

Design for social media engagement: Insights from elderly care assistance



Paolo Spagnoletti ^{a,*}, Andrea Resca ^b, Øystein Sæbø ^c

^a LUISS Guido Carli University, Department of Business and Management, Viale Romania 34, 00197 Roma, Italy

^b LUISS Guido Carli University, Research Center on Information Systems (CeRSI), Viale Romania 34, 00197 Roma, Italy

^c University of Agder, Department of Information Systems, Post Box 422, NO-4604 Kristiansand, Norway

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ABSTRACT

This paper explores an alternative view of design as an emergent process of engagement and learning, as opposed to the traditional view of systems design as a problem-solving tool. We focus on digitally enabled elderly support networks as an innovative approach to the design of elderly care assistance through social media. Our research project is conducted in the context of an Italian health-care institution and provides the empirical back-drop illustrating the ensemble artefact, the four design principles and the pragmatic outcomes of personalized elderly care interventions. These contributions add both practical and theoretical guidance and learning regarding social-media engagement in elderly care assistance. Further, we illustrate how the design of personalized services through social-media technologies may challenge traditional organizational boundaries and transform the relationship between internal and external stakeholders. Based on our findings, the conclusion is that personalized elderly care assistance emerges as a socio-technical construction of social media.

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Introduction

Nearly forty years ago Richard Boland published a paper entitled “The Process and Product of System Design” in *Management Science* (Boland, 1978). This ground-breaking study reported the findings of an experiment conducted in the surgical division of a large teaching hospital. A number of teams, each comprising one nurse and one designer, were asked to engage in the design of health-care practices for personalized assistance while following two different interaction protocols. The first protocol was based on the traditional view of design, in which the designer acts as the problem solver who is engaged in interviewing nurses, analyzing data and collecting feedback and suggestions. The second protocol, labelled “alternative rationality”, consists of a discovery process in which the designer and the client engage in information sharing, mutual suggestions, and critiques. According to the traditional view, design is performed through an iterative learning process aimed at gaining consensus on data collected to find an appropriate solution for a given problem. In the alternative design, the designer acts as facilitator of a human-centred process; this alternative is characterized by shared leadership and aimed at building mutual consensus on the problem resolution. Drawing on the dichotomy between such different approaches to design, Boland presents a contingency theory of organization design by emphasizing the necessity to select an appropriate interaction protocol for a given design situation.

* Corresponding author. Tel.: +39 06 85225 795.

E-mail addresses: pspagnoletti@luiss.it (P. Spagnoletti), aresca@luiss.it (A. Resca), oystein.sabo@uia.no (Ø. Sæbø).

More recently, different communities of scholars and designers have advanced the two traditions of design with areas of overlap. For instance, to underline the mix of deliberate effects of design with emergent, unexpected or unintended ones, information systems (IS) scholars refer to concepts like design as “care” (Ciborra, 1996; Lanzara, 2009) and “cultivation” (Aanestad, 2012; Dahlbom and Mathiassen, 1993). By contrast, the traditional problem-solving view of design has gained momentum in the last decade in the mainstreams of both information system (IS) research and practice. The vast majority of approaches to design science research (DSR) views design as a problem-solving process aimed at achieving the internal consistency and coherence of the proposed solution (Hevner et al., 2004).

Although some efforts have been made developing methods addressing the emerging nature of the design artefact (Pries-Heje and Baskerville, 2008; Sein et al., 2011), recent changes in the contextual conditions of workers and institutions draw further attention to the alternative logic of design. The traditional view of design as a problem-solving activity performed in the controlled space of a workplace is challenged by today's digital technologies, increasingly being present in all spheres of users' personal and professional lives (Winter et al., 2014). Multimedia content, mobile connectivity, social networking and other emerging digital capabilities make it difficult to isolate a specific role played by an individual as user.

Focusing on a design problem related to the provision of personalized care to patients of a health-care institution, we recall Boland's background. In our case, the design unfolds in a context in which elderly care assistance is mediated by digital tools, such as social-media technologies used within institutions, professions, and user communities. Considering digital tools apt instruments for personalized assistance when activated and monitored by healthcare organizations, social media is here defined as the emerging outcome of a set of interventions made on a digitally enabled patient-support network.

Digitally enabled patient-support networks provide an ideal setting for exploring the applicability of alternative views of IS design. Since in these settings the design is not straightforward, we focus on such an ill-defined problem to conduct our investigation on personalized assistance through social-media engagement. An inquiry on the design of personalized elderly assistance in the geriatric unit of an Italian hospital provides the basis for a better understanding of design as a socio-technical construction of digitally enabled elderly support networks. The proposed approach originates from the “Help and social interaction for elderly On a multimedia Platform with E-Social best practice” (HOPES¹) project, which is aimed at providing social e-services to elderly Europeans and their social circles in an attempt to improve the quality of social relations between the elderly and their social environments. An ADR project (Sein et al., 2011) has been undertaken in the final part of the HOPES project with the objective of building and validating a model for personalized elderly care assistance through social media. Our findings demonstrate how this model provides an alternative approach to design personalized assistance. Involving elderly support networks through social media engagement helped to overcome recipients' IT-illiteracy. Our study contributes to build prospective and normative knowledge, as defined by pragmatism, in addition to prescriptive and descriptive knowledge (Gregor and Hevner, 2013). Finally, while addressing the main challenges related to the provision of elderly care services, practical implications for a wider area of interests are discussed, envisaging settings in which lessons learned about elderly care assistance through social media engagement can be applied.

The paper is structured as follows: First, works related to design views in IS research and to the role of social media as an ensemble artefact are discussed to clarify current research knowledge; next, the research approach is introduced, followed by the empirical findings from the ADR project at the Geriatric Campus; then, theoretical contributions and lessons learned are covered; finally, implications for research and practice are explored.

Related works

Design views in IS research

In recent years, design science has attracted much attention as an engaged form of research in IS, organization and management studies (Gregor and Jones, 2007; Hevner et al., 2004; Romme, 2003; van Aken, 2004). Such studies are characterized by a problem-solving orientation and a prescriptive form of inquiry. In the IS field, design science research (DSR) has been recognized as an important stream of research that is aimed at generating knowledge through the development of socio-technical artefacts (Lee, 2010).

A variety of positions regarding theories and their roles in DSR has emerged from the IS discourse. Some authors claim that the ultimate goal of a design research effort must be a combination of prescriptive and descriptive theories (Gregor and Hevner, 2013). Other authors adopt a more pragmatic position by arguing that artefact impact is more important than artefact grounding. In such a view, design theories comprise a special kind of practical theory (Goldkuhl, 2012a, p.140), and design science, like action research, is framed within a pragmatic philosophy as an engaged form of research (Baskerville and Myers, 2004).

Studies conducted under this perspective focus on actions, interventions and experimentations with the final goal of developing knowledge that is useful in action (Goldkuhl, 2012a). Therefore, knowledge is not restricted to explanations and to understanding; instead it also has a constructive character being prescriptive, normative and prospective (Goldkuhl and Agerfalk, 2005; Goldkuhl, 2012b). While prescriptive knowledge deals with giving guidelines and is common to any DSR approach, the normative and prospective values of pragmatic knowledge are unique characteristics of this

¹ www.hopes-project.org.

perspective (Goldkuhl, 2012a). Normative knowledge focuses on value systems and emphasizes the ethical aspects that are relevant in a given situation. Prospective knowledge focuses on “what-might-be” scenarios by suggesting possibilities for future conditions. Therefore the consideration of ethical aspects and a critical assessment of the consequences of design must be taken into consideration (Avital et al., 2006; Bednar and Welch, 2012; Myers and Venable, 2014). This can be done for instance by engaging in the design process people that are involved in changes and interventions (Bednar and Welch, 2014).

The pragmatic view of design assigns to models and to explanatory frameworks the role of metaphors to stimulate reflection and learning rather than rational tools for problem solving. Examples in this respect are the metaphor of design as “care” (Ciborra, 1996; Lanzara, 2009) where technology is seen as a “thing” that is subject to a continuous process of embeddedness within a larger context of meaning; “hospitality” where design is considered an effort related to technology adoption in organizations (Ciborra, 1999); “cultivation of the installed base” (Aanestad, 2003, 2012), where design encompasses processes in which technology and work practices evolve together through growth, user mobilization and learning (Aanestad and Jensen, 2011; Grisot et al., 2014).

Action design research (ADR) has been proposed as a tool for conducting an engaged form of research for advancing theory while producing useful knowledge. It provides means for designing artefacts emerging in an organizational context, stressing the inseparability of the building, intervention and evaluation phases that leads to an ensemble view of artefacts (Sein et al., 2011). Therefore this method assumes a pragmatic view of knowledge and emphasizes the importance of assessing values exhibited by the artefact in context.

Combining the research traditions of action research (Baskerville and Wood-Harper, 1996) and design science (Hevner et al., 2004), ADR focuses on changing practices through the creation of a problem-solving environment in response to specific needs, allowing the participation of key stakeholders to facilitate an understanding of complex problems (Van de Ven, 2007). ADR has been also advocated as a viable approach to study IT value generation in the health-care sector (Sherer, 2014).

However, despite the variety of themes and domains, few studies have reported the results of ADR projects in top IS journals. Even the case of building a competence management system at Volvo, proposed by the ADR authors for illustrating the method, is based on a reinterpretation of a previous work framed as an action research project with a design orientation (Lindgren et al., 2004) rather than as a canonical ADR project. We explain this lack of explicit ADR applications in IS journals by virtue of the fact that the dominant focus of IS research assumes, as unit of analysis, traditional socio-technical systems, as characterized by a self-contained view of organizations in which the social and technical parts must be jointly optimized (Winter et al., 2014). These assumptions made by traditional DR studies imply a view of design as a form of control in which products designed are static elements whose development ends after a few iterations in the context. In this regard, some studies focusing on developing countries differentiate. For instance, the network of actors and locations is decisive in the provision of health care based on health-information systems (Braa et al., 2004). The present work follows this perspective with the goal of advancing the view of design as socio-technical construction. By reflecting on the results of an ADR project conducted in the context of a healthcare institution, we help to make explicit the pragmatic view of design.

