaction cost theory and organizational learning. More recent models have been trying to extend managerial theories such as the resource based view model [26] and the dynamic capabilities theory by taking into consideration the contribution of IT to company performance.

From an accounting perspective, new approach to re-think the lateral process on accounting information [27, 28] emerged in accounting literature since the mid-1990s, when many important scholars [29] emphasized the importance of extending the domain of accounting across the traditional boundaries and called for a need to encourage the research accounting in inter-organisational settings [30]. In this evolutionary perspective, Italian literature has traditionally accorded much importance to the study of accounting issues for networks. Consistent with a solid tradition, this subject is considered to be central for the understanding of the new organizational structures and needs to be investigated in close connection with the management issues. Even more the gap between the evolution of managerial and organizational structures and the definition of adequate information systems can influence the development of more effective forms of networking, as the support of managerial and organizational processes is not considered a crucial role of information [31]. By broadening the analysis perspective, Mancini focuses on the issues of "relational control" [32, 33] and illustrates an integrated scheme "information-governance-control-performance" where the differentiating factor of information sharing—together with the information system which it originates from—are the main components on which a company can implement an effective governance and control of its alliances [33].

Even in the light of this scientific maturity, it is widely recognized the technological innovation are bringing new criticalities and opportunities to be investigated [34, 35]. The challenges posed by the open and smart society are twofold, as the MIS design, implementation and use have to continuously fit the technological evolution and the network configuration [36]. This will assure the needed support to innovation dynamics and relational dimension allowing individuals and firms to achieve the complex set of strategic and operational objectives of collaborative processes.

In the need to thoroughly explore these issues, the first four papers included in this book provide some relevant scientific advancements, investigating the relationship between innovation, technology and MIS on different network settings (business and government, organizational and individual). The implicit question arising from the contributions is to whether inter-organizational relationships are following the technological innovations and the information systems (IS) are adequately designed and implemented to achieve the complex set of networking performance.

Particularly, the work of Treku and Wiredu focuses on Government to business inter-organizational relationship (G2B), analyzing a case of IT innovation platform (GIFMIS) involving the Government of Ghana and a private firm committed in the project to help with specifications, acquisition and deployment of IBM systems for the inter-organizational information system (IOS). Adopting the theoretical lens of structuration theory and transaction costs theory, the paper investigates how the technology induce organizational changes and, more specifically, which kind of influence the information systems (IS) implementation lead on structural adaptation of IOS. The qualitative data collection performed through open-ended interviews, document studies and non-participatory observations demonstrate that the structural adaptation derives from tensions between economic, technological and governance mechanisms, aiming at balancing IT infrastructure with inter-organizational governance to maintain low transaction costs. The work also illustrates the dynamics of inter-organizational transactions and the role of human agency in structural adaptation, highlighting the influence of strategic level agency by executive decisions.

In a similar networking arrangement, the manuscript of Di Vaio and Varriale deals with inter-organizational relationship involving public authorities and private operators assuming the management control systems (MCS) and inter-organizational information system (IOS) as main research objectives. The specific context is referred to the seaport activities and the focus is devoted to the administrative interconnections linking port authorities, shipping agents and cruise companies to assure the regular operational and information flow related to arrival, mooring and departure of ships in the port destinations. Rooting the discussion on the MCS and environmental literature of seaport activity, the paper investigates the role of IOS on preventing and reducing the environmental effects and supporting the environmental strategic decision. The qualitative approach adopted interviewing two users in the Italian port of Naples investigate different relationship systems between shipping agency, cruise company and between port authorities (PA). The exploratory study found relevant differences in terms of information systems adopted for adequately managing the process and a lack of specific IS for supporting port users. Quality and quantity of information for environmental effect reduction are really scarce and the functions analyzed in the two inter-organizational systems do not allow the integration of operational and informational flow for effective relationship management and reduction of environmental effects.

