The Contributions of Alessandro D'Atri to Organization and Information Systems Studies

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Many authors have contributed to defining the distinct subject matter of the Information Systems (IS) field, and to clarify its relationships with other interrelated disciplines [1]. In the view of Avison and Fitzgerald, the IS field concerns "the effective design, delivery, use, and impact of information technology in organizations and society" [2]. Gregor contrasts Webster and Watson's view of IS being just another management field like organizational behavior [3] by observing that a characteristic that distinguishes IS from these fields is that it concerns the use of artifacts in human-machine systems, so that "we have a discipline that is at the intersection of knowledge of the properties of physical objects (machines) and knowledge of human behaviour" [4]. As Allen Lee describes it, "research in the information systems field examines more than just the technological system, or just the social system, or even the two side by side; in addition, it investigates the phenomena that emerge when the two interact" [5].

As to the relationships between IS and other disciplines, the initial view of the IS community is well represented by Keen, who in 1980 argued that IS, as an "applied" discipline, has to borrow theories, methods and research best practices from more mature "reference disciplines" upon which the field was drawn [6]. The initial list of reference disciplines was quite restricted (including engineering, computer science, mathematics, management science, cybernetic systems theory

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and behavioral decision theory). With the growth of the field the list expanded considerably, with, e.g., political science, psychology, sociology, accounting, and finance included in the classification proposed by Culnan [7]. Gregor observes that IS shows commonalities with architecture as well, which also concern people and artifacts, or with applied disciplines such as medicine, where the products of scientific knowledge (e.g., drugs, treatments) are used by people [4].

Notwithstanding this great bunch of relationships, the conventional view in the 80's and 90's was to see IS as being near the end of an intellectual food chain, consuming theories and discovery from other disciplines, with a flow of knowledge and information entirely one way. Scholars then changed their position and started to recognize that the IS discipline had fully emerged as a discipline in its own right. In 2000 Gorden Davis, in an analysis of bodies of concepts, theories, processes, and application systems unique (or somewhat unique) to IS, identified five bodies of knowledge that had developed in the IS tradition [8]. In 2001 Allen Lee observed that the field's reference disciplines "are actually poor models for our own field. They focus on the behavioral or the technological, but not on the emergent socio-technological phenomena that set our field apart" and for this reason suggests to refer to these disciplines as "contributing disciplines" [5]. This shift in perspective is then extended by Baskerville and Myers who suggested a new scenario in which not only did the IS field pose itself as independent from traditional reference disciplines (there is clear evidence that IS research can serve as a foundation for further IS research), but it could also issue a challenge to become itself a reference discipline for others, even for those fields that previously served as reference disciplines for IS [9]. This opportunity arises because, given the growing impact of information technology in business and society as a whole, almost every other human discipline is now a potential consumer of IS research discoveries. In this new model, the flow of knowledge and information among inter-related fields become multidirectional, and IS scholars, instead of just importing knowledge, should consider the possibility to cooperate with scholars in other fields to the benefit of those other fields. IS ceases to be the end of the chain and becomes "one of the many reference disciplines exchanging ideas in an intellectual discourse" [9].

This interdisciplinary approach, along with a focus on design science, characterizes this book, which is dedicated to the memory of Professor Alessandro (Sandro) D'Atri, who passed away on April 22, 2011. Professor D'Atri started his career as a brilliant scholar interested in theoretical computer science, databases, and more generally, information processing systems. These interests became a journey through various applications, such as human–computer interaction, human-factors, ultimately arriving at business information systems and business organization. Among his many accomplishments, Sandro founded in 1998 the Research Centre for Information Systems (CeRSI) at LUISS University in Rome,[1] and he framed all of the research activities within the context of projects in applied

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[1] www.cersi.it

research founded by national and international institutions. In 2003, together with his friends and colleagues Marco De Marco and Claudio Ciborra [10], he founded ItAIS,[2] the Italian Chapter of the International Association for Information Systems. Through CeRSI and ItAIS, he pursued the development of an interdisciplinary culture that integrated social sciences, systems design, and human sciences. In 2011 D'Atri was honored posthumously as a Distinguished Member of the Association for Information Systems, an honor accorded to such luminaries as Gerardine DeSanctis, Heinz Klein, Claudio Ciborra, and Charles Kreibel.

