

Introduction

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Abstract The socio-technical approach to the study of the relations between people and technology in organizations has a long standing tradition in the managerial research. The increased adoption of information and communication technologies in organizations contributed to offer new empowerment opportunities for organizations, as well as opened new avenues for research. ICTs offer different, peculiar, organizational and individual affordances if compared to process technologies. ICTs are also continuously evolving at a quick pace. As a result the literature has seen, throughout the years, the growth and the evolution of different conceptualizations of the socio-technical relationship between technology and organization. On this specific topic this book contains a selection of the best papers presented and accepted at the XI edition of the ItAIS conference, held in Genova in November 2014. Papers included in the books discuss the role of empowerment potential for organization of IT artifacts and IT platforms, providing the results of cutting-edge research projects in the Italian and international scientific community.

Keywords Technology and Empowerment · IT Artefacts · IT Platforms · Socio-Technical Systems

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1 Empowering Organization: A Continuous Challenge

When Rosabeth Moss Kanter (in 1977) first introduced the concept of empowerment in working contexts, she suggested workers would require some discretion to emancipate themselves from the hitherto dominant hierarchical structure, and that it would be really positive for organizations and their capacity to develop.

Born in social and political context in the 1960s, the term empowerment defined a growing process based on an increasing in self-esteem, in self efficacy, and self-determination aimed to bring out the potential of each person, thereby producing a more inclusive society through everybody's active participation in public life. Quickly, the concept has been introduced in managerial and organizational studies, underlying that development is real and effective if organizational actors, human resources, and workers have the opportunity to grow first. Their knowledge, experience and motivation—usually underused—can increase, through empowerment processes, while their favourite responsible behaviours remain coherent with the demand for more participation in the strategies and activities of an enterprise.

In more recent time, organizational empowerment is considered an effective tool for management to confer responsibility of all employees and support their engagement and motivation [1]. Indeed, an empowering organization allows to its members to have a better control on their work and on their working conditions [2]. Hence, an organization wishing to create an empowering context has to begin with individual empowerment.

Someone considers empowerment a cutting-edge technology ensuring both strategic advantage that enterprises are looking for and opportunities that people seek [3]: so, organizational empowerment is presented with a positive connotation, just for this implication.

This orientation finds its proper contextualization into the socio-technical approach, in which the role of workers is evaluated just for their capability in managing technologies and technical context. In this perspective empowerment become an interpretative key to understand the logic of social-technical system.

As known, the concept of socio-technical system emerged from the observation that the way in which people worked did not follow the mechanistic view of procedures, which emphasized specialization and division of labor minimizing the role of each worker, his respective competences and ability in using working tools and instruments. Relations among workers were found to be important [4]: workers cooperate and collaborate to use the available technologies. The performance of a productive system was strictly connected with the interaction between two coesential dimensions: social dimension, which is created by people all together and their particular organization; and technical one, which is represented by materials, machinery and plants with task and interrelations among such tasks. Both are open, organic systems that regularly interact with external environment, producing feedback and adaptive actions in order to face with required changes.

Since the first analysis, the concept of socio-technical system emerged as a useful basis to describe and understand any kind of organization. This is because it

underlines the strong relationship between technology and human being and social aspects, and explains the need to consider both the components for an effective organizational design. Central is the idea of joint optimization, that summarizes the necessary dynamic equilibrium between key variances of technical system for the organizational purposes and the variance control analysis developed by workers and the job satisfaction need, pure expression of workers' behavior in working context [5].

In this perspective it is evident the relation with an empowering organization, whose aim is essentially the evaluation of a proactive role played by workers. Intrinsic job satisfaction and individual preferences become the starting point to analyze the organizational system and to build it according to job redesign orientation more finalized to satisfy the requisites of technical system [6]. At the same time innovative and free behaviors aimed to facilitate the goals of the organization more than the rigorous application of role prescription, but moreover this appears directly connected with high level of intrinsic satisfaction.

This approach can be helpful in understanding the relation between *organization* and *technology* because its nature is structurally adaptive, considering as basic the complementary between social aspect and technical content [7]. A socio-technical system is based on a rich interplay of human actors, introduced in multi-agent systems, that use different and heterogeneous interfaces, with a certain degree of discretion by worker and an operational environment in which technology evolution assumes an increasing intensity [8].