The next two papers complete the analysis of technology evolution and accounting and MIS in the relational view, enabling a broader understanding of networking relationship in the open and smart society at organizational and individuals level. The work presented by Siciliano and Gaudenzi relates to industrial firms and consider the disruptive effects for modern supply chains (SC) deriving from information technology (IT) and cyber risks. The central issue discussed is the evaluation of the level of knowledge acquired and the risk management approach adopted by SC and IT managers. Framing the theoretical analysis on IS security literature and referring to the emerging research stream of cyber supply chain risk management, the paper collects data from fifteen selected industrial supply chains headquartered in Europe, composed by medium/large companies operating in

different private industries. Providing a questionnaire based on security and risk management standards the research highlights a lack of knowledge sharing between IT manager and SC manager, poor communication processes and overconfidence in technical investments. In the absence of integration between the different functions the paper proposes an holistic IT and Cyber risk management framework based on resilience and discusses empirical implications.

In the last work written by Uljala and Scupola the analysis context moves from organizational to personal level, and the relational view is referred to the networking effects lead by technology innovation in developing the virtual entrepreneurship of individuals. The paper adopts the Rogers' diffusion of innovation (DOI) theory and take into consideration the case of E-Residency project implemented in Estonia. This is a transnational digital identity in the form of an eID card allowing individuals to electronically identify and authenticate encrypt and digitally sign documents, accessing electric services, aiming at contributing to the development of the Country's economic and cultural development. Selecting seven individuals adopting E-Residency technology for entrepreneurial purpose and submitting them a web-questionnaire accompanied by interviews, the case highlights the difficulties emerging on innovation diffusion and e-services. Despite the rather simple procedure designed, the scheme implemented encountered some obstructions due to the lack of integration between legal, administrative and policy capacities. The harmonization of these different dimensions of innovation from the users point of view is considered as a fundamental attribute in launching new e-service, especially at government level.

Summarizing, the overall contribution provided by the papers define a relevant view involving technology, organization and MIS that is fundamentally concerned with the reticular interaction between the innovation, organization and information processes (Fig. 1).

Framing the findings in this logic, the first paper demonstrate the existence of three forms of inter-organizational structural adaptation (legitimation, domination and signification) related to the need to balance efficiency and effectiveness between

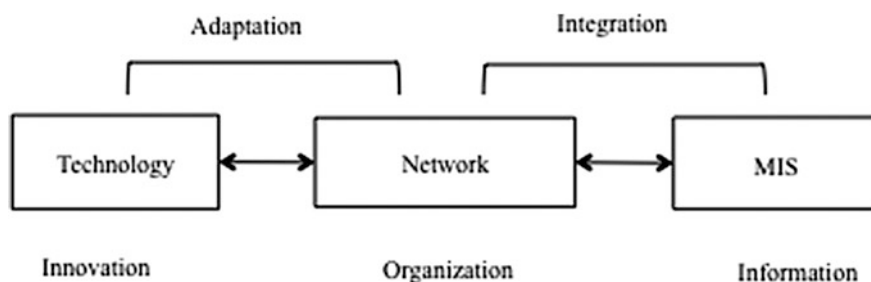


Fig. 1 Technology and MIS in network settings

governance, IT sources and capability, and simultaneously achieving cost efficiency of shared goals.

Viceversa, the remaining papers mostly focus on the issue of integration between networking and MIS and highlight the crucial role of the latter on supporting the relational systems to achieve the various kind of strategic objectives at organizational and individual level. Here the findings show the difficulties and obstacles encountered in different network settings to adequately integrate the information processes with the reticular organization in order to achieve some relevant strategic objectives in the open and smart society like environmental performance, risk management for IT and cybers risks and virtual entrepreneurship development.

Above all, it emerges the importance of a holistic approach and the integration of MIS with transversal organizational structures, which in turn are increasingly shaped by technology. In this context a comprehensive design and implementation of MIS has to be able to consider the interaction between innovation, organizational and information processes, moving from an “integration” to a “sharing” logic. Only this will allow to exchange not only information but also feed-back, ideas, suggestions, opinions between people, inside and outside companies, in order to create value by interaction [36].

These issues are raising the most significant challenges at operational and theoretical perspective that future research will have to investigate to develop the full potential of networking in an open and smart society. The Italian literature has traditionally accorded much importance to the study of the connections between management and information processes, even focusing on networked structures [31] and accounting in inter-organizational settings. For future researches and challenges there is the opportunity to discover the value of this holistic approach to study the continuous interaction between technology, networking settings and MIS, integrating this vision with theoretical concepts provided by the cybernetics.

