

E-services and the Ageing Society: an Italian Perspective

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Abstract

The higher resources needed to provide a service portfolio that responds to the rapid growth of an ageing population is a concern for many governments in the developed countries. The paper explores the convergent insights of three conceptual frameworks to identify where age-aware eGovernment is more likely to be developed effectively. The paper shows how the social and relational capital of the Italian “industrial districts” make them ideal settings, receptive to the implementation of age-aware eGovernment services, thanks to both the innovative mindset of the business community and their rich social capital.

1. Introduction

The world population ageing issue is gaining significant importance. According to the available data [1], while the over-65s accounted for 6.5% of the world’s total population in 1970, that figure that had climbed to 7.6% in 2008 is forecast to increase to a hefty 16.7% in 2050. This upward trend raises several policy-relevant social and economic issues that, in turn, are intersected by the advances made in information and communication technology (ICT). These points of interception are themselves a matter of concern for public policymaking, which needs to prevent excessive commoditization of the relevant artifacts and services. The elderly have significant economic and political influence on society and there is increasing pressure not only for their participation and inclusion, but also for the management of diversity and special needs. As a result, the engagement of these citizens can be enabled only through an ‘e-inclusion’ strategy.

The problem is that governments have little knowledge of how to expand and overhaul their service portfolios to respond to the specific and fairly distinct needs of ageing societies, and there is a large gap between actual and potential eGovernment research on societal aging [2]. Moreover, the governments continue to ignore the need to define and implement channels capable of informing, supporting and delivering services to the various segments of the elderly population.

To the best of our knowledge, there is no holistic multidisciplinary picture of eGovernment services, policy design and implementation to address the needs of the elderly. This lack suggests the necessity to conduct research into the adoption of an integrated approach. The paper intends to inform both the research and the practice of eGovernment services implementation for this rapidly growing segment of the population. Exploring and framing the relevant theories and possible modeling variables

will provide research with a useful conceptual tool, while practice would benefit from the identification of the most suitable local areas for involving the users in the design and implementation of e-services projects.

The paper addresses the need to close the implementation gaps in the rapidly evolving field of age-awareness and guides policymakers and e-service designers through key issues, such as the adoption of appropriate theoretical frameworks, ensuring extensive user involvement, and identifying the criteria for suitable local areas in terms of social and relational capital endowment. The closely knit communities of Italy's 'industrial districts', the cornerstones of Italy's social and economic landscape, are rich in social and relational capital [3]; in fact, "relations are socially integrated and change is more a function of collective learning and social control, consistent with the institutional perspective" [4]. This conceptual paper qualitatively explores aspects of interconnected phenomena and highlights their significant relations with the aim of responding to two research questions:

- *Which approaches best respond to the needs of the elderly?*
- *Why are 'industrial districts' particularly suited as innovation "laboratories" and testing grounds for age-aware policies?*

The paper adopts a four-phase research design. Phase 1 consists of a preliminary and extensive review of the literature on societal ageing and eGovernment services, citing the recent work of Niehaves [2], and a perspective Delphi study that underscores the unsatisfactory state of research on the issue. Phase 2 is based on extensive problem-setting discussions among the authors to identify both the theoretical underpinnings and the interdisciplinary scope of the research paper, covering three research areas: i) IS in eGovernment; ii) key organizational issues from the service science perspective; and iii) neo-institutional approaches to economic systems. Phase 3 studies the relevant EU and Italian policies. Phase 4 analyzes emerging issues and sets out the conclusions reached.

The introduction is followed by Section 2, in which we review the theoretical underpinnings used to analyze, first, the development and implementation of e-services projects and policies and, second, the distinctive traits of Italy's industrial districts. Section 3 illustrates the necessarily major role played by the users in eGovernment development, and how ignoring this aspect can significantly hold back the improvement of age-aware e-services, highlighting some aspects of the ageing-ICT relationship and the relative European Union (EU) policy. Section 4 describes the traits of the Italian industrial districts and analyzes their suitability as 'natural laboratories' for the implementation of regional policies. The case of the Marche Region (the Italian area with the most industrial and social clusters and the highest longevity rates in Europe) and its ageing population policy is summarized in Section 5. The key issues to emerge are discussed in Section 6, specifically, the need to improve the stakeholders' learning processes by adopting appropriate project evaluation methods, the benefits of leveraging the industrial districts to spur age-aware eGovernment services, and the importance of 'intermediaries' and 'gatekeeping' activities. Lastly, Section 7 presents our conclusions, the paper's limitations, and charts the future research agenda.

2. Theoretical underpinnings

The paper adopts three theoretical frameworks to consider the key issues of studying the points of intersection between e-services, the elderly, and policymaking. The first is Orlikowski's 'Entanglement in organizational practice' of technology [5], a useful compass for the research, design and development of solutions and systems for the market of senior users. The second framework adopted is 'service science', which applied to the development of e-services enables us to focus on knowledge sharing and the co-creation of value, two specific and especially relevant aspects, besides intangibility, of service provision. The third framework is Institutional Theory, widely known and used here to underscore the role of relational systems (such as industrial districts) as institutional carriers for innovation. Further, our discussion builds on the complementary insights of the two notions of 'gatekeeping' and 'intermediaries'. Gatekeeping is especially fruitful when considering the 'information' level in user-provider and citizen-government relationships, while the role of the intermediaries appears decisive to the successful implementation of policies based on citizen engagement.