Rather than memorializing D'Atri in a retrospective work, this book aims to advance in the directions he was pursuing. It seeks to stimulate a debate about the new potential of design research in the field of information systems and organization studies as an interdisciplinary approach. Each chapter assumes a different position in the continuum between IT systems design on one extreme and organization design on the other. A great variety of theories grounded in multiple disciplines inform novel design directions.

1 Alessandro D'Atri's Legacy

The work and career of Alessandro D'Atri epitomizes the evolution of the IS field. His progressive shift in perspective on the kind of mutual relationships between "companion disciplines" is a defining characteristic of this evolution.

D'Atri scholarly career began with his appointment as lecturer of Programming Techniques at the Faculty of Engineering of the University of Calabria (1977–1980). He later served as Associate Professor of Databases at the Faculty of Engineering of the University "La Sapienza" of Rome (1983–1987) and Professor of Computer Engineering (1987–1997) and Dean of the School of Electronics (1993–1997) at the Faculty of Engineering of the University of L'Aquila. He was appointed as Professor of Business Organization and of Information Systems at the LUISS Guido Carli University in 1997.

We might be tempted to formally divide D'Atri's career in two distinct "eras": the early era focused on Computer Science (1977–1997) and the late era focused on Organization Science (1998–2011). But a deeper analysis within the two periods reveals that what may look like a sharp change of focus and direction (from technology-oriented to organization-oriented research) is actually just a step in a continuous and smooth shift of interest. It is a steady progression from more abstract disciplines towards more applied human-oriented and organization-oriented studies. The focus shifts steadily from technical systems to wider socio-technical systems involving behavioral and institutional aspects. These evolutionary paths are rather more of an unceasing enrichment of knowledge and methods than a discrete series of distinct research lines or projects; throughout their deployment, they gave rise to worthwhile bilateral contaminations among related disciplines,

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[2] www.itais.org

and contributed to the creation of diverse networks of cooperation. Sandro's quest for contaminations is also reflected in his teaching activities that, after 1997, included delivery of technology-oriented courses in business-oriented schools on the one side, and delivery of organization-oriented courses in technology-oriented schools on the other side. He helped his students understand and appreciate the increasingly multidisciplinary nature of IS.

1.1 Contributions to Computer Science

In 1977 D'Atri began working on computational complexity theory, a branch of the theory of computation in theoretical computer science and mathematics that focuses on classifying computational problems according to their inherent difficulty, and relating those classes to each other (i.e. [11–13]). Computational complexity is a foundation discipline for the more applied studies in graph theory. Sandro shifted his focus in the beginning of the 80s to research on graph and hypergraph properties that were both at the level of abstract structures (i.e. [14–16]). He also used the context of graphs and hypergraphs as foundational structures in database theory (i.e. [17–20]). In these years Sandro was actually working also on database theory problems, which both stimulated his research in graph theory and also led him to new foundations for database theory research (i.e. [21, 22]).

In the second half of the 80s, D'Atri's work is characterized by a new shift toward more *applied* research problems at the intersection between database systems and Human–Computer Interaction (or man–machine interfaces, as HCI was termed at the time). His results became more and more oriented to the end-users rather than the designers (i.e. [23–25]). The shift towards human–machine systems brought a new research model that constitutes the common traits of all subsequent Sandro's work: the creation of knowledge from the design, the implementation, and the evaluation of new IT artifacts in the context of innovative projects. The genre of these projects reflects Sandro's growing interest in organizational issues. There are early techno-centric projects, focused on general database and knowledge base systems initially (i.e. [26, 27]). Later there are more specific geographical information systems (i.e. [28]). Later still are more organization-centered and multidisciplinary projects in medical informatics in the 90s (i.e. [29]). Medical informatics is an excellent example of his engagement in a multidisciplinary field, relying, among others, on data and knowledge base systems, human–computer interaction, computer-based medical records, clinical decision support systems, strategic information systems, etc. Sandro's approach did not just "import knowledge" from these fields to implement new systems, but included projects' activities that gained results to enrich the referring disciplines.

Medical informatics and e-health will remain among D'Atri's areas of interest also after his move to the LUISS Guido Carli University in 1997. Papers in these areas serve as a lens on his gradual shift of focus from technology issues (i.e. [30]) to organizational (i.e. [31–33]) and strategic issues (i.e. [34]).