The cybernetic view has always been consistent with the Italian holistic approach and provide a comprehensive framework that can allow to integrate the different level of analysis involving the impact of innovation and digital technology on networked structures and their related MIS. The adoption of cybernetic tools, already occurred to interpret the firm system of transformation [37] and recently discussed with reference to Management Control Systems [19] should then be extended to investigate networks and MIS in open and smart society, to discover the self-regulating mechanism ad support individual and firms to achieve performance in network settings.

3 The Transformation Role of Smart Management Information Systems

Since ten years environ, Web 2.0 has been transforming the way ICT is affecting both the economic environment and the daily life of people and business. Born from the financial bubble and the failure of several old-fashion ICT companies, the label Web 2.0 is nowadays a buzzword used here and there sometimes without a clear awareness about its real meaning [38]. The Internet is no more an instrument, but it becomes a platform without boundaries or dimensions, transforming the way people and firms interact each other in the digital milieu [39]. It emerges the potential driven by the Web to harness collective intelligence and to enforce participation [40].

At the origin, Web 2.0 was conceived in the ICT technology production context as a disruptive technology, as Web 2.0 is much more than just pasting a new user interface onto an old application. It is indeed a way of thinking, a new perspective on the entire technological environment. In the further, Web 2.0 has becoming a new vision of the whole business and finally also of the way people live, work, relate each other [41].

These transformations driven by the Web (r)evolution have cross impact on all the economic sectors and social contexts, therefore interesting a very large set of different aspects. Transformations especially modify the role of actors and stakeholders in the social, political, economic systems [42].

Traditionally, the value chain was conceived like a linear relation regarding one player and linked with other value chains of suppliers and customers [43]. Using ICT and especially the Internet, value chains become bi-directional or multi-directional, deeply changing the way firms interact each others [44–46]. From competition, the new organizational frameworks shift towards cooperation and finally cooptition, conceived like new way to add value in the production chain thanks to information and activities sharing [47]. The ICT pervasiveness produces cooperative exchange relationships on the Internet, involving both firms and customers [48]. New paradigms emerge, such as economies of aggregation, where the Internet deploys its ability to modify the value proposition of a company [49].

The most interesting effect of the deep use of the Internet 2.0 is that it increases the involvement of people in all the daily activities, not only economic ones, but also social and political ones. It produces intra-organizational networks that consist of both collaborative and competitive ties among organizational units [50]. Several cases are nowadays well known: for example, value chains where customer cooperate in creating the final product, such as in MyPhotoBook, where the customer creates his own photo booklet building the frames and then the book is printed and sent by mail; or business networks where suppliers become partners involved in the co-design of the final products of their customer firms; or citizens cooperating with the local or central government in governing their city or country [51].

Also the relationship between the public administration and citizens is deeply changed, thanks to a set of technologies and applications forming the so-called

e-government: government's use of technology, particularly web-based Internet applications to enhance the access to and delivery of government information and services to citizens, business partners, employees, other agencies, and government entities [52]. E-government is not only a way to speed or make more efficient the delivery of information and services: it is indeed an instrument to create new relationships between the government and the citizens and to increase trust and dialogue [53]. The use of Web 2.0 platforms and behaviors is especially a driver towards e-democracy, that is, the Internet potential to reshape democratic life and the use of digital network technologies to shape public policy [54].

Examining the Web 2.0 wave in its cross impact, some keywords strongly emerge, bringing together all the different fields of digitalization: they are participation, communication, smartness, co-creation, and network. These keywords depict a scenario where the traditional relationships tying different actors in a context are modified in a new way not known before.

This transformation clearly emerges from four papers included in the present book, regarding different implementation of Web 2.0; all the works highlight the capability of new technology to transform processes and relations, instead of simply improve old ways-to-do.

Rossi, Moggi, Pierce, and Leardini, in their paper face the topic of using a digital platform not only to communicate, but to exchange information and to involve stakeholders in understanding the goals and the activities in the not-for-profit sector. Corporate social responsibility is an emerging topic in the 21st century [55], and it is especially important for not-for-profit organizations. Technologies have improved interactivity between firms and their stakeholders, and the use of 2.0 technologies to have a better dialogue should be central in Nonprofits, even if they have not moved since now from web 1.0 [56]. The authors focus their research on Italian bank foundations, exploring the use of the Web as a tool for discharging accounts to stakeholders and involving them in dialogue. The data show that most of the foundations do not use websites to communicate interactively with their stakeholders, and communication is limited to one-way disclosure of information. The results suggest more steps can be taken to ensure increased responsiveness to community needs.