'Entanglement in organizational practice'. The literature continues to prompt research and debate on the paradigms underlying information systems (IS) research and practice (e.g. [6] and [7]). Many diverse causal agency hypotheses have been used to study the relationship between information technology and organizational change, specifically: the 'technological imperative', the 'organizational imperative', and the 'emergent perspective' (in which latter, the consequences and uses of information technology emerge unpredictably from social interactions) [8]. According to Markus and Robey, all three perspectives have their merits and should be taken into consideration when researching a specific organizational context. Here though, the issue has a more fundamental nature because it concerns the relationship between society and technology. In fact, a vast array of organization types and individuals in different roles now interact with an increasing number of solutions in the attempt to respond to the needs of the elderly. In this respect, Orlikowski's later work shows that technology is only in part a *datum* (exogenously set) and that it is dynamically defined by (and it itself defines) the intertwining of organizations, individuals and artifacts. The adoption of this perspective avoids both the techno-centric (technology as a given instrument) and the human-centered (technology is the way people involve themselves in it) viewpoint, which are misleading because the first "black-boxes" technology and the second underestimates its role. Orlikowski refers to the 'entanglement in organizational practice' of technology: "Humans are constituted through relations of materiality — bodies, clothes, food, devices, tools, which, in turn, are produced through human practices." [5, p. 1438]. The adoption of this approach seems to be particularly rewarding since "contemporary forms of technology and organizing are increasingly understood to be multiple, fluid, temporary, interconnected and dispersed" [9, p. 137].

Service Science. In 2005, when Chesbrough [10] explained in the Harvard Business Review why the new discipline of 'services science' seemed to be a promising area of

research, the author underscored the role of the transfer of tacit knowledge. This role is particularly relevant since services promote encounters among people that have to learn from each other in order to provide an effective service. The focus on tacit knowledge was further developed in the article co-authored by Chesbrough and Spohrer published a year later [11]. Successive work by Spohrer and other members of the Almaden IBM Research center [12] points to explicit knowledge (“information” in their wording) as the key issue. The concept of value co-creation is strictly linked to that of knowledge transfer: in a service-dominant logic (as opposed to a goods-dominant logic) “the roles of producers and consumers are not distinct, meaning that value is always co-created, jointly and reciprocally, in interactions among providers and beneficiaries through the integration of resources and application of competences.” [13, p. 146]. Further, the specificity of service is highlighted as one of the basic tenets of service science (the ‘Foundational Premises of Service-Dominant Logic’): “Value is always uniquely and phenomenologically determined by the beneficiary” since “value is idiosyncratic, experiential, contextual, and meaning laden” [14, p.9]. These concepts can be valuable aids in identifying the best criteria to use for the selection of settings suitable for the implementation of IS-ICT policies for the development of age-aware services.

Institutional Theory. The contribution of Scott [15] on the relationship between organizations and technology is particularly apt to describe the general policy-oriented approach needed to develop successful age-aware eGovernment services: “.. it is important to emphasize the extent to which an organization's technology — although an “internal” element — links the organization to its environment: the environment not only is the source of inputs and the recipient of outputs but also is the major source of the work techniques and tools employed.” [15, pp 208-209]. From the institutional perspective, we also draw on arguments from Whitley’s research on business systems and innovation [16] to evaluate the industrial districts as social productive contexts capable of developing new age-aware ICT platforms and related services (e.g., eGovernment).

From a neo-institutional perspective, an industrial district is an integrated ‘relational system’ (i.e., a system made up of connections between individual and collective actors, [17]. The assumption is that the district, as an institutional form shaped by rules and norms, cultural beliefs and material resources [17, p.39], provides meaning and influences how stakeholders define their interests and preferences.

Network Gatekeeping Theory. An extensive review of the meaning of gatekeeping in the literature of different disciplines (including information systems management) led us to draw some interesting conclusions, in [18]. The word gatekeeping “refers broadly to the process of controlling information as it moves through a gate or filter, and is associated with different types of power” [18, p.433]. For the purposes of this paper, the study identified the following points of interest:

1. the role of the ‘gated’ (e.g., the elderly) and not only that of the gatekeepers needs to be taken into account because both roles interact dynamically;

2. in the management of information systems, gatekeepers are ‘facilitators’ who “improve or maintain internal processes and help new gated entering the network (gatekeepers ... in many cases serve as educators)” [18, p.443];
3. the gated are also considered capable of ‘challenging’ gatekeepers given: i) the high rate of exchanges between the two parties; ii) the useful information potentially generated by the gated; iii) the choice of alternatives available to the gated; and iv) the fact that the gated are not powerless.

Further considerations can be drawn from the Network Gatekeeping Theory. First, the “gatekeepers and the gated are not monolithic social and political entities ... dynamism is important to represent an environment where the interests and goals of the stakeholders constantly change, as do their gatekeeping and gated roles” [18, p.465]. Second, the phenomenon of gatekeeping is large yet sensitive to specific contexts. Third, there are multiple dimensions to gatekeeping whereby, for example, gatekeepers are both ‘guardians of boundaries’ and ‘messengers of the community’.

Intermediaries. A recent study analyzes the emergence of ‘intermediaries’ and their potential influence on the qualities of the citizen-government relationship [19]. Adopting a *citizen-centric* perspective, the intermediaries are seen as a way to help a broad range of citizens to access the information/resources they need through more tailored services. In that sense, the intermediaries have the potential to bridge inequalities, above all in terms of the adoption, access, and use of the ICT resources. The type of individuals receiving assistance from social intermediaries, compared to those not receiving assistance, tends to be those who are otherwise beyond the digital divide, excluded from both eGovernment and other information society benefits [20]. The presence of intermediaries who add human skills and knowledge to the ICT environment is critical for projects that want to reach less advantaged citizens [21].

Sorrentino and Niehaves slot the intermediaries into the “institutional carrier” category (a concept worked on by Scott [17, 22] and highlight its dual nature: *relational agents* (i.e., “systems made up of connections among actors, including both individual and collective actors” [17, p. 886]), and *symbolic agents* (i.e., “systems that can be used to convey information about rules (...), values and norms (...), or mental schema or models” [17, p. 882]. In the former role, the intermediaries (such as one-stop shops and professional associations) reshape organizational boundaries and “stimulate managers to reconsider who and what are inside vs. outside” [17, p. 887].