Social media as an ensemble artefact

In this study, social media is intended as an ensemble artefact emerging from a set of interventions made on a digitally enabled elderly support network. The notion of “artefact” has been highly debated within IS research (Lee et al., 2015) since the desperate call for more knowledge regarding Information technology (IT) artefacts was raised by Orlikowski and Iacono (2001). The ensemble artefact view has its roots within the view of IS design as a socio-technical construction, with the primary objective of ensuring equal consideration of technical and human factors in the design process, as well as the involvement of the users in the determination of the required quality of working-life improvements (Mumford, 2006). The objective of socio-technical design, “the joint optimization of the social and technical systems” (Mumford, 2006, p. 321), guide the idea of the ensemble view of an artefact (Orlikowski and Iacono, 2001; Sein et al., 2011), the socio-technical artefact (Silver and Markus, 2013) and the IS artefact (Lee et al., 2015). Likewise, it informs our view of social media as an ensemble artefact whose components are the technology, the information and the social structure of digitally enabled elderly support networks.

The ensemble view of an IT artefact conceives technology as one element in a package that includes the interaction between people and technology (Orlikowski and Iacono, 2001). By considering material and organizational features as socially recognized structures inscribed into the artefact, the ensemble view softens the distinction between development and use (Sein et al., 2011). The design of such artefacts requires a shift in focus beyond technical dimensions by taking into consideration contextual factors and their influence on the design efforts.

Some scholars have recently criticized the concept of artefact for being too broad and hence no longer of any value for IS research (Alter, 2015), while others argue for the need for more detailed exploration of IT artefacts (Goldkuhl, 2013a; Lee et al., 2015; Silver and Markus, 2013) to encourage the adoption of socio-technical perspectives within IS design research. The latter argument resonates our view and is introduced here to explain the benefit of conceiving social media as an IS artefact in comparison with an IT artefact. The concept of an IS artefact is the result of three subsystems: the technology artefact, or tools used to solve a problem, achieve a goal or serve a purpose defined by humans; the information artefact, or the instantiation of information occurring through a human act; and the social artefact, or the nature of the relationships or

interactions between individuals (hence social) in attempts to solve problems, achieve goals or serve one's purposes. The whole IS artefact is greater than the sum of its parts, and the constituents are interactive parts that form a larger system (Lee et al., 2015). Such classification clarifies the current use of the term, which reaches far beyond the technical aspects of artefacts and also includes the socio-technical parts, enabling us *"to more exactly describe different kinds of artifacts in IS instead of so overloading the term 'IT artifact'"* (Lee et al., 2015, p. 8).

Although social media has received increased research interest in recent years, few contributions have adopted an ensemble view of social media as an IS artefact. A common definition of social media refers to *"a group of Internet-based technologies that allows users to easily create, edit, evaluate and/or link to content or other creators of content"* (Kaplan and Haenlein, 2010). Moreover, little attention has been given to social media as an emergent artefact whose characteristics are dynamically shaped by the contextual dependencies of its context of use, adoption and implementation. In fact, previous studies are more concentrated on explaining patterns of use and the influence of social media on organizational and social practices.

The *technology* artefact component of social media as an ensemble artefact plays a twofold role by supporting social activities and constraining interactions. Social media is essentially a communication system (Culnan et al., 2010) mutually constituted with the organizational context (Leonardi, 2009) and the digital platform that both facilitates and hinders individual and social interactions (Faraj et al., 2011). Digital platforms are intended here as evolving systems (such as Facebook or Twitter) composed by a set of stabilized core elements and emerging features generated by the reciprocal interaction with their communities of users and developers (Hanseth and Lyytinen, 2010; Spagnoletti et al., 2015). The functions of social-media tools (Leonardi et al., 2013; Treem and Leonardi, 2012), are rarely the main focus of research within the IS literature on social media. Instead the technology is often seen as black-box static system whose role is to explain features related to the informational or, even more, to the social component of the IS artefact.

The *information* artefact component is investigated by studies focusing on the publicly available user-created content (Kaplan and Haenlein, 2010). Users may generate content (Culnan et al., 2010) that is visible (for others), persistent (original display available after editing) and editable (users may craft and re-craft content before it is viewed by others) (Treem and Leonardi, 2012). Furthermore, social media allow users to post, edit and sort content linked to themselves or to others (Leonardi et al., 2013) while integrated across different social-media tools (Kane et al., 2010).

The *social* component is the main research focus in IS-related studies on social media. Through social media, users are engaged in online conversation by reacting to others' presence, profiles, content and activities, informed by relational and content ties (Majchrzak et al., 2013) to establish connections between individuals (Treem and Leonardi, 2012). New social practices may occur (Huang et al., 2013; Urquhart and Vaast, 2012), including the enactment of community-sustained roles (Majchrzak et al., 2013) in which users are provided an environment to interact more easily with other stakeholders (Kane et al., 2010).

The features of both the technology and the information artefacts are mainly seen as necessary conditions that render possible the social features through which users are linked to other creators of content (Kaplan and Haenlein, 2010). The three subsystems are clearly assembled so that each component relates to the presence of the other.

When applied to the domain of elderly care assistance, the view of social media as an ensemble artefact suggests a focus on the technological, informational and social components in which the elderly and the enlarged space in which health-care institutions interact with the environment are part. Social-media tools can be used by the public, patients, and health professionals to communicate about health issues (Moorhead et al., 2013) and may influence the relationships between health-care professionals and patients (Eckler et al., 2010), as well as enable self-organizing assistance (Griffiths et al., 2012). Whereas IT-literate patients may utilize social-media technologies knowledgeably (Griffiths et al., 2012), healthcare services for elderly have to target also IT-illiterate users. Elderly may lack technical access to necessary infrastructure, but even more so competence on how to use social-media tools and understanding of the potential impact on their social and medical situations (Godfrey and Johnson, 2009). Intermediaries (as introduced in our study), such as trusted, technology-literate persons from elderly people's social circles, may be necessary to facilitate access that better fits personal needs of the elderly.

A closer look into this space allows the introduction of digitally enabled elderly support networks as a fundamental building block in the design of elderly care assistance. Digitally enabled elderly support networks, including patients and their trusted intermediaries, may add value and address obstacles related to digital-divide issues by providing access to information (since intermediaries may search for information), advice (since intermediaries may access relevant discussion forums) and better collaboration and information exchange between stakeholders from both sides of the network (i.e. private and professional) (Godfrey and Johnson, 2009; Griffiths et al., 2012). In such networks, the actions, the roles and the technologies are fluidly enacted in the attempt to provide the elderly with the necessary assistance by exchanging concrete resources and information. Therefore, a digitally enabled elderly support network instantiates our view of social media as an ensemble artefact and informs our examination of design as socio-technical construction in the context of elderly care assistance.

Research approach

The aim of this paper is to emphasize the view of IS design as a socio-technical construction. By applying the above-mentioned conceptions of design as *"care"* and of social media as an ensemble artefact to the domain of elderly care

assistance, we show how IS design can shape digitally enabled elderly support networks by engaging people and institutions in the provision of personalized assistance. The interconnection of the technology artefact, the information artefact and the social artefact offers the opportunity to reflect on the role of social media in IS design. As empirical settings for this study, we concentrated on the problem of orchestrating personalized elderly care assistance through social media from the perspective of a health-care institution.

The focus on change in local health-care practices and the interplay between knowledge and action that characterize our study make appropriate the adoption of a pragmatist approach to conducting the research (Goldkuhl, 2012a). For these reasons, we used ADR (Sein et al., 2011) as the overarching methodological framework of our study. In addition, ADR supports the concept of the IS artefact as a socio-technical construction shaped by development and use. Sein et al. (2011) define ADR as “designing IT artefacts while allowing for their emergence in an organisational context, and seeking utility in the ensemble they represent” (p. 53). The method conceptualizes the research process as comprising the inseparable and inherently interwoven activities of building the ensemble artefact, intervening in the organizational process and concurrently evaluating the artefact. Therefore, through ADR, investigators retain, as an ensemble, the holistic and meaningful characteristics of complex, real-life events. The ADR framework allows experimenting with localized methods for building an ensemble artefact, including situated interventions and the evaluation of outcomes through multiple iterations.

In this paper, we present the results of an ADR project aimed at generating and orchestrating personalized elderly care interventions from the geriatric unit of an Italian hospital fictitiously named “Geriatric Campus”. The design of an effective way for triggering and shaping such interventions provides the ill-defined problem to be addressed within the ADR project. A view of design as “care” and the idea of an ensemble artefact emerging across organizational boundaries suggest to position members of elderly support networks, with their technologies (e.g. social-media tools) and interactions, at the center of the problem space. Our theorizing is based on the abstract knowledge generated through reflection on the embedded data collection at Geriatric Campus in the context of the HOPES project.

Context of study

The HOPES project, a three-year endeavor that began in September 2010, was funded by the Ambient Assisted Living European Union (EU) Joint Programme, which seeks to develop a set of digital tools and managerial practices for enhancing the sociability and quality of life of elderly people by leveraging the potential of Web 2.0 technologies. The HOPES project aimed to enhance seniors’ socialization; quality of life and autonomy; prevent isolation and loneliness; and generate positive social experiences and behaviors. A key requirement, stressed by the project slogan “quality of life is contagious”, was to leverage network externalities by means of social media. The HOPES project provides a valuable context for reflecting on and learning about the role of social media in the design of personalized elderly care assistance.

In contrast to classical approaches to hypothesis testing, the HOPES research process was characterized by a continual emergence of empirical data, which were used for theorizing in an experimental and explorative way (Goldkuhl, 2013b). Data were generated, for instance, from direct observations and from focus groups of domain experts, researchers and potential users, who were involved in achieving a common understanding of the problem space, the interventions and their effects.

Therefore the HOPES project provided an opportunity to conduct engaged forms of research. Through contributions to the design process using abstract knowledge and by generating empirical data for building and testing theories, IS scholars and domain experts have been actively involved in HOPES’ design practices. During the first part of the project, the research activities addressed issues such as the architectural design of the digital platform and its implementation methods (Spagnoletti et al., 2015). Once the HOPES toolbox was deployed and assessed in April 2012, the design of a solution for engaging elderly social support networks through social-media tools and technologies followed, as indicated in Fig. 1 (see also Appendix A).