2 Organization and Technology

The debate on the relation between *organization* and *technology* has a long standing tradition in the managerial literature [9, 10], and saw different perspectives across the years [10, 11]. In the organizational mainstream literature three milestones characterized the study of this duality: the contributions on technological complexity by Woodward [12–14], the studies on complex and routine activities by Perrow [15, 16], and the work on interdependences and on supporting technologies by Thompson [17].

The advent of digital technologies (ICTs) enriched this debate with the discussion of new affordance for organizations [18]. ICTs embeds a great empowerment potential for organizations, allowing both individuals and organizations to achieve changes and to pursue innovation and improvements [19–24]. The adoption of ICTs interested a large part of human activities, and continuously change the way people live and work [25].

ICTs afford people and organizations to easily create, manage, store, and transmit information. Doing so they support all the main organizational processes [26]: sense-making, decision-making, and knowing. For this characteristic ICTs deeply differ from process and automation technologies that were traditionally studied by the technology and organization debate in the literature [24, 27, 28]. ICTs empower organization, as they allow them to resort to new and different organizational forms

or control instruments, which in the end foster and promote organizational change and performance improvements.

In the study of the relation between organization and digital technology a pivotal element is the ICT artefact, being it the main manifestation of the ICT with which individuals and organizations relate. Different ways to investigate the mutual influence between organization and technology have been used in the literature, mainly following different conceptualization of the ICT artefact [29]. In the recent years technology innovation contributed to change the nature of the ICT artefact. The diffusion of mobile technologies and social media produced new organizational affordances, enriching the socio-technical nature of the ICT artefact, and giving rise to the concept of ICT platform.

2.1 The ICT Artefact

The ICT artefact can be seen just as a *tool*, a “computing resource (that) is best conceptualized as a particular piece of equipment, application or technique which provides specifiable information processing capabilities” [30]. Under this perspective what ICT affords organization is mainly seen under a technical perspective, sometimes in an uncorrelated manner to the social and organizational surroundings. Under this perspective ICT is usually seen as a tool to substitute human labour, to enhance productivity, to process and exchange information, and to change social relations [29].

The ICT artefact can be seen as a *proxy*, i.e. a set of properties or key elements shared by different pieces of ICT. This perspective focuses more on the technology in action, assuming that different ICT artefacts can be described by common measures or values. ICT artefacts are then intended either as perceptions (i.e. how they are understood by people using them), or as diffusion trends or adoption rates, or as capital/value/benefits [29].

The *computational* perspective neglects instead the social side of technology focusing only on the technical capabilities and performance of these artefacts in manipulating, storing, and transferring information. Under this perspective ICT artefacts are studied just either as a collection of algorithms to build new or improve existing systems to support human activities, or as mathematical models used to represent and simulate processes or events [29].

A final perspective on ICT artefacts does not only considers the artefact as the single important element, but takes it as a part of a larger ensemble which includes all the other elements which are necessary to use the specific artefact to support human activities. This is part of an effort to un-black box the technology, to directly include in the object of study the human agency that underpins the work of the ICTs, to better understand both how the technology empowers the organization. Following this perspective ICT artefacts can be seen [29] as development projects (i.e. the set of design, development and implementation processes of an ICT artefact.), as

production networks (i.e. as an ensemble of different ICT artefacts at a national or industry level), as a system embedded in another system, or as a an artefacts which embeds social structures [31, 32].

2.2 The ICT Platform

Recent developments of digital technologies called for an enlarged perspective of the conceptualization of the ICT artefact. Considering the diffusion of the Internet, more and more often ICT resources are used by organizations as a collection of different interconnected elements, forming a *platform*. Some author include in the definition of platform just a set of ICT features (mainly software based) that provide shared functionalities trough which an ICT artefact interoperates with another one [33]. To this perspective some see in this just a novel and more complex conceptualization of an ICT artefact [34].

ICT platforms do not only involve pieces of technical artefacts (i.e. pieces of software and hardware), but they also encompass a more rich set of different actors, involving both final uses, owners, and developers, and work on a basis of a set of shared resources designed and organized to allow, at the same time, both control by the owner, and evolution and diffusion by the final user [33–35].