The second role (i.e., symbolic agents) played by the intermediaries, especially those who interact directly with individuals, is particularly crucial for the carrying of tacit knowledge, i.e., non-codified knowledge embedded in the skills and routines of performers. For instance, the citizen sees the pharmacist as a kind of access point to an abstract system, i.e., the national health service. Nevertheless, codified knowledge also can be embedded in hardware and software artifacts (as in the case of the virtual intermediaries). In turn, like other institutional carriers, the artifacts can be viewed as associated with, and affected by, regulatory, normative or cultural elements.

3. Key eGovernment issues in the development of age-aware e-services

3.1 The quest to raise citizen-government interaction

In 2001, the Organisation for Economic Co-operation and Development (OECD) [23] published a report identifying key issues in strengthening government-citizen relations and ongoing interactions. Three ways of interaction were depicted with an increasing degree of influence exerted by citizens: 'information' (dissemination of information by the government on policymaking), 'consultation' (acquiring feedback on policymaking), and 'active participation' (the direct engagement of citizens in decision-making and policymaking). As explained in the handbook prepared for government officials [24], the third form is deemed desirable because it "envisions the role of government not as a micro-manager, but as an enabler and provider of frameworks ... [so that within] ... these frameworks, market and civil society, individual citizens and groups may organize their activities and relations" [24, p. 35]. Yet that 'new frontier' of government-citizen relations has been dogged by limited experience and experiments conducted mainly at the local level. The analysis of the impacts of ICTs conducted in the report [23] confirmed that online active participation was even more limited than offline participation. Overall, none of the experts who contributed to the survey expected ICTs to completely replace the traditional methods of interaction. Most emphasized the need to ensure equal participatory rights to everyone, both online and offline. The question of the 'digital divide' (and the correspondent need for e-inclusion policies) as a condition for information, consultation, and participation was confirmed by the OECD two years later in a study on the implementation of eGovernment [25]. In fact, "facilitating consultation and engagement" is one of the emerging good governance objectives [25, p. 28]. The 'bridging of the digital divide' therefore is a major priority for effective eGovernment policies. Larger parts of the population must be ensured not only access to, but also the ability to use the Internet. A number of solutions have been envisioned besides infrastructure development [25, p. 62]: providing access points (such as public libraries and schools), promoting familiarization with ICTs, and prompting diffusion also by qualifying the 'tools' for special needs (the elderly, the disabled, people living in rural areas, and those with lower incomes).

The engagement of citizens and the contextualization of eGovernment projects require also 'intermediate entities' to act as a go-between in connecting citizens with eGovernment services. The importance of the role of the 'intermediaries' is due to the fact that people's attitude to ICT-intensive services has not been encouraging, as attested by a survey conducted in the United States, which showed that in 2000 half of the adult population had never visited the websites of federal agencies (two-thirds had never accessed state or local government websites), while the users tended to be male, younger, better educated and higher income earners [26, p.21]. The situation had not improved five years later: the users of health information technology were few, whether to get information or to communicate with healthcare personnel, or making online medical purchases, with even fewer older and lower income people [28]. Thus, any strategy for the delivery of public services must leverage other resources to integrate digital and in-presence public services, and not only the technological, organizational and inclusion aspects. An example of such a strategy is the 'transformational

government' policy launched by the UK government in 2005 [27], whereby government is transformed through technology but is also 'transformational' because it retains the ability to innovate by using technology effectively as technology itself develops. One key aspect of this transformation strategy is the shift from a product- to a customer-focused structure so that services are both citizen and business-centered. Specific customer groups are defined (for example, the elderly) because the "needs of key groups ... are best viewed in the round rather than service by service" and "government will ... implement new processes to engage with citizens, businesses and public servants to research technology enabled services..." [27, p.8]. This approach determines the appropriate channel strategy for each customer group, including relevant parts of government, "use of intermediaries,..., local providers and the voluntary and community sector" [27, p.11].

3.2. The paradox: pursuing citizen participation *but* in eGovernment projects

There is, at the policymaking level (at least in the OECD countries): i) a willingness to ensure higher interaction between citizens and governments; and ii) the belief that ICTs can be effective drivers and enablers of such augmented interaction. In addition, there is awareness that the electronic channels pose problems of accessibility and usability that curtail their diffusion and use [29]. Despite this widespread perception of the issues at stake, most existing studies on user engagement are not sensitized to the context of eGovernment [30, p.127]. The knowledge of how citizens are engaged in the development or selection of appropriate 'tools' (a growing phenomenon) is still inadequate since the literature on this topic is scant [31]. Clearly, the specific issue of 'citizen' engagement needs further study since 'user' participation has been extensively researched in information theory and practice (and its usefulness often acknowledged): as, for example, in the June 1993 issue of Communications of the ACM [32]. Further, theoretical frameworks have been available for a long time: the socio-technical approach to IS of Enid Mumford dates back to 1983 [33].

Therefore, it is somewhat paradoxical that while eGovernment applications pursue interaction (and possibly active participation), the understanding of user (citizen) participation in designing eGovernment systems is still limited. In other words, users have little opportunity to be involved in the actual design of the technology or to exercise 'ownership' over the solution provided. "There is also an inadequate appreciation of the culture of service providers and users and the context of service delivery and use" [34, p.863]. However, because the use of eGovernment services is still unsatisfactory, the engagement of citizens in the development of eGovernment systems and services would appear to be an essential factor, "the missing link" in generating eGovernment projects [35, p.500]. Though based on the current limited evidence of citizen engagement in such projects (as the authors themselves highlight), the conclusions of this last study emphasize the importance of 'capacity building' in IS development for both citizens and public officials, of leveraging the experience matured in offline citizen consultation and participation, and of circulating the emerging eGovernment participatory practices.