A closer look at the research activities conducted in the HOPES project serves to clarify the research context of the present study. In ADR terms, three intertwined streams of activities can be identified. The first is related to problem formulation, in which ill-defined problems are identified and conceptualized on the basis of existing theories. Then, in the building, intervention and evaluation (BIE) phase, design and evaluation are practiced as a form of empirical work. Finally, in the reflection and learning phase, researchers generate knowledge in the form of theoretical contributions. The preliminary results of such theorizing activities were presented in conference papers, book chapters and workshop proceedings during the project (Spagnoletti et al., 2012; Spagnoletti and Resca, 2012; Spagnoletti and Tarantino, 2013). A summary of the research process is provided in Fig. 1, in which the sequence of activities is distributed along three layers and the arrows represent the flows of inputs and outputs linking design practices to theorizing activities, such as problem formulation or reflection and learning.

In Fig. 1, the gray area represents the focus of the present paper, in which we concentrate on the activities conducted at Geriatric Campus in Rome. The aim was to design and evaluate a model for engaging users in the adoption of the HOPES toolbox, which was developed in the previous phases. The first two authors of this paper were actively involved in HOPES’ problem formulation activities and in coordinating the empirical work. The third author was involved in HOPES’ reflection and learning activities by contributing to the production of abstract knowledge from the HOPES case. Moreover, one of the authors sat on the board of the HOPES project; attended almost all of its technical meetings, workshops, seminars and focus groups; and contributed to all the deliverables issued by the consortium. Such privileged access to the official project documentation and to the large amount (about 3000 email messages) of data generated and collected over the three-year project has provided the empirical grounds for this study.

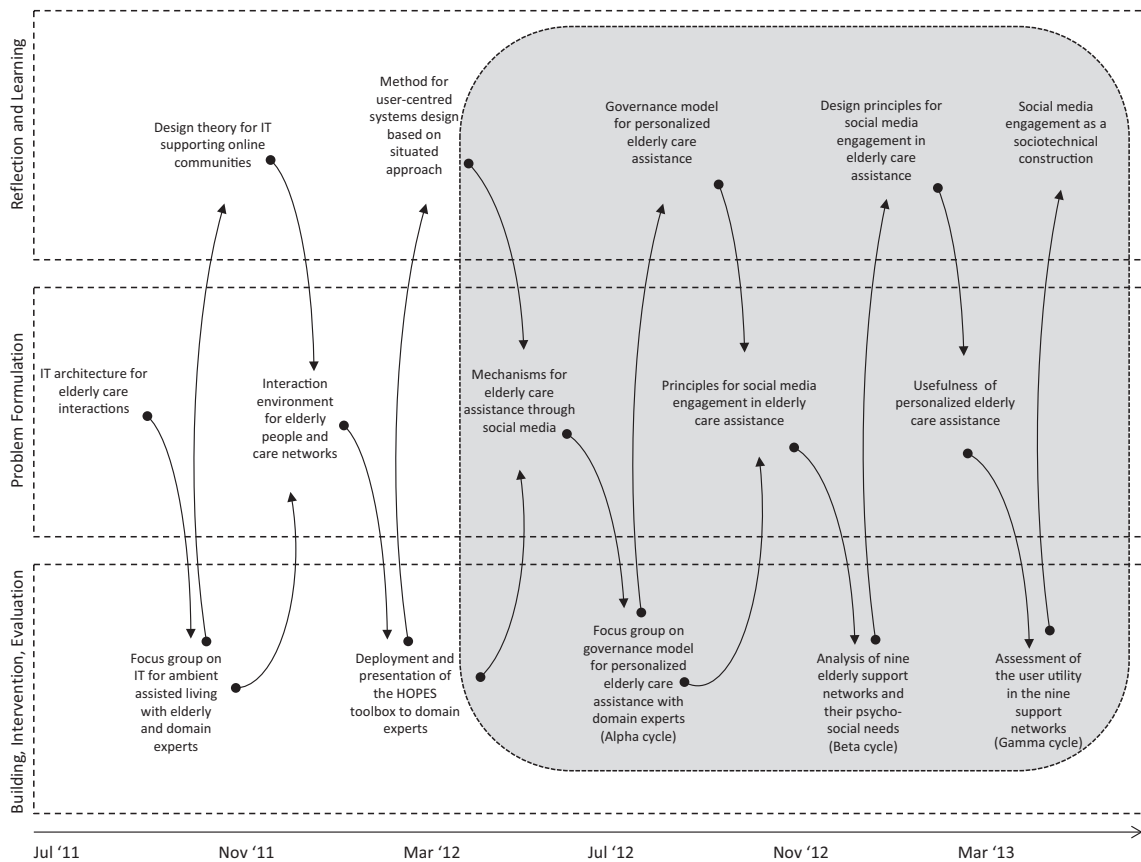


Fig. 1. Sequence of research activities in the HOPES project. Inspired by Goldkuhl (2013b) and Sein et al. (2011).

The hospital has more than thirty clinical units, and its services include an outpatient unit, a day hospital with associated day surgery services and inpatient units with flexible admission schedules. The geriatric unit involved in the project was represented by a geriatrician and a social assistant, who were also members of the ADR team. Hence, the contributions provided by the project are limited by the context of Geriatric Campus Hospital. Specifically, the scope of personalized interventions was limited to nine elderly support networks. Therefore, the possibilities to extend findings from this ADR project to social media engagement on a large scale deserve further effort and are out of the scope of the present paper.

ADR at Geriatric Campus

During a project meeting in July 2012, the HOPES partners agreed to execute an ADR project in Rome during the final part of the project, aiming to develop and test a model for the provision of personalized care assistance for the elderly through social media. According to the ADR methodology, the model was expected to emerge from mutual interactions among the sociotechnical components of the geriatric unit and its interaction context. That is, in addition to the elderly and their family members, general practitioners, social assistants, volunteers and neighbors are significant examples of players engaged in project activities. The project continued until the end of the HOPES project in March 2013.

A closer look at the activities carried out at Geriatric Campus reveals details about the actors involved, their roles in the three cycles and the contributions provided by the project (Fig. 2). Researchers were involved from the beginning by ensuring continuous access to both descriptive and prescriptive knowledge on the adoption of social media in this type of context. Practitioners from the geriatric unit of the hospital were involved in the design and evaluation of situated interventions, which were performed both to coordinate the activities of the ADR team and to deploy personalized assistance to nine elderly participants through the social media engagement of their support networks. For each elderly person, a trusted member of the social circle (called the “evangelist”) was identified by the practitioners and asked to act as a mediator between the members of the person’s support network and the ADR team.

Building was essentially performed by the ADR team, which was composed of two IS researchers, the geriatrician, the social assistant for the geriatric unit and a junior assistant with network analysis skills. The geriatric unit, in cooperation with the evangelists, was the protagonist of the **interventions**. **Evaluation** was carried out by the authors of this paper, along with practitioners, on the basis of feedback collected from peers regarding methods and intervention effects within elderly

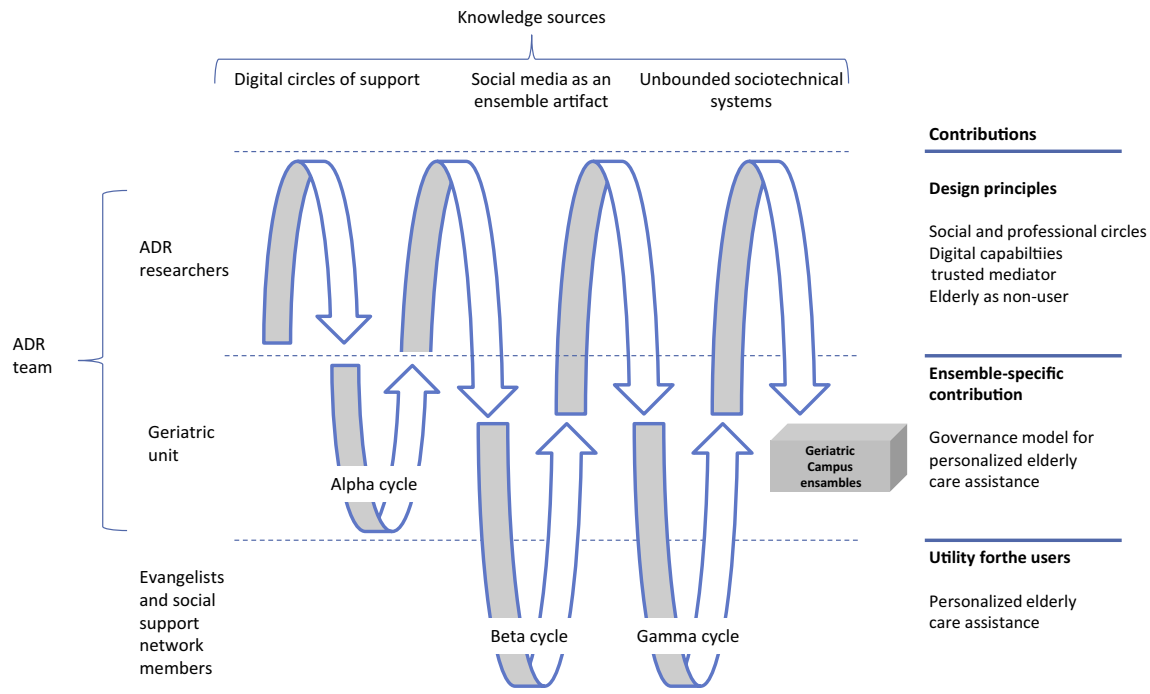


Fig. 2. Detailed BIE at Geriatric Campus (adapted from Sein et al., 2011).

people's support networks. Within the ADR team, the practitioners from the geriatric unit ensured the development of practice-inspired research, while the researchers ensured the design of a theory-ingrained artefact and challenged the knowledge base with new insights from the field.

The Alpha, Beta and Gamma cycles represented in Fig. 2 correspond to the empirical activities that were conducted to address the design problems formulated by the ADR team and to derive research outcomes through reflection and learning, as depicted in Fig. 1. The unfolding of the three outcomes in this iterative process guides the presentation of the case.

Ensemble-specific contribution

Like any engaged form of research, ADR is problem driven. In the HOPES case, the ill-defined problem of organizing actions for personalized elderly care assistance through social media drove the efforts of the ADR team. A draft version of the roles and responsibilities for such an endeavor was proposed by the researchers at the beginning of the project. This structure, grounded on the idea of digital circles of support (Godfrey and Johnson, 2009) and on the empirical findings of the previous phases of the HOPES project, offered a conceptual tool to achieve a common understanding of the problem space. The roles and responsibilities were revised in subsequent design cycles.