Ravarini and Strada, and Castelnovo too, both explore the Digital Do It Yourself (DDIY) behavior, in two different fields of investigation; the workplace and the government. DDIY is defined on the EU website as "a new socio-technological phenomenon which stems from the widespread availability of digital devices that support the convergence of physical ("atoms") and informational ("bits") components (ABC), as well as the growing accessibility of related knowledge and data through open online communities" (<http://www.didiy.eu/home?page=1>). DDIY is reshaping organization and work, education and research, impacting on social and legal systems, changing creative design and ethics.

Ravarini and Strada's paper explores the use of digital platforms in the workplace. Even if information and communication technology (ICT) has been used in production and business processes from longtime, its effects are unexpected when using new disruptive technologies. To better understand this heterogeneous

panorama, the authors define a four-folded taxonomy that highlights the differences between traditional automation, self service and virtualization applications of digital technology and Digital Do-It-Yourself (DDIY). Their findings outlines as DDIY means rethinking the work in a more intelligent way, challenging the traditional constraints related to location and working hours, leaving to workers more autonomy in defining the modalities of work, be it intellectual or manual, compared with greater responsibility for results.

Castelnovo in his paper faces the topic of e-government using new technologies, defining a specific DDIY behavior in the public sector. Recent forms of citizens' participation to the public debate, such as emerging Do-It-Yourself (DIY) and Do-It-With-Others (DIWO) movements (with the key contribution of ICT) have further challenged our traditional vision by showing a variety of different forms of engagement with technology and participation in its design and use [57]. The author of this paper, assuming the concept of co-production as the lens through which to look at citizen's participation in civic life, shows how, when supported by a real redistribution of power between government and citizens, citizens' participation can determine a transformational impact on the same nature of government, thanks to disruptive technologies. Finally, the paper shows how the weakening of the distinction between service producers and service users, analogous to the weakening of the distinction between content producers and content users typical of the Web 2.0 paradigm, can lead to a radical redrawing of the relationship between government and citizens.

Finally, Savastano, Amendola, and D'Ascenzo in their work address the transformation of the manufacturing processes, using digital technologies. Based on the emerging Industry 4.0 paradigm, the authors explore this emerging trend through a case study carried out with an Italian company world leader in the food industry, aiming to shed light on opportunities and threats connected to digital transition. Business process digitalization is reconfiguring every aspect of organizational and operating activities along the entire value chain, defining a networked digital ecosystem allowing firms to achieve important gains in terms of value creation [58]. Even if this papers seems not too similar to the previous ones, it remarks that also in manufacturing the emerging paradigm regards a self-organizing digital infrastructure, aimed at creating a digital environment for networked organizations, to support the cooperation, the knowledge sharing and the interaction between different actors.

In conclusion, these four papers, although addressing very different field of research—accountability in not-for-profit organizations, digital enabled jobs, citizens coproduction in public services, and industry 4.0—contribute to outline the ongoing transformation driven by the Web 2.0 and the new digital platforms. This transformation is deep and effective if it is linked with a behavior transformation, involving people in their different roles of citizens, workers, entrepreneurs, political leaders, technicians, and so on. The joint efforts between technology, institutions and people could conduct ICT towards a new networked ecosystem.

4 The relationship between Open Data and Management Information Systems

Open data is a recent phenomenon that has received a considerable attention in recent years [59], because of a wide variety of open data policies developed for instance in the United States [60, 61], Europe [62, 63] and individual countries. But, despite their similarities, open data policies highlights different scopes. While the European Commission emphasizes the direct and the indirect economic gains coming from the use of open government data, the Obama regulation focuses on developing transparency, participation and collaboration, in order to improve services for American people.

In general, literature shows the relevance of open data policies, as their scopes is to achieve the long term transparency of government information and to contribute to citizens' rights to public access to government information. Furthermore, "open data policies have the potential to increase the participation, interaction, self-empowerment and social inclusion of open data users and providers alike, stimulating economic growth and realizing many others advantages" [59: 17]. Besides, previous studies in the area of open data supposes that open data positively influence the development of social, environmental and economic value [64].

Starting from Open data government initiatives, even private companies have begun to develop open data initiatives. In the private sector, open data seem to include business news, marketing information and competitor data that are available from an assortment of web sites. It is argued that open data can stimulate innovation, deliver new opportunities to companies and influence also the company reputation [65].