3.3 Ageing and ICT

The independence of an ageing population can be facilitated by some of the basic features (such as appropriate building design for accessibility) needed to use more sophisticated aids. In fact, the use of ICT-enabled wheelchairs depends on appropriate contexts if they are to be used at all. Further, the development of satisfactory solutions for this equipment is not yet complete, and the sensors fitted to commercial devices have yet to fully satisfy the requirements for this domain [36]. Mobility is thus one of the areas in which it is necessary to develop ICT solutions to increase the independence of an elderly person. 'Assisted living environments', a form of 'smart house', are another research area that deploys sensors, home networks and communications to monitor the safety of the occupants of a given environment. Higher levels of safety can help the elderly to live longer in familiar surroundings and optimize the possibility of being taken care of at home, therefore they can help to reduce the demand for (and the cost of) home nursing services. At present, 'home care systems' are developed according to four basic principles [37]: (i) 'personalization', indicating the possibility to respond to different support and monitoring needs: diseases and disabilities are different (as are lifestyles); (ii) 'customization', emphasizing the need for inputs and feedback from care professionals and not only specialized technologists (a prerequisite for large-scale deployment) in the personalization phase; (iii) 'adaptation', whereby the system needs to be adaptive to support the changing types of care needed over time; and (iv) 'dependability', emphasizing the need for both hardware and software to be predictable and reliable. Accomplishing all four of those requirements is a complex endeavor solely from the technological perspective. Moreover, the organizational, medical and nursing care aspects are crucial to interpret the signals sent from the house to the care center staff. Neither can privacy issues be neglected, given that assisted living environments are multiple and changing situations by nature, making it necessary to manage the trade-off between the effective monitoring of the elderly person's safety and minimizing the intrusion into their everyday life [38]. The privacy and home care systems issue is not only a regulatory conundrum, but also has an impact on the extent to which these systems are accepted, given that elderly people seem to be particularly sensitive to the intruding nature of technology [39].

A decisive factor in using ICTs is that of learning to cope with the many different devices, systems and services, in addition to grasping how to use the Internet to access the public services provided through eGovernment applications, other e-services such as e-commerce and e-entertainment, and/or simply to connect with friends and relatives. The underlying issues therefore are linked to the usability of 'technology design'.

3.4 Ageing and public policies

The difficulty of developing design methodologies suited to specific ageing-related needs and the relatively short time in which the ageing population has become a major issue have not triggered the virtuous cycles needed to drive the market of ICT-enhanced services for the elderly, which appears to be still in its infancy [40]. It is therefore

necessary to create awareness among consumers, producers and policies to ensure the balance between commoditization and the welfare state, supporting the growth of this group of industries by both lowering barriers and providing incentives for the research and deployment of new Internet services and technologies. The role of the public authorities is clearly that of ensuring that all user categories have access to age-aware ICT-enabled services, defining quality standards and supporting the research, development and implementation initiatives of the market players, while also defining the scope, extent and character of its own presence [41].

The European Union policy for e-inclusion is set out in the “Riga Ministerial Declaration on an Inclusive Information Society” [42]. In the Declaration, the term e-inclusion stands for ICTs that are both inclusive and enablers in achieving inclusion objectives. The ‘ICT and Ageing’ project is intended to halve the gap in the use of the Internet, to remove the barriers of the EU internal market for ICT products and services for the elderly, and to support their active participation in society and at work through greater ICT skills training. Overcoming divides in Internet use is not only socially responsible but also economically rewarding. In general, “the wellbeing of a vibrant European society depends also on human capital, social capital, health, and reduction of the costs of social exclusion and in general on the quality of life” [43, p.7].

The “Action Plan on ICTs and Ageing” [44] addresses three areas of information society user needs: i) “*Ageing well at work*”; ii) “*Ageing well in the community*”; and iii) “*Ageing well at home*”. The plan pursues not only advantages for senior citizens but also benefits for both Europe’s companies (increased market size in Europe in the ICT and ageing area, a stronger position in the world market, a more highly skilled workforce) and its authorities (enhancing eGovernment solutions to enable a reduction in costs and improve the quality of health and social care systems).

A pillar of the action plan is ‘Preparing for the future’, which underscores the rapid evolution of ICTs and proposes a specific joint research program on Ambient Assisted Living (AAL), with the aim of providing:

“equipment and services for the independent living of elderly people, via the seamless integration of info-communication technologies within homes and extended homes, thus increasing their quality of life and autonomy and reducing the need for being institutionalised. These include assistance to carry out daily activities, health and activity monitoring, enhancing safety and security, getting access to social, medical and emergency systems, and facilitating social contacts, in addition to context-based infotainment and entertainment” [45, p.64].

By stating these research priorities, the European policymaker wants to ensure that the three basic needs areas (work - community - home) will continue to guide an age-aware ICT policy in a complex network of interconnections. The program is expected to mobilize at least Euro 600 million in private and public funding in six years. In fact, in 2008 the European Union decided [46] to contribute Euro 150 million to the program, while the member states will double that figure, thus providing a total of 50% of the funding; the remaining 50% will be invested by the private organizations responsible for developing the research projects. The rationale of this funding approach is that it will not

only create EU-supported critical mass, but also link the research program of the member states while supporting private R&D efforts [45].

In short, the Action Plan on ICT and Ageing (specifically the Ambient Assisted Living program) aims to build critical mass and remove regulatory barriers to create a single European market, whereas, at present, the products and services cater to national or local needs as a result of different reimbursement, service delivery and certification schemes [ibid, p.36]. However, this situation not only limits interoperability, but also restricts the potential of e-health and eGovernment services. The resulting industry fragmentation (Europe has an estimated 20,000 assistive technology products [ibid., p. 38]) prevents economies of scale, translating into a high cost for both users and insurers. Regulatory uncertainties weaken the willingness to allocate resources in an industry where the investments are high and the returns not immediate. The European action plan would enable the small and medium-sized enterprises (SMEs) to obtain the support needed to expand their reach beyond the domestic niche markets: a well-defined interoperability, innovation and research framework for ICT and ageing favors both a de-fragmented marketplace (a solid investment base) and the need for customization to respond to diversity of needs [ibid., p.55].