The practical goal of the design effort was to develop an environment to engage and enable elderly people's support networks to provide personalized care by interacting and communicating with the geriatric unit. Multiple rounds of interactions with the support networks of the nine elderly people involved in the project allowed the ADR team to test a set of interventions with users and reflect on their effects in order to refine the assistance practices for the elderly. The second cycle focused on the analysis of the social support networks and psychosocial profiles of the elderly participants. The third cycle entailed the engagement of IT literates within the elderly people's support networks to purposefully shape the emergence of information exchange and interactions through social media devices and platforms.

The set of roles and responsibilities drafted in the first cycle was designated as the "governance model" and represented the starting point for the emergence of the ensemble artefact (Appendix A). The ADR core team, composed of investigators and domain experts, was in charge of coordinating activities, defining interventions and orchestrating the flow of resources and information. Evangelists constituted a second level of involvement, representing trusted members of the elderly people's networks. In accordance with the conception of digital circles of support (Godfrey and Johnson, 2009), an evangelist is the closest relative in an elderly person's support network and advises the older person by leveraging their trust relationship. Evangelists were assigned the role of mediators by engaging them in collecting data from the elderly people's networks and then recruiting other network members to implement interventions. A third level was made up of the elderly people's social circles and, especially, the IT-literate members of those circles, who were the actors most likely to contribute through their engagement in tinkering with digital devices and social media tools. Roles and responsibilities are summarized in Table 1.

Table 1

Roles and responsibilities in the Hospital Campus Project.

Roles	Responsibilities
Investigators and domain experts	<ul style="list-style-type: none"> – Define methods and coordinate the process – Identify the evangelists and invite them to join the monthly meeting – Collect, analyze and report empirical data – Discuss and identify interventions
Evangelists	<ul style="list-style-type: none"> – Engage the elderly individuals and identify their social circles – Provide data on the personal networks of the elderly (main informants) – Participate in monthly meetings and provide feedback on methods and outcomes – Engage members of networks to implement interventions
Care receivers and their social circles	<ul style="list-style-type: none"> – Provide requested information – Implement interventions by using social media for the benefit of the elderly

Ten elderly people were identified as prospective participants and nine agreed to participate. The participants established close relationships with the geriatrician, as they were subject to frequent medical examinations due to their age and clinical conditions. The social role played by medical doctors and their importance in the lives of the elderly, as the custodians of their health, formed the basis of these trusting relationships. This specific situation made it possible to take into consideration the elderly participants' involvement in the HOPES project despite the problem of IT literacy. After identifying participants, the next step was obtaining descriptions of their social circles. Specifically, the aim was to acquire a list of the people with whom the elderly participants were in touch and to discover the frequency of their meetings, their trust levels, the modality and content of their interactions and their level of IT literacy. In order to perform this task without being intrusive in the elderly people's daily activities, the relatives who accompanied them during their periodic appointments in the geriatric unit – “the evangelists” – were in charge of gathering information. The evangelists were also asked to meet the ADR team to gain an understanding of the goals and the approach of the HOPES project and determine their willingness to volunteer in this delicate role.

Next, a questionnaire was developed to assess each elderly participant's degree of social integration, collecting information on their psychosocial conditions and on the structure and composition of their nine individual support networks. This questionnaire was completed during the second cycle by the nine evangelists, who reported information on the members of the support networks, the frequency and content of social interactions, the level of trust characterizing each network link, the IT literacy and capabilities embedded in the networks, and the psychosocial conditions and existential profiles of the elderly participants. The intention was to acquire information on the main issues that characterized the participants' everyday lives and how these issues were experienced. The questionnaire provided the input data for a personal network analysis, resulting in sociograms illustrating the social integration level of each elderly individual (Abbott et al., 2012). Each sociogram includes about 50 nodes (see Fig. 3), some of which represent the IT literates (in red color) while others are members without basic IT skills (in blue). The sociograms proved an important tool for understanding the participants' social contexts and exploring the presence of resources that could be mobilized through further interventions.

After acquiring information related to the elderly participants' conditions, their social circles and their evangelists' roles, interventions were made with people around them to provide personalized assistance aiming to improve their quality of life. A series of interventions to be made in each participant's social circle emerged and were summarized in personal charts in an attempt to create a more comfortable, supportive and secure living environment. To fully understand the potential of social media to improve the quality of life of the care receivers, the IT literates in each elderly person's social network were surveyed, mapping out the IT skills, devices and connectivity available in each network in order to envisage the most effective use of social media tools to achieve the objectives outlined in the elderly participants' personal charts.

During the last cycle at Geriatric Campus, the nine evangelists, supported by the ADR team, contacted members of the elderly participants' social circles and shared with them the aim and scope of the personalized interventions. Technical support was ensured by a member of the ADR team, who offered guidance to the IT literates regarding the use of social media functionalities by identifying and sharing good practices among elderly people's support networks. The objective at this stage was to engage IT literates in implementing simple tasks, such as creating and moderating private and public groups, channels and shared calendars on the HOPES toolbox and other social-media tools (e.g., Facebook and YouTube). This phase lasted three months, with the final part aimed at reporting the effects of the interventions in each elderly person's network.

By means of reflection on the network of actions observed in the geriatric unit during the three project cycles, a governance model was formulated as the basic mechanism to enable the emergence of personalized elderly care assistance in this specific setting. The involved researchers adopted the schema proposed by Newell and Williams (2011), in which a governance model is composed of a governance structure, a governance process and a set of governance mechanisms.

The three components of the governance model (summarized in Table 2) consist of a set of roles and responsibilities for the actors involved, a seven-step process to guide the emergence of desired behaviors within the digitally enabled support networks of the elderly participants and a set of mechanisms to ensure coordination within and across social support networks.

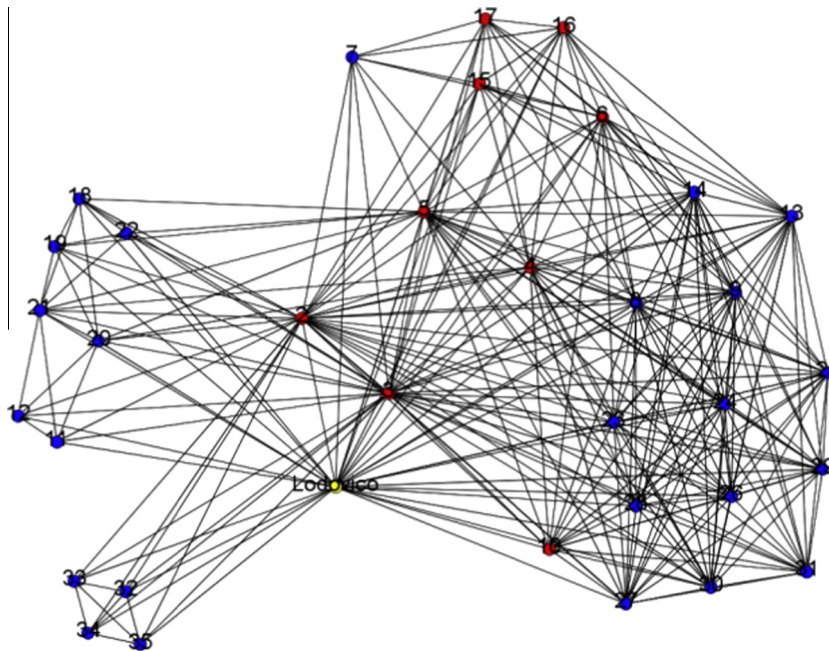


Fig. 3. Example of a sociogram representing the social network of one elderly person (Ludovico).

Table 2

The governance model for elderly care assistance.

Governance structures	Governance process	Governance mechanisms
<ul style="list-style-type: none"> – Investigators and domain experts (core team) – Evangelists – Elderly people and their social circles 	<ol style="list-style-type: none"> 1. Social network analysis 2. Psychosocial profiling and existential profiling 3. Evangelist profiling 4. Quality-of-life recipe 5. IT-literacy profiling of social networks 6. Implementation guidelines for the use of social media 7. Implementation report 	<ul style="list-style-type: none"> – Coordination across networks – Geriatric unit coordination activities – Evangelist coordination activities

Design principles for social media engagement in elderly care assistance

As a second step in the problem formulation, the ADR team addressed the problem of defining a set of principles for social media engagement in elderly care assistance. Such principles guide the design and implementation of solutions for providing personalized elderly care assistance in contexts beyond the Geriatric Campus hospital.

In the initial formulation, a set of design principles was grounded in previous research on social media in health care (Griffiths et al., 2012), studies on IT and IS artefacts (Lee et al., 2015; Orlikowski and Iacono, 2001) and evidence collected in the design and preliminary evaluation of the governance model. These principles were presented to and discussed with members of the geriatric unit in order to collect feedback on their applicability in that specific context. As the principles were applied to the design of the governance model, they were revised according to the issues emerging in their practical application and, later, they were evaluated on the basis of the effects produced by the IS artefact in the lives of the nine elderly participants.

The first principle relates to the capacity to engage social and professional circles (social artefact) through social media technologies (technology artefact) to create opportunities for communicating and managing information (information artefact). Previous studies on the positive effects of online social support on elderly people's health conditions and quality of life have suggested focusing on digital circles of support as the context for elderly assistance. These ensemble artefacts provide an environment for helping the elderly in their daily lives. Among the components of the social artefact, younger relatives and knowledge workers are IT literates and are therefore considered the primary targets for engagement in new modes of interaction using social media for the benefit of the elderly. In addition to this category of actors, the IS artefact was also expected to include other participants (e.g., IT illiterates) and resources that elderly people could access directly or indirectly (e.g., assistance services outside the geriatric unit, IT applications). These preliminary findings were confirmed in the three cycles and complemented by some unanticipated evidence related to the difficulty of engaging IT-illiterate social network members and providers of social services in interacting with the elderly. The first design principle can be stated as follows:

Engage both social and professional circles in the provision of personalized elderly care assistance through social media.