1.2 Contributions to Organization Science

The second half of the 90s is characterized by D'Atri touching down in the information system area. His vision with respect to the research on information systems can be summarized with a claim taken from an email message exchanged with his team in 2010: "we finalize the research to the design of an IT artifact or a social or organizational system, and we evaluate its possible organizational impacts". He envisioned a way of working in which research addresses relevant problems, engaged in national and international cooperation with other universities and research institutions, and gained insights from the construction, intervention, and evaluation phases of innovative IT projects. In Sandro's view, the expected outcomes of the research activities were embedded in the overall project plans. These outcomes mainly related to the generalized characteristics of the artifacts, to the methodological aspects of system design and implementation, and to the organizational effects that can be captured during the pilot evaluation.

Another important aspect that characterizes this second "era" of D'Atri's career is the influence and stimulus that Claudio Ciborra's work exerted on Sandro's approach to IS research. As Sandro claims in the EJIS special issue in memory of Claudio Ciborra "I found his metaphors, such as bricolage, improvisation, tinkering, hospitality and care illuminating when I was investigating the conceptual relationship of ICT and human activity in phenomena such as the development process of an Information System or new forms of cooperation among organisations" [35]. It is quite surprising the extent to which these concepts are reflected in almost all the activities carried out by Sandro in the last 10 years of his work.

In 1998 D'Atri founded the research center on information systems (CeRSI, www.cersi.it), which he directed until his death in 2011. Under his leadership, the center became one of the leading research centers on information systems in Italy, and gained a distinctive international reputation (in 2010 CeRSI joined the ERCIS network [www.ercis.org] as its Italian representative). Under Sandro's leadership, the center conducted its research within the framework of more than 30 research projects funded by the European Commission and/or by Italian institutions and private companies. Such a conspicuous portfolio of projects has matured into a wide array of areas such as e-government, e-business, e-care, e-learning, enterprise interoperability, besides the already mentioned e-health. A selection of these projects is provided in Table 1.

Two main aspects emerge from an overview of these projects. First, the temporal link between project initiatives in the same area shows how D'Atri's new projects either evolve from a local to a national and European scale or evolve by exploiting the outcomes of previous EU projects to solve local field problems. Second, the project areas (the field problem space) are not independent; activities in one area trigger new initiatives in different areas. This interdependence applies to the solution space in which the nature of the IT artifact can be the same for different areas. For instance, a former e-health initiative at EU level (TACIT) triggers a new e-health projects at a local level (C4BIOT) and then subsequently a

Table 1 CeRSI's selected projects

Project area	Project name	Funding agency
e-government	OK-eG: Organizing knowledge in e-government (2003–2005)	Italian Ministry of research
	LD-CAST: Local development cooperation actions enabled by semantic technology (2006–2008)	EU commission, VI framework programme
e-care	HOPES: Help and social interaction for elderly On a multimedia platform with E-social best practices (2010–2013)	EU commission, AAL joint programme
e-learning	AUTOMATIC: Development of curricula and innovative training tools for industrial automation systems for people employed in SMEs (2009–2011)	EU commission—LdV programme
	EARNFILE: Evaluation and recognition of non-formal and informal learning (2009–2011)	
	OTIS: On-line training for investment on securities (2005–2008)	
	VIRTUOSE Virtual Online System for Education on Quality (2004–2007)	
	LiVES: Learning in virtual extended spaces (2010–2012)	Lazio region
Enterprise	MID-BLUE: Multimedia information distribution using bluetooth (2010–2012)	Lazio region
interoperability	INTEROP-NoE: Interoperability research for networked enterprise applications and software (2005–2007)	EU commission, VI framework programme
e-health	C4BIOIT: Campus for bioinformation technology (2006–2008)	Lazio region
	TACIT: Technologies augmenting clinical insight (2004–2006)	EU commission, VI framework programme
e-business	FAIRWIS: Trade fair web-based information services (2002–2004)	EU commission, V framework Programme

new project in the e-care area (HOPES). Moreover the same technological artifact can be applied to solve field problems in different domains. This knowledge reuse is exemplified by the development of semantic technologies in an e-government project (LD-CAST) and its subsequent re-application in e-care areas (HOPES).