An overview of the advancement of the AAL program shows that by the end of 2010 a first batch of more than 50 projects was under way [47], while another 30 projects have been funded within the Seventh Framework Program for Research.

4. The industrial district: a “natural laboratory”

Small and medium-sized enterprises are the most numerous type of economic organization in the world, but have often been believed to hamper growth due to their limited R&D expenditure and apparently low tendency to innovate. However, this does not apply to SMEs located in the specific kind of socio-economic setting known as “industrial district” .

Whitley [16] has highlighted the interconnections of institutional contexts, types of firms and innovation strategies. Typical innovation strategies implemented by the SMEs of industrial districts can be defined as ‘responsive’ since “they compete by making rapid and continuing changes in product qualities to suit customer needs” [16, p.875]. Even though the development of the concept of ‘industrial district’ dates back to the work of Alfred Marshall [48], the OECD countries have shown ongoing interest in this socio-economic phenomenon [49, 50]. The following definition [51] summarizes what characterizes an industrial district (otherwise called ‘cluster’): “geographically close groups of interconnected companies and *associated institutions* in a particular field, linked by common technologies and skills. They normally exist within a geographic area where ease of communication, logistics and personal interaction is possible. Clusters are normally concentrated in regions and sometimes in a single town” (our italics).

Italy is the Western country with the highest weight of districts [52], accounting for 40% of its production companies, i.e., 200,000 factories, and 40% of Italian manufacturing employment. Further, 5 million families – one-fifth of the total - and one-fourth of the 8,000 municipalities are situated in these territories [53]. Most of the above-cited literature on ‘industrial districts’ and ‘clusters’ (and specifically [54]) actually

consider the Italian case to be exemplary of the traits of such settings. It is therefore valuable for our discourse to analyze in some depth the particular nature of Italy's industrial districts.

4.1. The entrepreneurial profile of districts

The extensive research conducted on Italian districts [55, 56, 57, 58] highlights the following traits. Besides agglomeration economies and economies related to technology, a district has other advantages, specific to a certain territory (for example, a higher level of trust, a specific technical jargon), that originate from a number of adaptive processes among firms and between firms and the local population. The profitability of an enterprise of a district is due to its ability to adapt its products and services to the changing needs of the market and to produce outputs at decreasing costs (increasing productivity). Continual change is linked directly to smallness of size (the average firm employs nine people), to non-hierarchical but direct intra-firm interactions, to intellectual rewards and not only incentives, and to a well-integrated team of workers who interact closely with the entrepreneur. This kind of enterprise is able to generate a number of different offerings by means of a *trial and error* approach which, though risky, is certainly adequate to respond to the demands of the market. Basically, the features of a 'district firm' and its ongoing trading with the community generate 'learning economies' [4] which, thanks precisely to its continual adaptive nature, increase the ability to manage change as opposed to other kinds of firms. In addition, the factors that influence the quality of processes in these firms are not related solely to their economic (availability of capital) and technological (scientific knowledge and technical know-how) assets, but also to their socio-economic features (values, institutions, diffused knowledge). The interplay of these two sets of attributes qualifies an area for a specific production (machinery, shoes, apparel, and so on).

The following section better explains these traits, describing the context of these kinds of firms.

4.2. Italy's industrial districts: social profile and knowledge-creating mindset

The notions of 'social capital' and 'relational capital' help us to understand how the districts form and function and to grasp their value as a testing ground for engaging citizens in the development of age-aware eGovernment service projects.

OECD proposes a synthetic definition of social capital: "networks together with shared norms, values and understandings that facilitate co-operation within or among groups" [59, p.14]. This statement groups the informal constraints (codes of conduct, customs, and traditions) which, alongside the formal rules (constitutions, laws, and property rights) influence the economic development of an economy. Putnam [60], the scholar that first introduced this concept, studied the possible nexus between the different endowment of social capital (that is, the trust, reciprocity, and habits of co-operation shared among the members of a local community) and the higher rate of economic development in Northern and Central Italy (where 85% of the Italian districts

are located) compared to Southern Italy. Further studies and empirical investigations [61, 62] on the economic development of Italy have confirmed the relevance of social capital measured by a composite index of civic participation (density of not-for-profit organizations), political participation (percentage of voters, density of civil rights promotion organizations), and trust (density of crimes and litigations).

In addition to their 'social capital', the basic and distinctive features of districts are underscored by their 'relational capital'. Relational capital can be defined as "the set of all relationships (market relationships, power relationships and cooperation) established between firms, institutions and people that stem from a strong sense of belonging and a highly developed capacity of cooperation typical of culturally similar people and institutions" [63, p.77]. While the two concepts are similar, the latter highlights specific qualities, such as the exchange of skills between different actors and their ability to cooperate and interact with each other. The contours of districts, and not solely of those in Italy, according to [64], are: (i) physical proximity, a key element because it facilitates personal contacts among firms; (ii) relational resources, which are more critical than infrastructural externalities; and (iii) the cast of actors that surround the firms (trade associations, local authorities, universities and other local institutions) that are a constituent part of the relational resources. One of the outcomes of these ongoing relations (probably linked to proximity) is 'collective learning', i.e., "a social process of cumulative knowledge based on a set of shared rules and procedures which enable individuals to coordinate their actions in the search for problem solutions" [65, p.162]. So a district develops local knowledge that is basically 'tacit' [54], external to each individual firm, and which is not built by means of conscious efforts [65, p.162]. Further, the exchange of tacit knowledge requires strong interdependencies among firms so that a virtuous circle is established: experiences are exchanged that improve the problem-solving ability of participants and enable the forging of even stronger links. In turn, these links generate more opportunities to acquire rich tacit knowledge, and so forth. The result is a widespread desire to cooperate, a distinctive feature of all districts. Research has highlighted that this form of cooperation originates three mechanisms for transmitting tacit knowledge: non-business relationships (enabling continuous informal interactions outside work), new firms (created by the employees of parent firms), and human resources mobility (workers who take their knowledge with them into the local job market) [66].