The second principle relates to the technology artefact of the designed ensemble artefact. The literature on information infrastructures (Hanseth and Lyytinen, 2010) suggests looking at the role of the so-called installed base (Monteiro, 1998)—the interconnected technologies and skills that characterize a specific context. The diffusion of internet technologies, such as mobile devices, applications and social media tools, led the ADR team to expect that each social support network would be ready to integrate HOPES' IT capabilities within its own installed base. An exploration of the nine social support networks involved in the project revealed that the variety and flexibility of tools already available in these networks (e.g., Facebook, YouTube and Dropbox) minimized the necessity of a new, centralized system, which could potentially constrain the emergence of situated forms of engagement. The second design principle can be stated as follows:

Map and activate the digital capabilities available in elderly people's social circles (installed base) to build a simple and flexible IT infrastructure sustaining local assistance practices.

The third principle relates to the role of the information artefact in the provision of personalized assistance services. The information artefact is conceived as an instantiation of information, which occurs either directly, as in a verbal statement about a fact, or indirectly, as by the use of a software program (Lee et al., 2015). The evangelist, as the mediator between the elderly person and the health care institution, plays both roles. He or she takes a proactive role in shaping the elderly person's support network by overcoming the digital divide (Godfrey and Johnson, 2009) and also ensures an effective understanding of the person's needs through trust and proximity. The third design principle can be stated as follows:

Engage a trusted mediator to facilitate the communication process about elderly people's needs and planned interventions.

Finally, the fourth principle relates to the social artefact engaged in the implementation of planned interventions. Individual and social relationships should prevent the direct use of digital tools by the elderly, who may not have sufficient IT literacy to take advantage of social media tools. It can be frustrating for elderly people to make use of tools any more advanced than a traditional telephone. The same constraints hold for technology-mediated elderly care assistance services performed by older practitioners and volunteers. The support provided through the emergent process must take into account these limitations, and interventions must be tailored to the digital skills of the elderly and their social circles. The fourth design principle can be stated as follows:

Relieve the elderly—and IT illiterates in their social circles—of the need for direct use of digital tools.

The four design principles are summarized in Table 3, together with some evidences observed by the ADR team during the three cycles of the project. These principles have a twofold role. On the one hand, they explain the mutual relations between the social, informational and technical components of the social media ensemble artefact for personalized elderly care assistance. On the other hand, they guide the design of context-specific models for personalized elderly care assistance by leveraging social media and the installed base in different sociotechnical settings.

Utility for the users

As a third step in the problem formulation, the ADR team addressed the problem of providing useful personalized elderly care assistance through social media to the participants. The utility for the users has been assessed during the project by the means of focus groups, surveys and direct observation. For instance, the adoption of social-media tools in elderly care assistance was the main theme discussed by a focus group involving members of the ADR team and a group of potential users. Another example is the collection of detailed information on the structure of the elderly participant's support networks and on their psychosocial needs by the means of a survey conducted by the evangelists. Finally, interviews with the evangelists and IT literates in the networks served to assess the effects of personalized interventions in each network.

A variety of insights on the pragmatic outcomes of social-media engagement in the HOPES settings were gained based on the ADR team's analyses of the empirical data collected by the evangelists. First, the social artefact, dealing with individual and social relationships to solve a specific problem, represented the possibility of both providing personalized elderly care assistance and shaping the social contexts of the nine participants. Second, the technology artefact influenced the structure of an individual's social relationships by changing the environment in which the individual interacts. Third, the exchange of information both directly and indirectly permitted the involvement of the elderly in new topics of discussion within the social circle. Finally, the emergence of the IS artefact led, in some cases, to the adoption of a new perspective on society, as well as opportunities to enrich intimate relationships.

A further consideration is related to the possibility of enlarging the social circle or social support network to create favorable circumstances for establishing new social relationships. In the ADR project, this was limited to a few cases. However, while peer production and other emerging models of social production were limited, interesting phenomena occurred in the elderly people's networks. Some users assisted the elderly in making videos to teach Italian, in presenting do-it-yourself task guides and in commenting on and sharing news. Such activities were supported not only by the HOPES toolbox, but also by well-known social media tools, such as Facebook and YouTube. The elderly participants' involvement represented an important attempt to restructure their own identities. For example, an elderly who once again was able to teach Italian, even in front of a camera, relived school days and reassumed a social role that had been undermined by

Table 3

Summary of design principles as a BIE outcome.

Design principle	Description	Evidence from the Geriatric Campus project
Engage both social and professional circles in the provision of personalized elderly care assistance through social media	The engagement of elderly people's social circles through social media technologies enhances their socialization, quality of life and autonomy. The focus is not limited to the IT literates within the network and the geriatric unit. Assistance services available in the context in question should also be involved using social media	<ul style="list-style-type: none"> • The elderly participants have been involved in the use of technology, albeit indirectly, and have experienced new modes of interaction with family and friends • Members of elderly people's social circles have experienced new modes of interaction • The IT literates play a prominent role, but it is difficult to engage other network members • It has proven difficult to engage the providers of social services as active members of elderly people's social circles
Map and activate the digital capabilities available in elderly people's social circles (installed base) to build a simple and flexible IT infrastructure sustaining local assistance practices	The mapping of the installed bases available in elderly people's social circles allows for the identification of potential contributors and participants in their support networks. The activation of IT capabilities enables an infrastructure that includes various tools and services (e.g., mobile devices, social-media tools) independent of traditional health care IT solutions	<ul style="list-style-type: none"> • Members of elderly people's social circles who are able to use the HOPES toolbox properly are easily identified • The tools used by members of elderly people's social circles act as an installed base to which the HOPES toolbox may be connected • In some cases, the HOPES toolbox has become a component of a larger system comprising additional tools, such as YouTube and Facebook. These additional tools can also substitute for the HOPES toolbox, rendering it unnecessary
Engage a trusted mediator to facilitate the communication process about elderly people's needs and planned interventions	The role of the mediator is crucial in the provision of personalized assistance services for the elderly. The mediator should be a trusted and IT-literate person from the elderly person's circle contributing actively to achieve alignment with the geriatric unit	<ul style="list-style-type: none"> • The evangelist plays a crucial role in the introduction of the HOPES toolbox • High IT literacy is necessary to use the HOPES toolbox • A relationship of trust between the evangelist and the geriatrician has proven essential in developing the project • A close relationship between the evangelist and the elderly person has proven essential for understanding needs and implementing interventions
Relieve the elderly—and IT illiterates in their social circles—of the need for direct use of digital tools	Elderly people may not have sufficient IT literacy to take advantage of social media. Hence, services should be designed such that they are not the direct users of the technology, but rather the receivers of services provided through their mediators and other members of their support networks	<ul style="list-style-type: none"> • Frail elderly individuals can be supported by IT literates in rebuilding their social identities • Social mediation overcomes the inherent limits of a model in which the elderly do not take advantage of IT capabilities

retirement. Opportunities to demonstrate skills dealing with typical problems of daily life through video tutorials or to post and share recipes for food were similarly significant. These options facilitated possibilities for the elderly to express some of their personality traits.

Turning to the geriatric unit, the doctor-patient consultation—the typical interaction model—acquired new features throughout the project, considering the nature of elderly people's relationships with people in authority. The unit played a pivotal role in planning and testing personalized interventions and then assessing their effects on the participants' conditions. Furthermore, the elderly people involved in this project were at the center of the scene, not only among their confidants, but also among other members of their social circles, including professionals. Consequently, these circles contributed actively to care of the elderly and its coordination. Various elements of elderly assistance were debated, coordinated and then provided under the geriatrician's supervision, thus creating an example of personalized assistance to the elderly.

Discussion

Our inquiry on the design of personalized elderly assistance yields insights on the role of social-media technologies in healthcare. Social-media engagement, intended as the mutual shaping of technologies, information and social interactions, can transform the ways in which healthcare organizations operate. Social-media tools are enacted in different ways within elderly support networks. Information, in the form of digital content, is produced, retrieved and channelled across elderly support networks and institutional boundaries with different purposes. Social activities improving the quality of life of the elderly are triggered by purposeful interventions often mediated by digital tools. Likewise, elderly psychosocial conditions can be monitored by engaging trusted mediators in channelling information. Such inseparable and coevolving behavior

is the emerging outcome of learning processes taking place within digitally enabled elderly support networks and partially controlled by healthcare professionals.

A centralized model defines the roles, processes and mechanisms for the governance of the overall system. The governance model is also the result of an emerging process of engagement and learning in which healthcare professionals together with members of the elderly support networks continuously revise their practices by reflecting on the evidences collected from the field. The ill-defined nature of problems addressed by the central team and by engaged members of elderly support networks challenges the traditional view of design. Designing for elderly care assistance through social media engagement requires a view of design as sociotechnical construction. According with such design logic, rather than providing solutions, the designer facilitates a learning process in which domain experts and engaged users experiment interventions by orchestrating resources available in their environment. Design principles provide guidance for driving the unfolding process of personalized elderly care assistance in specific contextual conditions but with a limited range of action.

Interestingly, the design principles, ensemble-specific artefacts and the personalized assistance practices were not generated by following a rational model for problem solving. Instead, the idea at the basis of the design activity was to create a context supportive of elderly care assistance in which the technology artefact, the information artefact and the social artefact would be continuously subject to reinterpretation, reformulation and eventually redesign. Social-media tools were adopted to different extents in different networks, for different purposes and by engaging different people in elderly care assistance on the basis of their trust relations and IT capabilities.

These findings recall the abovementioned metaphors of design as care and design as cultivation of the installed base, but they also go further by mixing the emergent and context-related view of the ensemble artefacts with the need for a specific guide to orchestrate resources and experimental interventions. Both aspects are relevant in a context such as elderly care assistance. In other words, a view of design based on both decentralized learning and centralized monitoring and control, emerges as a viable solution in this problem domain. On the one hand, a directive approach in which the geriatric unit can monitor patients requires a governance model that guarantees this supervision. This is in line with the traditional view of design as a form of control, in which doctor–patient consultations are needed to ensure proper decision making based on professional knowledge. On the other hand, the displacement of learning processes and situated interventions creates the conditions and the configuration for the continuous evolution of the ensemble artefacts. Such an emergent view of design is adopted within elderly people's support networks by embracing a democratic approach to deal with contextual dependencies and the available digital capabilities.