Literature review on open data reveals two aspects.

The first is that most of the research on open data have been carried out on public administrations. In general, these studies analyse the contingency factors that determine the development of open data policies in public government or they develop frameworks to compare open data procedures in different governments. These frameworks include factors as environmental and context, policy content, performance indicators, and public values. The findings of the works show that current policies are rather inward looking, while open data policy could be improved by collaborating with other organizations, focusing on the impact of the policy, stimulating the use of open data and looking at the need to create a culture in which publicizing data is incorporated in daily working processes [59].

The second aspect concerns the theoretical perspectives used to study open data. Literature review shows that several and different perspectives are used to study open data: legislative, political, social, economical, institutional, operational and technical [64]. The legislative perspective underlines how open data regulation, including open data directive and open data policies, are essential. The political perspective emphasizes the relevance of political developments and political changes between the countries. The social perspective focuses on cultural differences among countries and differences in programmes related to the social benefits

of opening data, such as transparency and accountability. The economical perspective considers the financial benefits and gains that can be created by open data. The institutional perspective analyses the way in which institutions permit the publication and the use of open data. The operational perspective focuses on the use of the open data and the requirements to be able to use open data. Standards are considered very important for open data operations. The technical perspective reveals the importance of open data technologies, open data platforms and open data infrastructures.

In general, open data research seems to be still in its infancy, and as a result, the extent literature uses limited application and development of theory toward understanding the open data phenomenon. Furthermore, very little research has been also performed on how open data can exactly result in innovation [64].

Literature which explore the relationship between open data and innovation, defines innovation as an act or set of acts aiming to do something better, to meet a new need or respond to new circumstances [64]. In this context, innovation can be articulated in several typologies, including the development of a new product or a modification in an existing product; a process innovation that is new in the industry, opening a new market, development of new sources of supply for raw materials or other inputs, or any change in an business organization.

Open data seem to be potentially relevant for increase each innovation type, though stimulating innovation through open data practices is not easy. The complexity of this relationship derives from several factors, including: the large number of actors involved in the process, the variety of social and technical context, uncertainty surrounding how open data will be used, and the difficulty to assess intangible impacts generated through open data innovation [64].

First, several stakeholder are involved in the open data practices. Citizens, researchers, journalists, developers, entrepreneurs, archivists, and so on, are focused on their own activities and have different interests in open data process. The complexity systems from the fact that these interests could be in conflict.

Second, the open data process can be develop in a variety of context. Each context has specific characteristics (legal, cultural, technical) which influence how open data are collected, elaborated and disseminated.

Third, it is difficult to hypothesize how users will use open data, when they will use it and how it will be used in the future. Therefore, it is complex to define the characteristics that open data processes must possess.

Fourth, it is problematic to assess the value created from open data innovation and, in particular, how public value is generated. Several studies focuses on the analysis of the public value. They show that public value can have many levels of observation and that it is generally derived from the direct usefulness, fairness and equitability of benefits to a variety of stakeholders. Realising public and private open data formats creates significant benefits for researchers, citizens, companies and other stakeholder, such as business creation or having the ability to understand public or private problems in new ways through advanced data analytics.

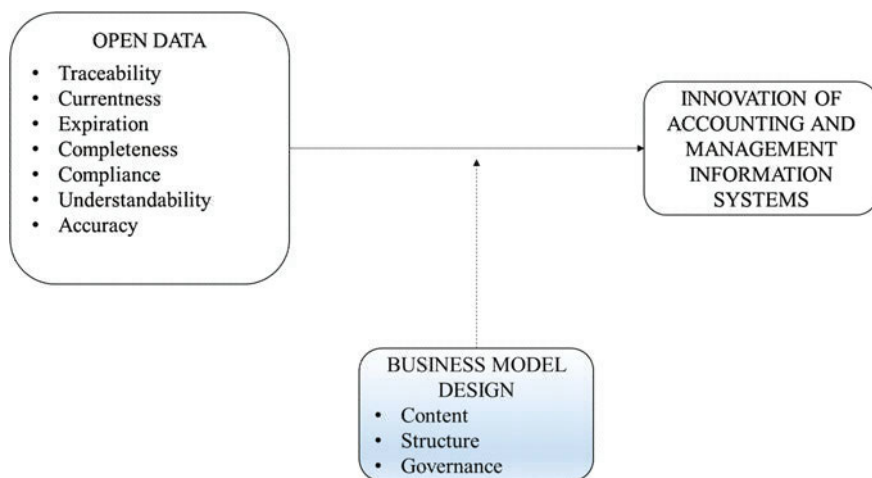


Fig. 2 The relationship between open data and accounting/management information systems

Analyzing the literature regarding open data and innovation, emerges as another research gap is almost the lack of studies that examine the impact of the open data on the innovation of accounting and management information systems.

