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Smart working in Italian Public Administration: A Socio-Technical Approach

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Abstract

In the last decades, new ways of job organization, like remote working, have been introduced to satisfy the need to rethink, redefine and redesign the organization of work in terms of nature, content, and responsibilities. In 2020, due to the pandemic emergency generated by SARS-CoV-2 (commonly known as Covid-19) and the policies to limit the mobility to contain the contagion, the diffusion of these new forms of work accelerated considerably. The evolution of work practices provides an exemplar use case of social and technical disruption. The principles of a Socio-Technical System (STS) are a compass to interpret the transformation of technology, processes, tasks, organizational culture, goals, and people.

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Adopting a STS approach, this paper aims to shed light on the impact of remote working (often called agile or smart working) in Public Administrations (PAs). A multi case analysis is conducted by coding diaries written by heads of staff and IT executives involved in the process of remote working implementation in three Italian PAs. Aspects related to organization, job design, tasks, and workers' behavior have been analyzed.

Key words: smart working, public administration, socio-technical approach

1. Introduction

Over the past two decades, remote working, conceived as working elsewhere than at the office (Krishnakumar & Choudhury, 2014), has become widespread practice. From the 1990s, the innovations in digital technologies have allowed organizations to introduce flexibility in managing the time and geographical location of the work, by introducing organizational practices referred to as teleworking (Niles, 1998). Following the Covid-19 outbreak, the percentage of remote workers in Public Administrations (PAs) increased exponentially and it is estimated that more than 40% of the workforce will continue remotely throughout 2021. The adoption of new forms of working has increased the debates and numerous doubts and criticisms have been point out by both practitioners and researchers. The definition of remote working is also under investigation, since teleworking, flexible, agile, and smart working are widely used synonymously in the managerial lexicon because of the lack of widespread shared best practices. Despite a clear definition of the different types of work, in this paper the concept of smart working will be used as a generic term to refer to teleworking, flexible and agile working. This study aims to shed light on the real implementation of smart working by identifying the critical variables for a correct and successful implementation. The main implications related to this phenomenon will be discussed, especially in terms of rethinking, redefining, and redesigning the organization of work in terms of the nature, content, and responsibilities.

This paper purposes to investigate the adoption and the implementation of remote working, to identify the major factors encouraging this new form of work, by clarifying its nature and characteristics. Using the multiple case methodology, the study provides evidence from the Italian public sector where several experiences were investigated within the socio-technical system (STS) approach.

In the following sections, a literature review on smart working as a socio-technical system is provided. The research question and method of analysis are sketched out and the framework of analysis is described by considering the most common variables from the STS approach. These variables are used to study how smart working adoption is evolving because of the exogenous tension caused by the Covid-19 pandemic. The Italian Public Administration is the study domain. The analysis refers to the period from January 2020 to June 2020 and focuses on several significant

Italian PAs. Individual diaries from PA managers, testimonials, interviews, and documents were collected, codified, and organized to unveil categories related to the STS approach. In Section 5, the theoretical and practical implications are discussed. From a research point of view, the paper demonstrates that, by adopting a more evolutionary perspective, the STS approach can be used to reveal a list of critical aspects and interdependences between social and technical features that may improve innovation and change management. From a managerial point of view, the paper underlies the need for a new set of norms and policies for PA managers. The conclusions are reported in Section 6.

2. Literature review

2.1 Smart working: state of the art and changes in times and methods

Over the last decades, the prefix "smart" has gradually been recognized as a term to indicate the innovative use of digital technologies in many business areas, including remote working. Several studies propose conceptual frameworks that highlight the semantic differences between the expression teleworking, flexible working, smart working, and agile working (Grant, 2020; Torre & Sarti, 2019; Yu, Burke, & Raad, 2019; Bednar & Welch, 2020; Rymkevich, 2018; Sullivan, 2003). As described in Cuel, Ravarini & Varriale (2020):

- Teleworking or remote working refers to the ability to work in a place other than the company office, such as another office, coworking areas, home, parks, or any other place with the possibility to connect online on various digital platforms which guarantee communication and coordination processes (e.g., Skype, Hangout, Slack, Hibox, Asana).
- Flexible working refers to flexibility in locations, hours, and/or contracts. It may include teleworking, compressed weeks, part-time, project work or other contractual forms.
- Agile working refers to several practices that allow organizations to optimize work by emphasizing proactivity, agility in managing activities and coordinating with others.
- Smart working – despite being used mainly in Italy to refer in general to tele/flexible/agile working – refers to a new approach for designing work to address the efficiency and effectiveness of activities through the combination of flexibility, autonomy, agile collaboration and coordination, and optimization of work tools. Bednar & Welch (2020) found that in smart working, organizations and workers are invited to substantially rethink their relationships by creating new jobs, acquiring new and more innovative skills (multitasking, virtual teamwork, etc.), more independently chosen spaces, hours and work tools, and acquiring greater responsibility for results.