ICT platforms can therefore be seen as complex socio-technical systems that are not stable over time, evolving trough the enlargement of the use base, and of the enrichment of the features offered to users [36, 37]. Going through an evolutionary approach these systems are not designed from scratch, but grow “conservatively through mutation and hybridization, rather than outright break with the past” [38].

The study of the technology and organization problem under this perspective calls for a more complex understanding of the mutual influences among the different components of this *assemblage* [39]. Seen from this perspective the capabilities of a platform are not only those of the components (i.e. there are not just a sum of the former), but emerge also by the intra-action of the components [40], i.e. by the co-joint action of the different components which, by the very fact of being part of such a system, show new and different properties and capabilities.

3 Contents of the Book

Within this reference framework this book presents a selection of the best peer reviewed articles presented at the XI Edition of the annual conference of the Italian Chapter of AIS (ItAIS) which took place on November 21st–22nd in Genova, hosted by the Department of Economic and Business Studies of the University of Genova. The book is composed by 22 original chapters. Each chapter studies the empowerment potential of ICTs artefacts and platforms adopting different perspectives within the two socio-technical and technical extremes.

A first set of papers adopts a sociotechnical perspective on information systems, with particular attention to management practices and to specific artefacts. Benevolo et al. [41] draw the attention to a novel but rapidly flourishing topic, that is Smart City initiatives. By studying Smart Mobility projects as part of wider Smart City initiatives, they investigate the role of ICT in supporting smart mobility actions, influencing their impact on the citizens' quality of life and on the public value created for the city as a whole. The "public" dimension is in common with Romanelli's [42] paper too. In this case, the unit of analysis are Parliaments, viewed as organizations seeking legitimacy by engaging citizens in the policy process thanks to Internet technologies; the model of e-sustainable Parliament is discussed, together with a review of Parliamentary e-participation initiatives.

Moving towards a more business-oriented context, Agrifoglio et al. [43] address the so-called "sailing ship" effect, that is the strategic reaction of new-comers that enter into a new market for adopting and improving old technology although technological change occurs and innovative solutions are available. By introducing a case study based on the instant photo industry after Polaroid leaving it, they demonstrate how this apparently inconsistent strategy can be successful.

Halfway between business practice and management education is Bednar and Sadok's [44] chapter, where they describe a teaching experience of information systems analysis and design unit. A sociotechnical toolbox is introduced and the application made by students in a real life business is described. The benefits from this project are twofold, as students experience of real world business and the entrepreneurs develop new insights and understandings of key features of their own work practices.

The second group of papers in the book keeps the sociotechnical perspective but shifts the focus to platform-based solutions and topics. Again, two sub-groups may be identified, according to a more "public" or "business" orientation.

To the first one certainly belongs the contribution of Ribaldo et al. [45], which analyses the emerging role of Universities as democratic intermediaries in e-Participation. Some experiences that recently took place in the city of Genoa are presented, where the local University played a core role as guarantors of the public dialogue in the design of democratic deliberative digital environments. Paletti and Za's [46] chapter too addresses a topic of public interest, when they design a new Disaster Management System that, while following the most recent United Nations' suggestions, includes citizens and volunteers in the disaster management organization in order to decrease vulnerabilities and to develop resilient communities.

The contribution of Mancini and Ferruzzi [47] has a hybrid nature, as Authors face a business topic—the use of collaboration platforms for management control—but in a no-profit context, that is a research institute. With an Italian-based case study, they show how this platform has become an important support device for management control processes and represents an opportunity for a higher integration among the components of the control process itself.

Far more business-oriented are the other three papers in this group. Firstly, Iannotta and Gatti [48] investigate the evolution and the new trends in the e-recruitment services, by introducing an Italian case study of e-recruiting platform and showing

innovative solutions in order to more efficiently match the requests of employers and job seekers. Secondly, Testa et al. [49] explore the relationship between human actors and technology in the context of a social media platform. Moving from Pickering's "mangle" theory and Jones' subsequent metaphor of "double dance of agency", they present a case study of a social-media platform run by a leading Italian firm in the food industry. A series of interrelated emergent phenomena arise, entangling managers, customers, and the social media platform, introducing further dimensions in the "dancing" metaphor. Lastly, Mola and Russo [50] investigate the influence of pervasive use of ICT-based platforms such as electronic marketplaces on the evolution of inter-organizational relationships. They analyse two Internet platforms specialized in outsourcing the e-commerce related processes in the fashion industry. Their results confirm that such platforms are deeply changing the system of relationships between clients and suppliers, affecting the processes performances, and requiring a new conceptualization of the traditional supply chain.