We identify four findings that can be generalized beyond the elderly care assistance domain and shed light on directions for future investigations. First, the design of personalized care services in contexts characterized by the presence of social-media technology must take into account the ill-defined nature of problems emerging from the interaction of the existing technical, information and social structures. The view of design as socio-technical construction can be applied to other domains in which social-media engagement is a strategic factor. This is the case for instance of customer care in private organizations, personalized e-government services and hybrid forms eventually involving also no-profit institutions. Further studies can develop design principles addressing other services through ensemble-specific artefacts.

The second finding is related to the ensemble view of the IS artefact. Our understanding of social-media technology as a component of an evolving information infrastructure emphasizes the importance of adding an architectural dimension and a time dimension to the analysis of the problem space. An analytical lens that also considers the nature of the exchanged information and the reciprocal shaping of offline and online social structures can be applied to phenomena in which social-media are seen as monolithical entities supporting communication processes. The openness and flexibility of today's digital platforms together with emerging practices (e.g. Bring Your Own Device) demand for an in depth understanding of the benefits and risks of architectural choices and boundary control issues (Hanseth, 2007).

The third finding is related to the situated nature of the centralized structure in charge of monitoring and control on the service provision. In our case, the application of the design principles to the doctors, patients and doctor–patient consultation practices in place at the Geriatric Campus determined the roles, activities and mechanisms described by the governance model. If applied to a different context, the same design principles would be expected to result in a completely different ensemble-specific outcome. The case confirms that learning and practices are socially, culturally and historically situated and cross-disciplinary innovation is not a straightforward process. Further investigations on the coevolution of social media open the floor to the contribution of other streams of research. For instance, a focus on social media interactions offers the possibility to study the emergence of new practices and learning processes in mixed online and offline environments (Feldman and Orlikowski, 2011; Gherardi and Nicolini, 2002; Mørk et al., 2008).

Finally, since research, learning and interactions in the HOPES project have been conducted by following the script of the ADR method, our study contributes to the discourse and research endeavor on how to use ADR. While traditional studies within this area focuses on design as a process within an organizational unit (see for instance MacKrell and McDonald, 2014; Sein et al., 2011; Westin and Sein, 2014), the HOPES project shows how ADR can address ill-defined design processes where social media as an ensemble artefact challenges traditional organizational boundaries and the separation between the private and the professional spheres. Lessons learned on how to manage ADR processes include the importance of figuring out the role of users in the initial phase of the process explicitly defining their responsibilities in the governance model. In this way, ADR projects studying alternative rationality protocols may prove apt for ADR oriented design project for the application in other domains.

Theoretical implications

As we identify theoretical and practical implications of our project, we refer to the distinction made by [Gregor and Hevner \(2013\)](#) between prescriptive (Λ), or 'how', knowledge about human-built artefacts and descriptive (Ω), or 'what', knowledge about phenomena and the laws and regularities among phenomena. We both used and contributed to knowledge within the two areas. Previous studies on the use of social media tools in health care and on the notion of digital circles of support served as a basis for our understanding of social media as an ensemble artefact. Moreover, the literature on IS design helped us to identify metaphors, such as care and cultivation of the installed base, that informed our design effort. Prescriptive knowledge of constructs, models, methods and instantiations influenced many of the choices made by the ADR team. The concept of online support groups, the model of digital circles of support with their trusted mediators, existing clinical practices and the actual doctor-patient consultation are examples of prescriptive knowledge that informed the design.

In addition to these knowledge sources, important elements relate to the application environment and to the human capabilities available during the project. The former provided the empirical evidence to test and validate our theoretical implications. The latter were important for representing the problem and accessing and assessing knowledge sources in search of previous studies and knowledge gaps. A summary of the study's knowledge contribution is depicted in [Fig. 4](#) using the schema proposed by [Gregor and Hevner \(2013\)](#). The gray circles and boxes represent the outcomes of our theorizing effort and hence position the knowledge contributions of this paper.

Following the distinction made by [Gregor and Hevner \(2013\)](#), our study is characterized by a low level of application domain maturity (engaging elderly people's support networks through social media) and a high level of solution maturity (the spread of social media). The knowledge contribution consists in the adaptation of known solutions to new problems with the intention of promoting the adoption of current technologies, such as social media, in a new problem context. As such, contributions to prescriptive knowledge (Λ) tend to prevail. Situated instantiations, the development of methods and models and the formulation of design principles identify the present research without neglecting descriptive knowledge (Ω).

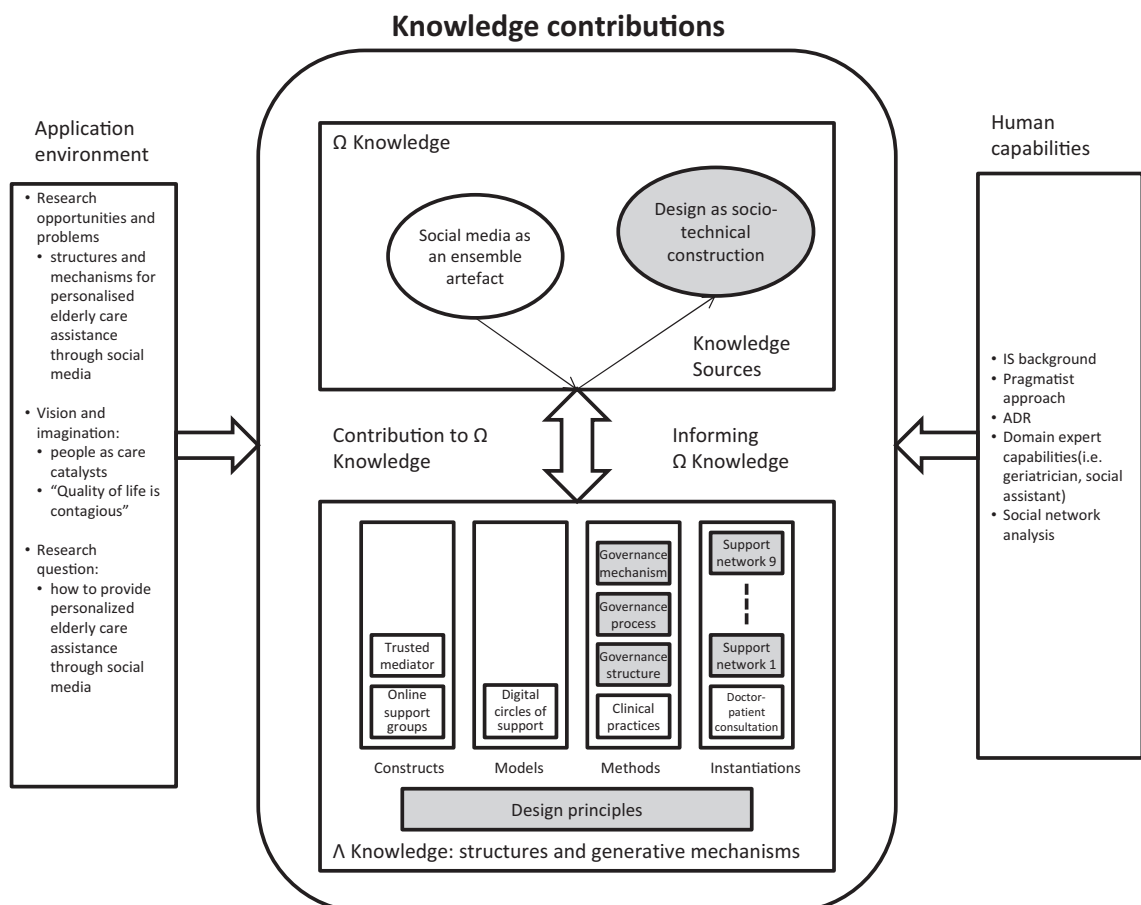


Fig. 4. Knowledge contribution (adapted from [Gregor and Hevner, 2013](#)).

The HOPES project contributes to Δ knowledge in the form of design principles and the constructs, models, methods and instantiations represented in Fig. 4. New representations were introduced, such as the sociograms capturing the shape and composition of elderly people's social networks, the psychosocial and existential profiles of the elderly participants and the IT-literacy profiles of their network members. Furthermore, the governance model represent a new approach on how to integrate current clinical practices, such as the elderly quality-of-life recipe.

Pragmatic approaches may lead to several forms of theorizing (Goldkuhl, 2012a; Mueller and Urbach, 2013). One form conceptualizes theory as a sense-making device to interpret the results of empirical intervention. Our ADR project provided an apt example in this respect. However, Gregor and Hevner's framework fails to capture the contributions to prospective and normative knowledge, as defined in pragmatism. As a contribution to prospective knowledge, the ADR project allows reflection on the reframing of health care services. It shows how both a relieving logic and an enabling logic have the potential to change the existing situation (Normann and Arvidsson, 2006; Normann, 2001). According to the relieving logic of the project, an actor is relieved of some tasks, which are assigned to another actor, as in the provision of welfare services to the social circles of the elderly by bureaucratic organizations. The enabling logic is related to assets and capabilities that enable new projects and activities, as when the ADR team, evangelists and other members of elderly people's social circles were supported by social media tools. Here, resources from the individuals' social circles, rather than public expenditures, are at stake.

In terms of normative knowledge, the study emphasizes the importance of ensuring professional monitoring of conditions in the elderly and a shift from standardized to personalized services. When applied to the domain of elderly care assistance, the conceptualization of social media as an ensemble artefact makes it possible to address the uniqueness of an elderly person's support network in terms of its technological, informational and social features. Such networks provide the installed base for the emergence of personalized elderly care assistance practices with potential benefits for the public interest. The monitoring and control function by a public authority is maintained and probably is improved due to the direct involvement of the elderly social entourage. Democratic values such as participation, transparency and empowerment are also promoted. Members of the elderly social circle have the possibility to take advantage of a context in which their rights and the rights of their loved ones can be exercised.

Practical implications

The HOPES project addresses three main challenges related to elderly care. First, while the demand for care services for elderly citizens increases due to societal ageing (Niehaves, 2011), new approaches are needed, demanding the employment of IT to orchestrate elderly assistance services and to support the exchange of resources and information among the actors involved. Our findings demonstrate a design process for social media engagement to address such purposes. Second, whereas IT-literate users may be able to utilize social media knowledgeably, elderly may face difficulties to gain value from such use due to lack of access and competence. The evangelist and the care receivers social networks demonstrate the importance of involving intermediaries when introducing social media for IT-illiterate users. Third, healthcare services are traditionally designed to address clinical needs to provide accurate health services, less emphasis has been put on the patients' social needs in terms of sociability, inclusion and empowerment of the care receiver. The HOPES project illustrates how the introduction of social media influences the way patients communicate, advancing the focus on social-related issues (the quality of life) at the expense of clinical-related issues.