A systemic view of CeRSI activities shows how these projects materialize as intertwined subsystems with many interactions at different levels. D'Atri master-fully orchestrated these interactions by guiding the evolution of this complex system, taking into account the dynamics of both inner capabilities and external environmental opportunities. In this context the research center has never espoused a single theoretical approach to ground the design and evaluation processes. Quite the contrary, it has always privileged the adoption of multiple perspectives, methods and techniques in order to be actually context- and problem-driven instead of being technology-driven. This same variety of perspectives is reflected in the way the project team members identified an impressive number of topics and adopted diverse research approaches yet always remained within the frame of Sandro's initiatives. A few examples are: virtual enterprises and supply chain management in the e-business area [36, 37], business models, trust and information security in the e-government and in the enterprise interoperability areas [38–40], studies on e-learning [41], project and innovation management [42, 43] and as previously mentioned, e-health [31].

The research dissemination activities have seen CeRSI and its members con-stantly active in major national and international conferences (just to name a few, ECIS, MCIS and ALPIS in the area of information systems, and WOA, Egos, EURAM, Academy of Management, and AIDEA for the areas of management and organization studies). In the 2001–2011 period, CeRSI group members published more than 200 research papers in conference proceedings, book chapters, and international journals. Such works yield a dense publication co-authoring network (illustrated in Fig. 1) that manifests the role of Alessandro D'Atri in catalyzing cooperation with other scholars.

2 Content of the Volume

The evolutionary progression of D'Atri's research suggests that design science is the next ground for advancing both Sandro's systemic view of technical and social phenomena and his continuous search for innovative solutions for managing the complexity of emergent problems. Although Sandro had not contributed directly to the discourse on design science research, the design orientation of his work emerges from almost all of his research contributions. In keeping with the aim of the book to continue Sandro's advances, and recognizing Sandro was headed this way, so go we there also. Design science is often grounded in the H.A. Simon book *The Sciences of the Artificial* in which a distinction is made between the natural sciences and the sciences related to the making of human artifacts [44]. These artifacts are necessarily material and can consist of many forms of designed
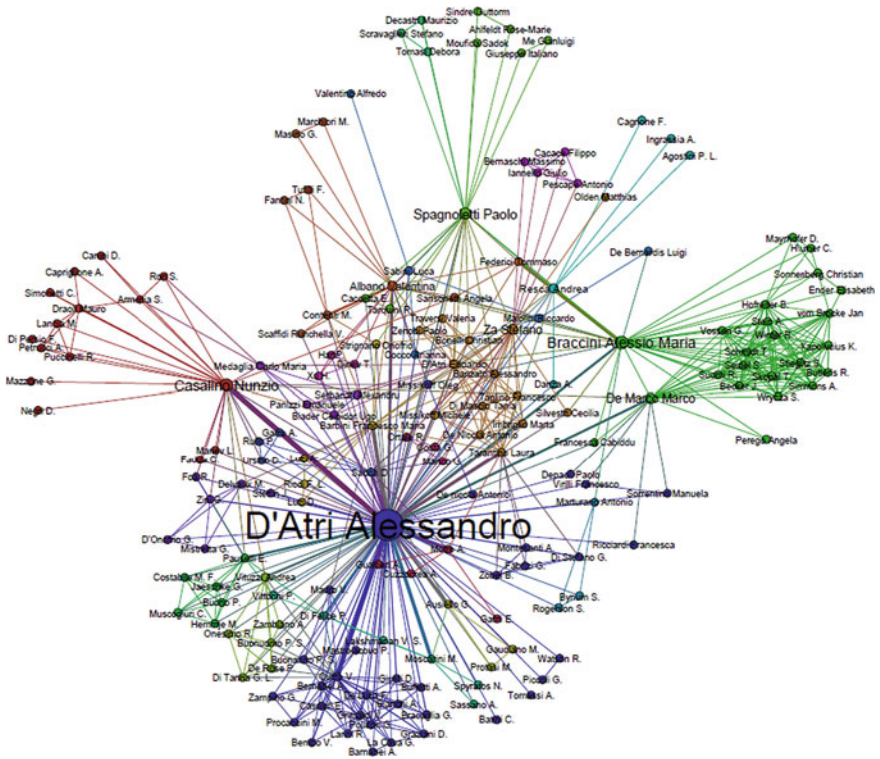
Fig. 1 Publications co-authoring network

interventions (e.g. actions, structures, processes, systems) to address field problems. The key characteristic of natural sciences is that they are descriptive and deductive in nature, being engaged in the quest for truth. On the other hand, design sciences, like architecture, engineering, and law, are prescriptive and abductive in nature. Debate about the role of these design sciences has engaged scholars in the fields of management and organization studies, and design research is now in the foreground of many conferences and top journals, especially in the IS field. Indeed in this field a particularly relevant problem involves the explicit prescription for the design and development of theoretical classes of IT systems.