4.3 Districts: weaknesses and evolution

The choice of industrial districts as potentially suitable candidates for the design and implementation of policies to support the development of an age-aware information society does not necessarily imply a favorable focus on a stereotyped, *tout court* positive vision of clusters of small enterprises. The vast literature on districts highlights and debates different aspects, proposes multiple interpretations, and underscores caveats. Some research, for example, urges us not to assume that co-operation practices among district firms always predominate nor that they prevent unfair behavior (such as poaching workers or getting work done off-the-books) [67]. Other studies highlight the

consequences of globalization whereby increasing numbers of migrant workers threaten the social cohesiveness of districts due to the impact of their immigration status on employment relations [68]. Above all, globalization has reduced the robustness and stability of such business systems and, at least in certain areas and industries, the 'organizational duel' between 'company' areas (pulled by centralized networks evolving into large vertically integrated companies) and 'network' areas of small companies was won by the former [58]. The result seems to be a hierarchical structuring of networks or a bleak future for small district companies, which are under-capitalized and lacking in managerial culture [58, p.397]. Yet, the "emergence of leading firms should be considered a positive change, one that can allow the district to survive, despite ever stronger international competition" [58, p.398]. The tendency to innovate in districts is thus led by 'focal firms' that have established relations with a larger number of customers and suppliers and, thanks to their higher technological and organizational capabilities, are able "to build bridges beyond the narrow confines of the district" [69, p.362].

Indeed, it is precisely their capability to evolve that makes the districts ideal candidates as laboratories in which to develop new age-aware products and services, as claimed in this paper. Regardless of the different and at times contrasting interpretations of the scholars and researchers, the districts are a fine-grained canvas of small firms with the ability to respond to changing needs interrelated with larger key ('focal') firms with the capacity to assess emerging market and technological opportunities in a global perspective. Information and formalized knowledge transmitted by distant actors can vivify local rich tacit knowledge (and vice versa) and information technology innovation, and, applied to a social issue as important as ageing, is itself further stimulus to enhance local and global forms of cooperation.

5. The Marche Region: districts, age-aware policies, launch of 'Ambient Assisted Living'

Marche and Lombardy have the highest number of industrial districts of all the Italian regions: 27 [53]. In Marche, a region of Central Italy, the districts are the major drivers of the local economy, hosting almost 90% of total regional manufacturers and providing 95% of jobs (more than 20,000 firms and 170,000 employees). The most important and export-oriented industries are furniture and other household goods, machinery, footwear, clothing, paper, and musical instruments. According to the Bank of Italy's 2012 annual survey of Italy's regional economies [70], the current international crisis hit the Marche economy the hardest during 2011, with the biggest brunt borne by the firms that in the preceding years reduced their prices without changing their internationalization strategies. Local human capital is considered a crucial factor in restoring growth and the regional education system is among the best in Italy, both in terms of schooling levels and learning capabilities. Innovation is still considered to be a distinctive trait of the local district enterprises. In fact, the Marche districts exemplify all the traits described above.

The European Union Committee of the Regions and the Marche Region organized a recent seminar (Home Automation at the Service of Active Ageing)¹ at which they presented and discussed the regional program for the launching of age-aware ICT-based projects. The longevity of the Marche population ranks the region first in Europe alongside Ile de France and Comunidad de Madrid. This situation has led the local policymakers to promote age-aware ICT-based projects in response to the need for an overarching 'active ageing' policy in a local area with a dense, innovation-oriented industrial fabric and a widespread entrepreneurial culture. The Region has already co-funded a number of projects and plans to assess more such initiatives in the near future. Experience in Ambient Assisted Living is being gained on a wider scale, also by the regional administration (in particular, its development agency and the coordinator of the project), through the launch in 2011 of JADE - *Joining innovative Approaches for the integration and Development of transnational knowledge of clusters policies related to independent living of the Elderly*², which draws on European research funds from the Seventh Framework Program. The project (to be completed by 2014) has a total of 40 partners from Finland, France, Turkey, the United Kingdom, and Italy, made up of both public-sector (e.g., the Marche administration) and private-sector organizations. These latter include both the larger companies (e.g., Italian-owned Indesit, one of Europe's largest household appliance manufacturers) and the SMEs (approximately 300 firms). Interestingly, for the purposes of this paper, one of the partners is a local research center (the 'Technological Center for the Wood and Furniture Industry'), a consortium of 200 firms (mostly SMEs), employers associations, and public agencies and municipalities, that serves the furniture industrial districts of the area. Like other similar centers in Italy spawned by local clusters, the research center provides information on new technologies and competences in the market, helps members to access public research funding, and designs and supervises R&D projects for individual enterprises.

6. Discussion

Given the early stage of our research, we can advance only preliminary responses to our two research questions: i) *Which approaches best respond to the needs of the elderly?* and ii) *Why are 'industrial districts' particularly suited as innovation "laboratories" and testing grounds for age-aware policies?* The theoretical approaches and the research examined earlier converge on three areas that we believe fundamental to the implementation of targeted policies. The first highlights the factors that need to be taken into account to enable all the people involved to benefit from a cumulative learning process when evaluating the projects. The second underscores the importance of the social and economic setting in which the policies, programs and projects are

¹ The presentations of the speakers are available at:

<http://cor.europa.eu/en/activities/commissions/ecos/work-in-progress/Pages/ecos-seminar-on-home-automation-at-the-service-of-active-ageing.aspx>

² The outline of the project is available at:

http://cordis.europa.eu/search/index.cfm?fuseaction=proj.document&PJ_RCN=11704331

implemented, showing the effectiveness, based on the case in question, of the industrial districts as testing grounds. The third addresses the organizational complexity of eGovernment services and the need for 'intermediaries' and 'gatekeeping' activities to support and optimize their delivery.