While the HOPES case focuses explicitly on elderly care, contribution may be provided to a wider area of interest. The alternative design process where social media is intended as an IS-artefact, challenges both the traditional view of design (discussed elsewhere) and the traditional organizational boundaries. The roles of providers and receivers of services are challenged, and new stakeholders and intermediaries are taking part in the design processes. Although more research is needed, we argue that our findings contribute to a better understanding of how to organize the design process for shaping IS-artefact based on social media engagement in general.

Limited access to IT or lack of competence on how technology may provide value due to gender, age, education and experience may require the role of intermediaries. Mobilizing social network users, they may also prove relevant outside the scope of elderly care assistance, addressing for instance users with disabilities, with low level of education, or inexperienced users of IT within other areas of interests.

Conclusion

This study emphasizes an alternative view of design as an emergent process of engagement and learning. By conducting an ADR project at Geriatric Campus, our work has contributed to social media practices through the development of user utility and a model for elderly assistance, as well as through the formulation and refinement of four design principles. Elderly people may benefit more than most other groups from the emergence of social media artefacts. A crucial part of the HOPES project is the development of tools and systems to support existing social networks, in which the development of the governance model is considered important. The lack of existing research, combined with the ageing of European societies, emphasizes the need for further studies in this area.

Adopting an emergent view of design in the use of social media within elderly people's support networks, our study extends the applicability of design as a sociotechnical construction beyond the limits of a self-contained view of organization. The logic introduced here to design social engagement through the use of social media is related to Boland's (1978) alternative logic, in which design processes are seen as facilitated human-centred processes that build consensus through successive iterations. We have shown how IS design can shape digitally enabled support networks for the elderly by engaging people and institutions in the provision of personalized assistance.

Our study demonstrates the practical usefulness of introducing ADR and the stepwise approach to explore design processes that address the ill-defined problem of organizing actions. A related contribution is our explicit description of the pragmatic view of design. Whereas Gregor and Hevner (2013) focus on the roles of descriptive and prescriptive knowledge as results of design research, we expand this view by identifying the presence and importance of contributions within prospective and normative knowledge areas, as well.

Our project, with its limited time and scale, does not allow for reflection and learning about social media engagement at large. But looking forward, we should not rule out the potential value in the delivery of new personalized services for the geriatric market. We also believe that involving stakeholders more deeply in the alternative design process may influence other areas of interest, expanding our capability to design for social media engagement under different contextual conditions.

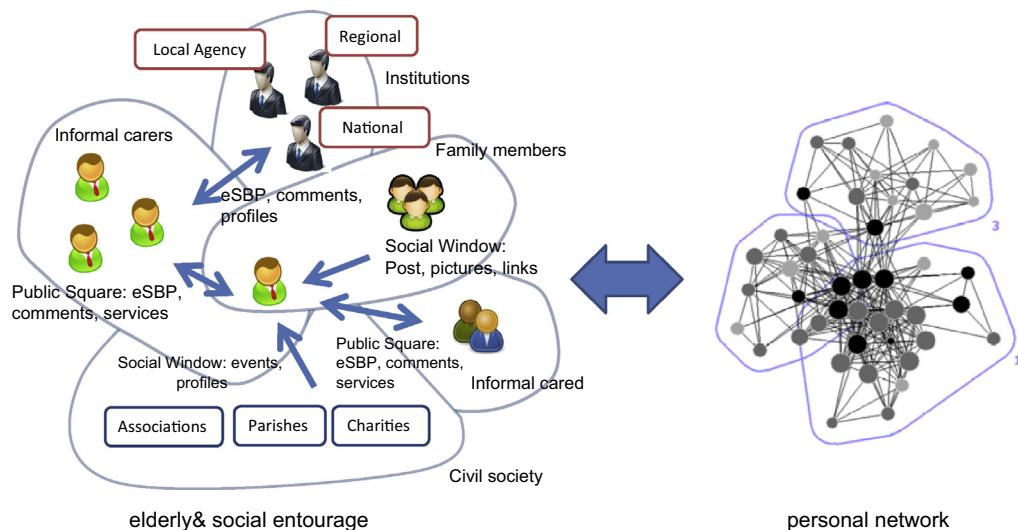
Our generation has a tremendous opportunity to harness the ensemble artefact view on social media to enhance the quality of life for individuals and for groups of persons such as the elderly community described in this paper. We hope our foregoing study can be a catalyst to deepen the understanding of the important interactions between social and professional networks and point the way toward a mindful and strategic use of social media technologies.

Acknowledgments

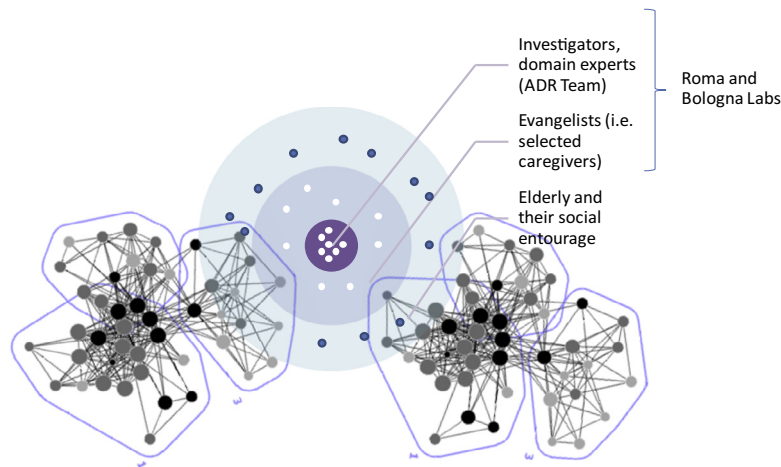
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Appendix A. Elderly-centred approach

The social interaction model of elderly support networks defined in the HOPES project is depicted in the following figure. The elderly are represented as nodes, which are connected to peers (e.g., formal and informal carers, family members), care institutions, and the civil society (e.g., associations, parishes, charities). The IT applications, the structure of information flows and the contexts of such personal networks constitute the ensemble on which the HOPES activities are focused. The emphasis on social interactions, together with the basic assumption that digital tools (e.g. social media, web 2.0) can generate sociability in elderly support networks, makes the HOPES context an ideal setting in which to investigate our research problem.



The following figure provides an overview of the HOPES governance structure. It shows the relationships between the different “circles” that participated in the ADR project. The central circle, named “ADR team”, is composed of the IS researchers and domain experts (i.e., social assistants, psychologists, geriatricians, managers from voluntary associations, etc.). A second circle also includes a small number of users that are called “HOPES evangelists”. They play the dual role of collecting data from a well-defined set of elderly personal networks and of implementing interventions following requests from the ADR team. Finally, a third level is composed of the elderly personal networks from which data are collected to carry out interventions.



A description of the roles and responsibilities assigned to the participants is reported in the table below:

Roles	Responsibilities
Investigators and domain experts	Define methods and coordinate the process Identify and invite the evangelists to join the monthly meeting Collect, analyze and report empirical data
Evangelists	Identify and engage the elderly and their social circles Provide data on the personal networks of the elderly (main informants) Participate in monthly meetings and provide feedback on methods and outcomes
Elderly and their social circles	Answer questionnaires and, in some cases, use HOPES solutions in their daily lives

References

- Aanestad, M., 2003. The camera as an actor design-in-use of telemedicine infrastructure in surgery. *Computer Supported Cooperative Work (CSCW)* 12 (1), 1–20.
- Aanestad, M., 2012. What if design is something else: the challenges of dealing with interdependencies. In: Aanestad, M., Bratteteig, T. (Eds.), *Nordic Contributions in IS Research, Lecture Notes in Business Information Processing*. Springer, Berlin, Heidelberg, pp. 95–108.
- Aanestad, M., Jensen, T.B., 2011. Building nation-wide information infrastructures in healthcare through modular implementation strategies. *The Journal of Strategic Information Systems* 20 (2), 161–176.
- Abbott, K., Bettger, J., Hampton, K., Kohler, H., 2012. Exploring the use of social network analysis to measure social integration among older adults in assisted living. *Family & Community Health* 35 (4), 322–333.
- Alter, S., 2015. The concept of “IT artifact” has outlived its usefulness and should be retired now. *Information Systems Journal* 25 (1), 47–60.
- Avital, M., Lyytinen, K.J., Boland, R., Butler, B.S., Dougherty, D., 2006. Design with a positive lens: an affirmative approach to designing information and organizations. *Communications of the Association for Information Systems* 18 (25), 519–545.
- Baskerville, R., Myers, M., 2004. Special issue on action research in information systems: making IS research relevant to practice foreword. *MIS Quarterly* 28 (3), 329–335.
- Baskerville, R., Wood-Harper, A.T., 1996. A critical perspective on action research as a method for information systems research. *Journal of Information Technology* 11, 235–246.
- Bednar, P.M., Welch, C., 2012. Critical systemic thinking as a foundation for information systems research practice. *Journal of Information, Communication and Ethics in Society* 10, 144–155.
- Bednar, P., Welch, C.E., 2014. Contextual inquiry and socio-technical practice. *Kybernetes* 43 (9/10), 1310–1318.
- Boland, R.J., 1978. The process and product of system design. *Management Science* 24 (9), 887–898.
- Braa, J., Monteiro, E., Sahay, S., 2004. Networks of action: sustainable health information systems across developing countries. *MIS Quarterly* 28 (3), 337–362.