The call for chapters of this book attracted many contributions that span across a variety of field problems, research goals, methods and outcomes. Sixteen chapters have been selected following a blind review process and are distributed into four parts addressing different classes of problems. For each part we provide a brief introduction below that explains how the following chapters offer advances on the themes and works of Alessandro D'Atri.

2.1 Part I: Design Science Research Principles and Methods

In the first part, four meta-level contributions open the book by providing insights into key epistemological, ontological, and methodological issues of design science research. The four chapters presented in this part have been selected because they provide the reader with a set of conceptual models and theoretical assumptions that allow a better understanding and context for the content of the parts that follow. The underpinning assumptions shared among all these chapters are the system theory foundations at the basis of design science research [44], and that these are made richer by concepts and ideas grounded in the social studies of IT [45].

The first chapter, "Design and Normative Claims in Organization Studies: a Methodological Proposal", by Francesca Ricciardi from Catholic University of Milan, provides a conceptual analysis for investigating the role of design claims and normative claims in organization studies, from both an epistemological and a methodological perspective. By referring to medicine as a discipline in which the relationship between descriptive, design, value judgment, and normative claims is well established, the chapter illustrates the genesis of a normative claim in the medical field. The story of research on puerperal fever in the nineteen century serves as an example to show the path of scientific knowledge discovery. The work is valuable because it encourages a stronger presence of design claims in both qualitative and quantitative organization studies research.

Next, researchers Ilia Bider, Paul Johannesson and Erik Perjons from Stockholm University propose a conceptualization and formalization of design science research that show the possible ways in which a design science project can be carried out. Our second chapter, "Design Science Research as Movement between Individual and Generic Situation-Problem-Solution Spaces", presents a map helping the researchers to plan their actions within design science research. The map is based on two three-dimensional spaces, one named the individual situation-problem-solution space and the other the generic situation-problem-solution space. Additionally, the authors provide two examples by using the map in order to show how design science research may differ in its types. This work is particularly notable because it astutely positions design science research as a project that must be managed in concert with research methodology.

The third chapter, "Restructuring the Design Science Research Knowledge Base: A One-Cycle View of Design Science Research and its Consequences for Understanding Organizational Design Problems", provides a meta-level discussion on how design science research can contribute to solve Organizational Design and Engineering (ODE) problems. With this aim, authors Robert Winter and Antonia Albani from the University of St. Gallen propose a framework that allows for a systematic classification and retrieval of artifacts and relates solution artifacts to problem characteristics. This framework is composed of an iterative process model and a supporting knowledge base of reusable design artifacts and organizational problems. The process model is inspired by the well known Spiral Model of software development in which design and evaluation activities alternate in an

iterative way. The knowledge base structure concerns the artifact type, generality, application domain and coverage. The applicability of the proposed framework is demonstrated with an expository instantiation in the domain of change projects in organizations. This chapter is remarkable because the research draws out the continuous character of design science research programs in which the beginnings and ends of distinct cycles may be recognized in some cases as epistemological description decisions rather than ontological events.

In the fourth chapter, "Dealing with Critical IS Research: Artifacts, Drifts, Electronic Panopticon and Illusions of Empowerment", Marcello Martinez and Mario Pezzillo Iacono from the Second University of Naples, explore the IS and organizational control design problems from a critical perspective. By developing on the philosophical roots of post-structuralism and on the Foucauldian conceptualization of control, they show how the overlapping between "electronic panopticon" and "commitment practices" used by management when designing IS becomes a powerful tool for exerting influence and control in the sense of self-discipline and self-regulation. A case study of the call centre outsourcing industry is presented to support the discussion. The chapter provides insights on the role of "power of control" in the analysis and design of IT and organizational artifacts. In particular it shows how and why IT artefacts enable and constrain human behaviours and how the managerial discourses frame organizational reality by impacting on drift, beliefs, and perceptions. It is an outstanding conclusion to our first part by raising our awareness of that the act of designing a technological artefact is inherently an act of managerial control in organizations.