Starting from this consideration, we analyse the relationship between open data and the innovation of the accounting and management information systems, in order to answer to the following research question: how is the influence of the open data practices on the innovation of the management and accounting information systems?

To answer to this research question we build a theoretical model. Figure 2 depicts our basic research model.

Our conceptual model shows that open data practices impact on the innovation of the accounting and management information systems. We also propose a contingency approach to analyse this relationship, hypothesizing that the design of a specific business model influence and differentiate the effects of open data processes on the innovation of the accounting and management information systems.

Business model is understood as manifestation of how organizational variables are configured, how the company structures its relations with external stakeholders and the consequences of this configurations on company performance. Thus, according to the literature, we describe the business model as the content, structure and governance transactions within the company and between the company and its external partners that support the company in the creation, delivery and capture of value [66]. Following this definition, a business model need to specify [67]:

1. The content: the set of essential activities.
2. The structure: the organizational units performing those activities and the ways in which these units are linked.

3. The governance: the mechanisms for controlling the organizational units and the linkages between the units.

Based on the different possible configurations of these elements, companies can design different business model to achieve their scopes.

Another important element in our model is represented by the features of open data. We suppose that disclosing open data is not sufficient, but we need also to consider data quality in order to avoid an inefficient reuse of open data.

We suggest that a set of metrics are necessary tools to achieve data quality improvement, as it has been recently advocated by the literature [68]. Open data quality concerns the following characteristics: traceability, currentness, expiration, completeness, compliance, understandability, accuracy. Traceability (track of creation and track of updates) indicates the presence of data associated with the process of creation of a dataset, and with the updates done to a dataset. Currentness indicates the number of days passed between the moment in which the information is available and the moment in which the dataset is ready. Expiration reveals the ratio between the delay in the publication of a dataset after the expiration of its previous version and the period of time referred by the dataset. Completeness reveals that the dataset is complete and includes all the data. Compliance indicates the degree to which dataset follows specific standards. Understandability indicates the percentage of columns in a dataset that is represented in a format that can be easily understood by users. Accuracy indicates the percentage of data in a dataset that have a correct value.

The last ten research works included in this book are related, to some extension, to the implication of ICT in building on open context.

The first three papers concern cloud platforms, that are one of the IT infrastructure able to support an open view of information management systems. They debate on the implications of cloud platforms on information systems from different points of view.

The next two papers regard XBRL, which is an electronic language for financial reporting in private companies and public administration and it enable business data to be used interactively and reusable. The two research works highlights the impacts of XBRL on comparability and its role within governmental financial reporting.

The following three papers debate on the meaning of openness considering the relationship between companies and their stakeholders through financial, non financial and social communication.

The last two papers discuss the implication of new technologies on decision making tools, management accounting technics and accountants' role.

The contribution of Hahn et al. discusses about the capability to create and appropriate value in an interfirm collaboration in IT industry when the collaboration is based on a cloud platform ecosystem that push the firms to search new business models. The research work, based on empirical data from four case studies of cloud platform ecosystems, confirm the validity of the framework of Ray and Tang and add interesting contribution to the field of business model of Cloud platform ecosystems extending value appropriation mechanisms and improving the

knowledge on IT capabilities. In terms of value appropriation mechanisms the authors add two new mechanisms as downstream capabilities and platform resourcing.

The research of Cavallari et al. discusses about MicroServices as a new Information Systems Architecture based on micro-components with specific functionalities, independent life-cycles yet interconnected and correlated. Based on a literature analysis, the authors highlight the implication of this new approach in terms of advantages and disadvantages. They also propose an interesting framework, the “Onion Model”, to represent the ability to enhance eService security within a MicroService environment.