6.1 Age-aware e-services projects and the usefulness of assessing them from a 'service science' perspective

The market offers many thousands of assistive technology products and has others in the pipeline, which, added to the results of present research, form the building blocks used by successive projects to further develop, select, connect, and seamlessly integrate to provide effective and personalized e-service systems for the various segments of the elderly and the different contexts they live in. According to the framework proposed by Spohrer and his co-authors [12], internal and external services are key components of service systems. The literature on eGovernment argues that as much attention needs to be paid to internal services (the vast area of 'back office', for example) as it does to updating front office service delivery channels [25]. Another service of importance to both the internal and the external sphere is the management of change within public care organizations, given that changes in ICT must perforce go hand in hand with organizational changes [25]. As a result, the shift from an institutional-based care system to a more intensive home care system based on the use of ICTs raises a number of change management issues. The way technology is conceived orientates priorities, and the early phases of eGovernment projects have suffered from technologic determinism [71], adding appropriate design techniques to the range of core services for the implementation of senior citizen-oriented projects (so that excessive 'technological imperative' approaches are mitigated). A further crucial service in this new eGovernment services arena is to assess and monitor the initiatives from the ex ante phase up to implementation to identify not only their strengths, but also their weaknesses, thus adding to the experience and applying the lessons learned to future projects. This complex issue has interesting implications for the aim of this paper. The enormous amount of resources invested by industrialized societies in government information technology, with some estimates placing it at over 1% of gross domestic product [72], makes evaluation an increasingly critical factor, as highlighted by eGovernment researchers seeking to provide guidance for initiatives in the developing countries. Not surprisingly, therefore, the most widely adopted evaluation approaches focus on the financial aspects, such as the return on investment, the cost/benefit ratio, the payback period, and net asset value. However, these approaches have been widely criticized on several counts, including the inability of such indicators to go beyond the direct tangible costs and benefits of information systems (IS) generally and, specifically, eGovernment [73]. Investigating the evaluation of information systems has led some authors [74] to pronounce as inadequate the evaluation approaches favored by the dominant overarching positivist perspective (basically functional or rationalistic), which claims that IS are separate from organizational components. Hence, the technological

and accounting aspects are favored over the social impact because the evaluation pays little attention to the organizational context and IS development. Such an evaluation method fails to provide a full picture of the results and outcomes of a project for all the stakeholders. On the other hand, an evaluation that sees technical change as interwoven with organizational change (as suggested by Orlikowski's 'entanglement in organizational practice' of technology) can no longer be considered an objective and external judgment and becomes itself "a socially embedded process in which formal procedures entwine with the informal assessments by which actors make sense of their situation" [74, p. 94]. In evolving situations, sensemaking is a process by which actors give meaning to their experience and orientate their choices and actions, creating an open-ended evaluation process, and, starting with the IS design phase, to interpret the outcomes and use them to guide future actions aimed at improved performances. Weick and co-authors point out [75] that, besides being retrospective (built on experience) and forward-looking (to identify successive actions), sensemaking is also social (actors are interdependent), entailing interactive communication and interpretive exchanges that shape the organizing and decision-making to the diverse circumstances. Basically, IS evaluation is a cycle that deals with its impact on many organizational facets and complexities, not only the relative technological and accounting criticalities. Specifically, the same research results show how the creation of important tacit knowledge is spurred by the interaction of people in the sensemaking process, and that this factor needs to be taken into account in both the design and the evaluation of age-aware e-services.

This is particularly relevant in cases that involve a large number of heterogeneous actors (such as the AAL initiatives of the Marche Region) because it shows that e-services are not only co-produced by providers and consumers (e.g. in distant monitoring and medicine dispensing, the two values to be co-produced and balanced are 'safety' and 'non intrusiveness') but that co-production is vital to prevent project ineffectiveness and even failure. The 'emergent perspective' outlined by Markus and Robey (cited above) is useful to understand how new and unforeseen technical problems can become entwined with unexpected personal and social attitudes. Enhancing the sharing of information (explicit knowledge) and experience (tacit knowledge) among service providers in a process of 'sensemaking' is a potential solution to reduce or manage such hurdles.

6.2 Industrial districts as ideal 'laboratories'

The social and relational capital of the Italian industrial districts make them suitable settings for the development of age-aware eGovernment services. The traits of these districts are conducive to an innovation strategy that responds to the changing needs of customers [16], given the dynamism and orientation of both the users and the providers to innovation. In addition, their consolidated fabric, rich in cultural and regulatory elements (the building blocks of institutional structures) provides the springboard for a new generation of eGovernment services tailored to the various segments of the population and delivered through diverse ICT and physical channels. The modest but not negligible size of the Italian districts (which, as mentioned above, average 80,000

inhabitants), based on an average of 14 municipalities, would favor collaborative eGovernment arrangements among the local authorities. In particular, the longevity of the Marche population, its local economy, and the policies adopted by the regional administration make this Region an exemplary case for researchers to monitor in the study and investigation of the drivers and limitations of e-services.

These district settings possess the key traits necessary to support the idea that such socio-economic contexts can help surpass some of the disappointing experiences that have fueled criticism and skepticism of eGovernment approaches and solutions [76]. In particular, the paradoxical situation - whereby citizen engagement is pursued through the development of eGovernment projects that fail to take account of the explicit needs of older citizens – can be better addressed in an environment where networks of relations (both social and labor) have already been established, thus providing tangible ‘laboratories’, whose networks can be of use to both the public authorities and the project implementers that favor an approach that goes beyond the techno-centric, who do not see technology as merely a vast array of ‘enabling tools’ from which to choose to meet both the aims of the PA and the needs of the users [77, 78]. In fact, not even the latest advancements in computer-mediated communication envisage a radical substitution of face-to-face with electronic interaction [79].