2.2 Part II: Design and Evaluation of IT Artifacts

The four chapters in the second part are related to the design and evaluation of IT artifacts that satisfy specific requirements (such as being user-centered, managing knowledge in a dynamic environment, enabling crowdsourcing, and e-participation). These works extend previous contributions by D'Atri in the Human Computer Interaction [25] and knowledge management [29] domains by taking into account the role of IT in contributing to the openness of organizational systems and in enabling new cooperative models and new feedbacks mechanisms. These contributions recall Sandro's revelation that, "in the context of cooperative systems the unpredictable behavior of actors involved and the openness of technology made me investigate new roles of technology and new forms of cooperation based on trust mechanisms instead of hierarchical structures" [35]. For instance this is the case for design principles and models emerging in the e-care, crowdsourcing, and e-participation domains.

This part opens with, "User Centered Systems Design: the Bridging Role of Justificatory Knowledge" by Paolo Spagnoletti from LUISS University and Laura Tarantino from University of L'Aquila. This fifth chapter addresses the field problem of developing successful user centered systems when IT artifacts are

expected to fit with the dynamics of complex socio-technical systems such as organizations. A synthetic view on the evolution of the main paradigms in Human Computer Interaction (HCI) is provided and current methods for the design of user centered systems are critically analyzed through the lens of a conceptual framework based on "The Anatomy of a Design Theory". The discussion is also supported by an expository instantiation in the context of an e-care project. As a result of this analysis the authors maintain that HCI, which is pragmatic in nature, can benefit from a structured contamination with concepts grounded in the IS design research stream. The contribution is important because it illustrates the usefulness of introducing research into practice.

In "A Design Theory for Dynamic Competencies Mapping Systems", Luigi De Bernardis and Riccardo Maiolini from LUISS Guido Carli University, address the field problem of dynamically mapping competencies with IT. They use the IS design theory constructs for deriving a set of meta-requirements from kernel theories grounded in the knowledge management tradition. These meta-requirements are then linked with a set of prescriptions for the design of an IT system supporting the dynamic mapping of competences within organizations. This sixth chapter also introduces a possible plan, based on the adoption of text mining software, for evaluating the effectiveness of the proposed solution. This work is important because it advances to both managerial research and practice by providing a new and sustainable way for updating skill inventories and job descriptions.

In the seventh chapter, "Open Innovation and Crowdsourcing: a Cross Case Analysis", Francesca Cabiddu, Manuel Castriotta, Maria Chiara Di Guardo and Paola Floreddu from the University of Cagliari address the field problem of designing IT platforms that effectively support crowdsourcing activities. The paper provides a cross-case analysis of two initiatives for generating innovation through the contribution of communities of customers. In order to frame the analysis, authors adopt a theoretical framework grounded on the concept of design theory and on previous literature on crowdsourcing and open innovation. Crowd integration, efficiency of creative process, community structure, and open culture are adopted as dimensions for understanding the link between requirements and design components of two crowdsourcing platforms that are analyzed through a netnography approach. The main contribution is an evaluation framework for supporting the design of IT artifacts that foster creativity among online communities. From a D'Atri perspective, however, we find importance in the work's observations about how people can productively cooperate in creative design with minimal organizational control structures and managerial intervention.

This part of the book culminates in "New Internet-based Relationships Between Citizens and Public Administrations: Challenges for Platforms Design". Alessio Maria Braccini and Tommaso Federici from the University of Tuscia (Italy), address the design of web 2.0 tools for enabling e-participation. In this eighth chapter, we see design as a bottom up process promoted and performed by citizens for increasing the transparency of governments' actions and improving their policies. They analyze four cases in which original or official

data about the activity of governments and public administrations are distributed through the Internet by private subjects. They see the characteristics of the IT artifacts in terms of spirit, technology, data, audience, language, and user interaction. The value of this work is particularly important because it proposes an explanatory design theory linking general requirements to general components by referring to three kernel theories, namely Social Capital, Absorptive Capacity, and Agency Theories.

2.3 Part III: Design and Evaluation of Organizational Practices

The third part collects four chapters focused on the design of organizational artifacts such as team composition, learning processes and spaces, and performance management systems. The two central chapters of this part are well connected with D'Atri's research activities in the e-learning domain [32, 41] and his interest in the role of IT for supporting learning processes. While less directly anchored to Sandro's work, the first and the last chapters of this part contribute a more complete view of the different levels involved when design is applied to organizational systems. In fact these contributions provide insights on the team composition decisions and on the design of organizational control systems respectively.