The contribution of Ficco et al. concerns the migration of mission-critical applications on an inter-Cloud ecosystem made by a federation of distributed Clouds of multiple heterogeneous organizations. In such environment some challenges have to be addressed: IT resource planning; scalability and elasticity metrics; forecasting models to predict behaviours of service level agreements violation; monitoring security issues. The authors suggest to integrate Cloud services with a Web dashboard which includes tools able to monitor and predict SLA violation, security issues, and the application resources.

The contribution of Yang et al. investigates whether the comparability of financial reporting has improved after the mandatory introduction of XBRL. The authors adopt an interesting methodology in order to measure not only the use of accounting taxonomy but also to evaluate the relative structure of semantic structures. They applied the local outlier detection method combined with the distance matrix from the graph similarity measure. Considering the three main financial statements taken from the XBRL annual report submitted to the SEC, the authors highlight that accounting semantic quality has improved and there is a significant convergence of statement structure that suggests a the improvement of comparability over time.

The paper of Fradeani et al. investigates the role that XBRL could play within governmental financial reporting. Through the case study of two Italian projects of the Court of Auditors and the State General Accounting Department, the authors affirm that the mandatory adoption of XBRL in public sector is possible and that the real challenge is the full use of XBRL both for private and public sector. On the base of the Italian experience, the paper also demonstrate that XBRL adoption cannot be considered an additional bureaucratic tool, but a different tool able to improve the reliability, timeliness and efficiency of information processing.

The contribution of Lepore et al. regards the relationship between openness and performance in Italian Local Government Authorities. In particular the authors propose an OLS regression based on the openness score and the financial distress indexes. Results show that the propensity of being more open (in terms of presence of open data, social media and Youtube Channel) is positive related to the financial distress score, and positive performance allows to be more open.

The paper of Corsi et al. discusses the openness of firms in terms of tools used to formulate, control and communicate the sustainability strategy, in the light of the triple bottom line model. Based on a case study, the research investigate the

relationship between different level of accounting information systems for sustainability and three different approaches to Sustainability Balanced Scorecard. The authors propose an interesting framework which put in relation sustainability communication tools and accounting information systems.

The paper Pisano et al. examines the disclosure of human capital in sustainability reports considering the role of cost of capital and ownership structure. The authors propose a disclosure index that includes both the stock of knowledge and capabilities of employee and the human resources management practices.

The contribution of Resta et al. explores the potential of machine learning models to the analysis of firms' performance. They propose a Self-Organizing Map to exploit the complexity of financial data and apply it to a sample of ICT companies. They identify five clusters characterized by different dominant financial dimensions and offer a handy way to visualize the analysis of firms' performance.

The paper of Nespeca et al. investigates the impact of ICT tools on management accounting and on management accountants' role. Considering Business Intelligence (BI) tools, the authors developed an exploratory field study based on semi-structured interviews to consultants that manage BI implementation projects. The results highlights that advanced ICT tools like BI makes accounting processes more structured, more rational and faster, fostering the implementation of advanced management accounting tools like Balanced Scorecard. BI also affects management accountants' competencies, in particular it stimulate the development of business-oriented and business analytics competencies.

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Information Systems Implementation and Structural Adaptation in Government-Business Inter-organization

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Abstract The adaptation of inter-organizational structure occasioned by organizational and information technology agency in government-to-business (G2B) relations has been quite under-researched. Drawing upon structuration and transactions costs theories, this paper analyzes how and why IS implementation causes structural adaptation. Based on analysis of a case of an inter-organizational implementation of a financial management information system, the paper argues that: legitimation structural adaptation is occasioned by the need to balance efficiency and effectiveness between governance and IT sourcing; domination structural adaptation is occasioned by the need to balance efficiency and effectiveness between governance and business IT capability; and signification structural adaptation is occasioned by the need to achieve cost efficiency of shared goals and by availability of IT to preserve what is achieved over the long term. It is argued that this implementation perspective on structural adaptation deepens our understanding of socio-technical shaping of structure. It also offers far-reaching benefits to structure conception and its organizational application than the previous ones.

Keywords Implementation • Structural adaptation • Inter-organizational Information systems • Government • Business

1 Introduction

The structure of inter-organizational relations plays an important role in successful implementation of inter-organizational information systems (IOS). Yet, how inter-organizational structures are produced and reproduced as they adapt to IOS

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