The remaining chapters of the books include contributions where the adopted perspective is mainly technical, and the attention is greatly concentrated on the technical characteristics of a given artefact or platform.

Beginning with those contributions presenting artefacts, a couple of papers introduce art-related solutions. Deufemia et al. [51] present a mobile application, named PetroSketch, for supporting archaeologists in the classification and recognition of petroglyph symbols; it uses a flexible image-matching algorithm, which compare the sample image with a set of references taken from archaeological archives. Calandra et al. [52], instead, design E.Y.E. C. U., a modular eye tracking system that supports art galleries fruition; every time a visitor lingers on a painting detail, a hidden camera detects her gaze and the framework beams, in real time, the related illustrative contents on the wall region around it.

A large group of papers deals with network and software related artefacts. Two chapters of this section are dedicated to app design. Caruccio et al. [53] propose a wizard-based development process that guides the users towards the construction of Web applications: a pilot application to student information management in Universities is discussed. Similarly, Vitiello et al. [54] propose MIDE, a Java-written tool that devises patterns in the form of ready-to-use application templates and interface snippets targeted at the Android platform, which could be particularly useful for novel users and programmers. Instead, Deufemia et al. [55] present several experiments aiming to compare the performances of classifiers of user intent on search engine pages; they also propose a metric to evaluate them and detect the most promising features for deriving a better classifier. Imrie and Bednar [56] address the problem of managing and controlling data stored on devices in a distributed technologies environment. They categorize and compare different approaches to controlling data on distributed devices, from the perspective of their effects on the usefulness to the end user. Finally Cassino and Vozella [57] propose the integration of a paradigm borrowed by risk theory, within a tool for the evaluation of software systems through the analysis of visual components of its interface; their tool could support organizations to define and properly allocate liability among system actors in order to identify recurring errors in view of a potential reengineering of the system.

Although still focused on an artefact, McGrath's [58] contribution differs from the previous ones as it addresses a more abstract topic: the Author investigates through an experiment the idea generation process of ad hoc pairs using external visualizations for divergent thought. The objective is to examine whether the perceived possibility to change visual representations of ideas impacts the cognitive persistence of pairs.

The final chapters of the book adopt a technological point of view to explore platforms.

Di Mascio et al. [59] move from social dynamics in the aftermath of the earthquake in L'Aquila (Italy) and discuss how IT solutions may support social recovery. They introduce the Emepolis + project, a kind of social network available as a mobile app which aims to help local citizens in the reconstruction of their city and in the recovery of their community: differently from traditional social networks, the focus of Emepolis + is not on user profiles, but rather on the issues posted by the users themselves.

The contribution of Ruggieri et al. [60] returns instead to a business context, as it explores the role of cloud working platforms in reshaping the job market. While in Iannotta and Gatti's [48] the focus was on e-recruitment services, in this chapter the Authors explore the crowdsourcing phenomenon, presenting three international platforms. They conclude that cloud working offers the employers an opportunity to externalize their activities via web and represents for the employees the chance to better manage their working life.

Finally, Bolici and Della Rosa's [61] contribution focuses on virtual currency markets. They analyse the rise and fall of Mt. Gox, a leading virtual currency exchange platform, in order to understand the value and the risks associated to the system and the consequences of the breakdown of one of the most important player in the market.

The volume ends with the contribution of Ricciardi and Rossignoli [62], which stands out from the others due to its theoretical and methodological nature. In their paper, in fact, the Authors propose a classification framework for Management and Information Systems studies, and apply it to a set of itAIS 2011 selected papers. Their results cast light on the extreme methodological variability in MIS research, necessary to cope with the complexity of the technology and organization relationships, confirming the value of complementary approaches and methods and allowing for an easier orientation in the increasingly wide spectrum of MIS studies.

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