In the ninth chapter, "Designing Teams for Enhancing Individual Added-Value Use of Technology: The Role of Competition and Dynamics among Team Members", Stefano Basaglia from University of Bergamo and Leonardo Caporarello, Massimo Magni and Ferdinando Pennarola from Bocconi University, address the organizational problem of underutilization of implemented technologies. They focus on a mix of team-level conditions and individual characteristics for predicting employees' intention to explore new technology. According with their results, managers may consider creating competitive team structures that emphasize a tight integration of technology use into employee work practices. Moreover team composition should be based upon a balance in individual attributes for facilitating the emergence of technology "creative explorers" within each team. This chapter is powerful in its operating assumption that success and failure is not a binary characteristic, and while the assumption is itself not new, the work advances novel techniques for managing the utilization phenomena on the continuum rather than the contradiction.

Next, Nunzio Casalino from Marconi University addresses the field problem of finding the designability edge at which organizational systems designers can effectively operate to enable learning to occur. Our tenth chapter, "Design Principles at the Edge of the Designable: Non-Formal and Informal Learning in SMEs", achieves this goal by exploring and describing in depth the organizational concept of informal learning at the workplace. The conceptual analysis lies on the results of European project aimed at investigating the complex dynamics of non-formal and informal learning processes in Small and Medium Enterprises.

The initial results provide insight into the designable aspects of for promoting such learning and elements that capture the results from such learning. In such a way, the designers design the before-edge and the after-edge of the informal processes. We found this work particularly important for its pragmatic theory: Because human behavior cannot be designed effectively, we can still design effectively at the edges of this behavior.

At the intersection of architecture, information systems, and organizations, we find our eleventh chapter, "Designing Innovative Learning Spaces in Higher Education at a Turning Point: Institutional Identities, Pervasive Smart Technologies and Organizational Learning". In this chapter, Chengzhi Peng from the University of Sheffield reports and reflects on the findings of an ICT-based design experiment in a higher education institution. The focus is the design of a large scale Web-based 3D virtual university campus modelling system aimed at supporting the design of learning spaces in a real institutional context. The core argument is that such digital modelling platform can be a useful tool in fostering organizational learning and improving institutional performance. Aside from the conspicuous richness of the intersection, this work is important because the merger yields an abstract design space: the "learning landscape". This architectural goal is an abstract place defined both by physical space and human behavior; still, this research shows how it is one that can be represented holistically and manipulated prescriptively by information technologies.

The twelfth and concluding chapter in this part is, "Performance Management Systems as Driver of Public Administration Improvement: a Dream?" Debora Tomasi, Stefano Scravaglieri and Maurizio Decastri from Tor Vergata University address the field problem of implementing Performance Management Systems (PMS) in public administrations (PAs). They present the results of an action design research project for the implementation of a PMS in an Italian PA. A set of prescriptive rules for the successful application of PMS principles to PAs are derived from the generalization of the empirical findings. The contribution is expressed in the form of testable propositions related to the meta-design and to the design method for future artifact design. The importance of a design research case such as this one, in terms of D'Atri's directions, cannot be understated. Decisions about how to manage human performance are not only loaded with the future of sanctions and rewards, but will also shape how people will behave, what they will do, and what the organization can accomplish. Such a "loaded" application means design decisions are conspicuous to stakeholders, and perhaps the most ideal setting for the transparency that is available from design science research.

2.4 Part IV: Design and Evaluation of Managerial Strategies

In the concluding part of the book, we find four chapters that are related to the design and evaluation of managerial strategies such as IT strategic planning in the e-business, e-government, and e-health domains. D'Atri developed interests in

such topics in the last part of his career by enlarging the scope of the organizational systems under control (and of the artifacts for controlling them) to the level of cooperative systems [36–38] and nationwide governance models (such as in the context of e-government and e-health [34]).