- Ciborra, C., 1996. Introduction: What does groupware mean for the organizations hosting it? In: Ciborra, C. (Ed.), *Groupware and Teamwork: Invisible Aid or Technical Hindrance?* Wiley, Chichester, pp. 1–19.
- Ciborra, C., 1999. Hospitality and IT. In: Ljunberg, F. (Ed.), *Informatics in the Next Millennium*. Studentlitteratur, Lund, pp. 161–176.
- Culnan, M.J., McHugh, P.J., Zubillaga, J.L., 2010. How large U.S. companies can use twitter and other social media to gain business value. *MIS Quarterly Executive* 9, 243–259.
- Dahlbom, B., Mathiassen, L., 1993. *Computers in Context*. Blackwell, Cambridge.
- Eckler, P., Worsowicz, G., Rayburn, J.W., 2010. Social media and health care: an overview. *Physical Medicine and Rehabilitation* 2 (11), 1046–1050.
- Faraj, S., Jarvenpaa, S.L., Majchrzak, A., 2011. Knowledge collaboration in online communities. *Organization Science* 22 (5), 1224–1239.
- Feldman, M.S., Orlikowski, W.J., 2011. Theorizing practice and practicing theory. *Organization Science* 22 (5), 1240–1253.
- Gherardi, S., Nicolini, D., 2002. Learning in a constellation of interconnected practices: canon or dissonance? *Journal of Management Studies* 39 (4), 419–436.
- Godfrey, M., Johnson, O., 2009. Digital circles of support: meeting the information needs of older people. *Computers in Human Behavior* 25 (3), 633–642.
- Goldkuhl, G., 2012a. Pragmatism vs interpretivism in qualitative information systems research. *European Journal of Information Systems* 21 (2), 135–146.
- Goldkuhl, G., 2012b. From action research to practice research. *Australasian Journal of Information Systems* 17 (2), 57–78.
- Goldkuhl, G., 2013a. The IT artefact: an ensemble of the social and the technical? – a rejoinder. *Systems, Signs & Actions* 7 (1), 90–99.
- Goldkuhl, G., 2013b. The empirics of design research: activities, outcomes and functions. In: *Thirty Fourth International Conference on Information Systems*, Milan, pp. 1–16.
- Goldkuhl, G., Agerfalk, P.J., 2005. IT artifacts as socio-pragmatic instruments: reconciling the pragmatic, semiotic, and technical. *International Journal of Technology and Human Interaction* 1 (3), 29–43.
- Gregor, S., Hevner, A.R., 2013. Positioning and presenting design science research for maximum impact. *MIS Quarterly* 37 (2), 337–355.
- Gregor, S., Jones, D., 2007. The anatomy of a design theory. *Journal of the Association for Information Systems* 8 (5), 312–335.
- Griffiths, F., Cave, J., Boardman, F., Ren, J., Pawlikowska, T., Ball, R., et al., 2012. Social networks – the future for health care delivery. *Social Science & Medicine* 44, 1–9.
- Grisot, M., Hanseth, O., Thorseng, A.A., 2014. Innovation of, in, on infrastructures: articulating the role of architecture in information infrastructure evolution. *Journal of the Association for Information Systems* 15 (4), 197–219.
- Hanseth, O., 2007. Complexity and Risk. In: Hanseth, O., Ciborra, C. (Eds.), *Risk, Complexity and ICT*. Edward Elgar, Cheltenham, UK, pp. 75–93.
- Hanseth, O., Lyytinen, K., 2010. Design theory for dynamic complexity in information infrastructures: the case of building internet. *Journal of Information Technology* 25 (1), 1–19.
- Hevner, A.R., March, S.T., Park, J., Ram, S., 2004. Design science in information systems research. *MIS Quarterly* 28 (1), 75–105.
- Huang, J., Baptista, J., Galliers, R.D., 2013. Reconceptualizing rhetorical practices in organizations: the impact of social media on internal communications. *Information & Management* 50 (2–3), 112–124.
- Kane, G.C., Majchrzak, A., Ives, B., Brown, C.V., 2010. Editors' comments-special issue on enterprise and industry applications of social media. *MIS Quarterly Executive* 9 (4).
- Kaplan, A.M., Haenlein, M., 2010. Users of the world, unite! The challenges and opportunities of social media. *Business Horizons* 53, 59–68.
- Lanzara, G.F., 2009. Introduction: Information Systems and the Quest for Meaning. In: Avgerou, C., Lanzara, G.F., Willcocks, L.P. (Eds.), *Bricolage, Care and Information, Claudio Ciborra's Legacy in Information Systems Research*. Palgrave Macmillan, New York.
- Lee, A.S., 2010. Retrospect and prospect: information systems research in the last and next 25 years. *Journal of Information Technology* 25 (4), 336–348.
- Lee, A.S., Thomas, M., Baskerville, R.L., 2015. Going back to basics in design science: from the information technology artifact to the information systems artifact. *Information Systems Journal* 25 (1), 5–21.
- Leonardi, P.M., 2009. Crossing the implementation line: the mutual constitution of technology and organizing across development and use activities. *Communication Theory* 19, 278–310.
- Leonardi, P.M., Huysman, M., Steinfield, C., 2013. Enterprise social media: definition, history, and prospects for the study of social technologies in organizations. *Journal of Computer-Mediated Communication* 19, 1–19.
- Lindgren, R., Henfridsson, O., Schultze, U., 2004. Design principles for competence management systems: a synthesis of an action research study. *MIS Quarterly* 28 (3), 435–472.
- MacKrell, D., McDonald, C., 2014. *Action design research: a case study of business intelligence in non-profit organizations*. Frontiers in Artificial Intelligence and Applications. IOS Press, pp. 291–302.
- Majchrzak, A., Faraj, S., Kane, G.C., Azad, B., 2013. The contradictory influence of social media affordances on online communal knowledge sharing. *Journal of Computer-Mediated Communication* 19 (1), 38–55.
- Monteiro, E., 1998. *Scaling Information Infrastructure: The Case of Next-Generation IP in the Internet*. The Information Society.
- Mørk, B.E., Aanestad, M., Hanseth, O., Grisot, M., 2008. Conflicting epistemic cultures and obstacles for learning across communities of practice. *Knowledge and Process Management* 15 (1), 12–23.
- Moorhead, S.A., Hazlett, D.E., Harrison, L., Carroll, J.K., Irwin, A., Hoving, C., 2013. A new dimension of health care: systematic review of the uses, benefits, and limitations of social media for health communication. *Journal of Medical Internet Research* 15 (4), e85. <http://dx.doi.org/10.2196/jmir.1933>.
- Mueller, B., Urbach, N., 2013. The why, what, and how of theories in IS research. In: *Thirty Fourth International Conference on Information Systems*, Milan, pp. 1–24.
- Mumford, E., 2006. The study of socio-technical design: reflections on its successes, failures and potential. *Information Systems Journal* 16, 317–342.
- Myers, M.D., Venable, J.R., 2014. A set of ethical principles for design science research in information systems. *Information & Management* 51 (6), 801–809.
- Newell, S., Williams, C.C., 2011. A multi-theoretic approach to IT governance: the need for commitment as well as alignment. In: Galliers, R.D., Currie, W.L. (Eds.), *The Oxford Handbook of Management Information Systems: Critical Perspectives and New Directions*. Oxford University Press, pp. 415–443.
- Niehaves, B., 2011. Iceberg ahead: on electronic government research and societal aging. *Government Information Quarterly* 28 (3), 310–319.
- Normann, R., 2001. *Reframing Business: When the Map Changes the Landscape*. Wiley, Chichester.
- Normann, R., Arvidsson, N., 2006. *People as Care Catalysts: From Being Patient to Becoming Healthy*. Wiley, Chichester, UK, 219.
- Orlikowski, W., Iacono, C., 2001. Desperately seeking the "IT" in IT research: a call to theorizing the IT artifact. *Information Systems Research* 12 (2), 121–134.
- Pries-Heje, J., Baskerville, R., 2008. The design theory nexus. *MIS Quarterly* 32 (4), 731–755.
- Romme, A.G.L., 2003. Making a difference: organization as design. *Organization Science* 14 (5), 558–573.
- Sein, M.K., Henfridsson, O., Purao, S., Rossi, M., Lindgren, R., 2011. Action design research. *MIS Quarterly* 35 (1), 37–56.
- Sherer, S.A., 2014. Advocating for action design research on IT value creation in healthcare. *Journal of the Association for Information Systems* 15 (12), 860–878.
- Silver, M.S., Markus, M.L., 2013. Conceptualizing the SocioTechnical (ST) artifact. *Systems, Signs & Actions: An International Journal on Information Technology, Action, Communication and Workpractices* 7, 82–89.
- Spagnoletti, P., Resca, A., 2012. A design theory for IT supporting online communities. In: *Proceedings of the 45th Hawaii International Conference on System Sciences*, pp. 4082–4091. <http://doi.ieeecomputersociety.org/10.1109/HICSS.2012.54>.
- Spagnoletti, P., Tarantino, L., 2013. User centered systems design: the bridging role of justificatory knowledge. In: Baskerville, R., De Marco, M., Spagnoletti, P. (Eds.), *Designing Organizational Systems LNISO*, vol. 1. Springer, Heidelberg, pp. 105–122.
- Spagnoletti, P., Resca, A., Russo, V., Taglino, F., Tarantino, L., 2012. Building theories from IT project design: the HOPES case. In: De Marco, M., Te'eni, D., Albano, V., Za, S. (Eds.), *Information Systems: A Crossroads for Organization, Management, Accounting and Engineering*. Physica-Verlag, Heidelberg, pp. 451–459.

- Spagnoletti, P., Resca, A., Lee, G., 2015. A design theory for digital platforms supporting online communities: a multiple case study. *Journal of Information Technology*. <http://dx.doi.org/10.1057/jit.2014.37>.
- Treem, J.W., Leonardi, P.M., 2012. Social media use in organizations: exploring the affordances of visibility, editability, persistence, and association. *Communication Yearbook* 36, 143–189.
- Urquhart, C., Vaast, E., 2012. Building social media theory from case studies: a new Frontier for IS research. *International Conference on Information Systems*, 1–20.
- Van Aken, J.E., 2004. Management research based on the paradigm of the design sciences: the quest for field-tested and grounded technological rules. *Journal of Management Studies* 41 (2), 219–246.
- Van de Ven, A.H., 2007. Building a Theory. In: Van de Ven, A.H. (Ed.), *Engaged Scholarship: A Guide for Organizational and Social Research*. Oxford University Press, London, pp. 100–142.
- Westin, S., Sein, M.K., 2014. Improving data quality in construction engineering projects: an action design research approach. *Journal of Management in Engineering* 30 (3), 1–17.
- Winter, S., Berente, N., Howison, J., Butler, B., 2014. Beyond the organizational “container”: conceptualizing 21st century sociotechnical work. *Information and Organization* 24 (4), 250–269.