However, the question is not how far a technical device or a software artifact can mimic face-to-face situations, but how people and organizations will “invent” and use new ways of effective communication by getting involved with emerging collaborative tools. And that is exactly what makes citizen engagement indispensable. As we said earlier, technology is only in part a *datum* (exogenously set) and is dynamically defined by the intertwining of organizations (institutions), individuals, and artifacts.

6.3 eGovernment projects: a complex organizational endeavor

The favorable setting of the industrial districts can be reinforced by the careful use by the public operators and project executors of both the ‘stakeholder theory’ [80] and, as suggested in this paper, the ‘network gatekeeping theory’. The former helps operators to identify and interact with key stakeholders to gain their cooperation in shaping the organizational aspects of an eGovernment project [37]. The second highlights the strategic role of the gatekeepers and users (or the gated). The gatekeepers and users become, respectively, ‘facilitators’ who propose potential solutions to problems that emerge during work in progress and ‘challengers’ who ask unforeseen questions (the issue of organizational improvisation is well known and studied by Weick [81] and Hatch [82]). The interplay of these two roles (among all stakeholders) enables the monitoring of the unavoidable drift of eGovernment projects from original blue-prints and plans [83].

Active citizen involvement in eGovernment development is an evolutionary stride forward compared with the practice of participative design. However, in this case, user involvement is not aimed at avoiding the mismatch between, on the one side, the knowledge of the designers and developers through technical requirements incorporated in the ICT artifacts, and, on the other, the reality of the user’s context. Rather, the gatekeeper and user relationship becomes an ongoing *co-production* project.

The gated acquire increasing power, the ability to interact, the capacity to transmit valuable information, and propose alternative channels of interaction. Complementarily, gatekeepers need support to develop their skills as 'facilitators'. Thus, the wider the digital divide (disadvantaged groups), the more critical it becomes to monitor the gatekeeping process.

Intermediaries are another complementary condition to gatekeeping in the use of districts as natural eGovernment project laboratories. In fact, the delivery of technology-driven projects to a variety of inhomogeneous user groups in terms of their ability to interact with specific technological contents, requires the service of intermediaries - what Scott calls 'relational agents' - to interpret and deliver public e-services. Further, due to the fact that people (especially the disadvantaged) find it difficult to switch from their customary channel to electronic modes [84], trusted intermediaries (thanks to their consolidated presence in the local areas) can promote awareness, facilitate access, and ease e-inclusion. Thus, a multichannel strategy can be effectively implemented by leveraging all the possible known (and trusted) channels harnessed by the users: profit and not-for-profit organizations (besides PA).

The distinctive features of the districts make them a valuable springboard for developing a design approach to age-aware eGovernment compatible with the expectations of the relevant actors and communities in a way that makes eGovernment implementation more 'an institution-building endeavor than an engineering exercise' [85, p.26].

In essence, our discussion enables us to more comprehensively understand the dynamics of eGovernment. In addition to the three critical domains identified by Lanzara [85, p.33] as the main components of 'system compatibility' (meant as an indispensable element in the generation of 'increasing returns for innovation'), specifically:

- *Technical compatibility*. Compatibility between the technical components of the information infrastructure;
- *Functional compatibility*. Compatibility between the technical and the normative/institutional components;
- *Institutional compatibility*. Compatibility between the multiple organizational and institutional agencies involved in the design and innovation process;

we argue that age-aware eGovernment must be also supported by *Social compatibility*, i.e., compatibility between beliefs, roles, cultural frames inscribed into the ICT artifacts, and the patterns of action adopted by individual actors and organizations. That view expands the concept of system compatibility and enables the creation of a space, both physical and conceptual, where opportunities emerge to offer platforms potentially more anchored in the situations of the individual user categories (not only the elderly) and the stakeholders involved in the delivery and use of services [86].

7. Concluding remarks, implications, and limitations

This study was motivated by the need to better understand: i) how governments in ageing societies can expand and overhaul their service portfolios; and ii) how product developers and service providers can design an offering that meets the distinct needs of ageing societies. The earlier part of the paper presents the general principles and

features that potentially underpin this kind of 'joined-up' approach, focusing above all on the districts.

The paper's contribution to the work of the policymakers is to underscore how the districts (or clusters) can serve as an ideal 'laboratory' to calibrate policy measures and to assess the reaction of both demand and supply; a particularly helpful evaluation in the field of age-aware eGovernment, where 'technical' aspects need to interact appropriately with 'socio-economic' networks. The existence of "lean" municipalities (about 60% of Italian municipalities has fewer than 3,000 inhabitants) that share common industrial and social interests is a positive driver of collaborative arrangements (intermunicipal and in partnership with local enterprises and organizations) to address ageing issues and, more generally, eGovernment solutions.

As well as the public authorities, the implementation of eGovernment policies involves several stakeholders, whose actions influence the growth of the relevant market. For the entrepreneurs, the districts are of potential interest as a market testing ground for the results of their innovation and large enough to orientate their development activities. Home care professionals [87] would be able to develop their interaction with assistive solutions in situations where the existing social networks (in addition to the elderly) could provide them with appropriate feedback. The end users would be able to rely on a large socio-economic network to provide them with the necessary information and assistance on choices and usage, thus acting as a safeguard. Finally, the large ICT companies would benefit from the timely and competent cooperation of a rich fabric of SMEs with valuable information on user needs and preferences.

The paper's limitations are linked to its exploratory nature and partial perspective, we have not considered, among others: i) the issues raised by the interaction of private and public organizations; ii) the implications of cooperation between large and small companies in research and development initiatives; and iii) the consequences on the implementation of e-services development policies in other types of settings.

Nevertheless, now that we have started to lay the foundations of such a challenging and interesting research agenda, we will continue to monitor the development of the Marche Region to support the validity and solidity of our claims.

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