We open with, "Design on a Societal Scale: The Case of E-Government Strategic Planning", by Carlo Batini, Gianluigi Viscusi and Marco Castelli from University of Milano-Bicocca. This chapter regards the implementation of a comprehensive method for the design and planning of service-oriented information systems with special emphasis on e-government initiatives. They test the appropriateness of this method in the context of an information integration initiative in the Tunisian Ministry of Agriculture and Hydraulic Resources. In this case, the authors evaluate the adequacy of the method and examine whether the method provides a contribution to some of the challenging issues mentioned by Simon for the design of artifact on a societal scale, namely the problem representation and the organizations in social design. The results are important because the issues and directions are scaled to *societal* design, a much more ambitious direction than technological or organizational design.

Next, Stefano Za and Paolo Depaoli from CeRSI-LUISS Guido Carli University propose a stage model of organizational learning built on existing literature and on the needs of the most innovative kinds of SMEs. This is our fourteenth chapter, "Towards The Redesign of E-Business Maturity Models for SMEs". Two sets of considerations support the proposal of an updated conceptual stage model. The first one concerns the heterogeneous world of SMEs, and the second set of considerations concerns the role of information technology and systems. The paper combines relevant areas to pursue the research aims. For example, *Business needs* (derived from the relevant environment as a combination of people, organization, and technology) and *Applicable knowledge*. The interplay of technology and organization is considered according to Orlikowski's principle of 'entanglement in organizational practice' of technology. This work is important because it provides outcomes with practical guidance both for entrepreneurs and policy makers.

In the fifteenth chapter, "Offline and Online Communities: Great Differences and Some Similarities", Andrea Resca and Maria Laura Tozzi from LUISS Guido Carli University investigate the concept of community by comparing characteristics of online and offline communities. The discussion is articulated along two perspectives. The first is derived from online and virtual communities, widely explored in studies related to ICT and Computer Mediated Communication. The second perspective is derived from the offline community, a classical object of analysis of sociological studies. A particular focus is given to the analysis of the organizational forms that characterize both offline and online communities. The comparison of market, bureaucracy, and clan with organizational forms that characterize the cyberspace according to the current literature leads to the rather timely conclusion that many online communities are not communities in the offline sense. This finding is important because it recognizes the label *community* may have a fundamentally different meaning online.

Our concluding sixteenth chapter is by Valentina Albano from Roma Tre University. In "The Role of Network Governance Models in the Design of Local ehealth Policies", Albano addresses the field problem of successful eHealth implementation by focusing on the mechanisms of coordination and control of network-level activities as a driver for the design of successful eHealth interventions. She adopts the concept of policy network as analytical tool for investigating the influence of the structural relationship between political institutions and the design of successful policy arrangements related to the diffusion of eHealth. Three cases of eHealth policy networks are comparatively analyzed in order to show how these models of network governance operate and influence the design of eHealth strategies. This paper is remarkable because several design activities become intertwined: design of policies, design of a network to help design the policies, and design of strategies related to these policies. The presence of this nested design problem in the eHealth domain makes the relevance to D'Atri's research directions all the more salient.

Our goal in this book was to actively energize Sandro's research directions by formulating and offering the next advances. As a prominent scholar, the research he completed should rightfully serve as a launchpad for better research, new ideas, and further studies. As such, even this volume should *not* be regarded as a final tribute to Sandro. It is rather the next, first steps taken in his absence. We are confident that the sixteen chapters that follow, embodied in the work of 35 authors and 12 editors, will further launch other works by other authors who will thus be able to stand on the shoulders of Professor Alessandro D'Atri.

Appendix

Alessandro D'Atri's selected publications

Disciplinary area	Co-author
Computational complexity	Ausiello et al. (1977)
	Ausiello et al. (1980)
	Ausiello et al. (1981)
Graph theory	Ausiello et al. (1985)
	Ausiello et al. (1986)
	Ausiello et al. (1986)
	Moscarini (1988)
Graph theory and database theory	Ausiello et al. (1983)
	Batini (1980)
	Moscarini (1986)
	Ausiello et al. (1986)

(continued)

Disciplinary area	Co-author
Databases	Moscarini et al. (1983)
	Saccà (1984)
	Ricci (1988)
	Di Felice et al. (1989)
Databases and human–computer interaction	Tarantino (1989)
	Laenens et al. (1991)
	Clementini (1991)
	Motro (1999)
Telemedicine and e-health	Tarantino et al. (1993)
	Di Stefano et al. (1995)
	Currò et al. (2000)
	Casalino et al. (2005)
	Currò et al. (2007)
	Spagnoletti et al. (2011)

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