The above-mentioned terms are still widely used synonymously in the managerial lexicon and organizational practices because of the lack of widespread shared best practices. Although the debate on teleworking, flexible, agile, and smart working remains open, most scholars recognize and outline the numerous associated advantages, especially its positive or negative effects on job satisfaction, work-life balance, empowerment, or productivity (Villani et al., 2021; Irawanto, Novianti & Roz, 2021; Wang et al., 2021; Vasiljeva et al., 2020; Bednar & Welch, 2020; Palumbo, 2020; Del Boca et al., 2020; Mas & Pallais, 2017). Zheltoukhova (2014) argues that flexibility, autonomy, and collaboration have been united by smart working approaches influencing working and relational dynamics, performances and working environments. Iannotta and colleagues (2020:4) identified three main categories of smart working impacts:

1. Changing behaviors: people in any organizational setting have to radically change their observable, visible, verbal, and nonverbal behaviors into more digital skills, empowerment and autonomy, outcome-focused approaches, flexible time and space to work, trust, and collaborate.
2. Creating shared meanings in change management processes: smart workers, especially leaders, have to activate a process of sense making, sharing meanings related to the new way to work.
3. Integrating physical and technology-mediated interactions: digital technologies impact work relationships, especially in terms of more flexible work activities, collaboration and knowledge sharing among employees.

These three categories can be used to systematically understand the phenomenon, but further investigation is needed to identify specific critical variables and contextual factors related to smart, agile, flexible and remote/tele working (Bednar & Welch, 2020; Torre & Sarti, 2019).

Socio-technical systems (STS) have been proven to be effective approaches to understand the pre-conditions for the successful adoption of smart working (Bednar & Welch, 2020; Sony & Naik, 2020). An STS approach should be promoted in any organization to achieve joint optimization between various organizational subsystems, overcoming the tradeoff between technical and social elements. In other words, organizations should design the socio-technical architecture of smart working by taking into account both the technical and social dimensions, namely the impact of technologies on people, tasks, processes, culture and organizational goals. Thus, STS can be used to identify the key variables to successfully implement smart working.

2.2. The application of the STS approach to smart working

The evolution of remote work practices, especially smart working, briefly described above, provides an exemplar use case (perhaps the most representative during the coronavirus pandemic) of organizational change driven by technology. The literature on this topic is very broad but still rests on an established basis of studies carried out long before the advent of the internet. Recently, Pasmore and colleagues (2019) reviewed the progress of the research in this field and concluded that, in the present times of social and technical disruption (possibly made even harsher by the

pandemic), the principles of STS are a compass to interpret the transformation of organizations. Similar considerations developed when adopting the lens of the fourth industrial revolution (Margherita & Braccini 2020): the changes synthesized in the concept of Industry 4.0 find appropriate representation in *"considering the socio-technical systems impact on people, infrastructure, technology, processes, culture and goals"* (Sony & Naik, 2020: p. 1). Bednar and Welch (2020) also suggest progress towards Industry 5.0 where technological and social systems work together in complete harmony to allow the delivery of personalized mass customization of products and services. Purser and Pasmore (1993) had shown the applicability of STS to non-routine knowledge work, so leveraging this and other fundamental research, Bednar and Welch (2020) proposed extending the result of the research using STS for Industry 4.0 to knowledge-intensive activities, and more specifically to smart working.

In smart working (SW), the worker is seen as a provider, located in non-predefined places, of a service delivered at times that change over time, and who operates in a continuously evolving relationship with the organization. Coherent with this definition, SW is claimed to be based on three fundamental pillars (Raguseo, Gastaldi & Neirotti, 2016):

- The social dimension, regarding the human resource management practices and the behaviors of workers within organizations.
- The technological dimension, referring to digital technologies that enable employees to work remotely and finally.
- The physical dimension, related to the layout and ergonomics of the environment where the work takes place.

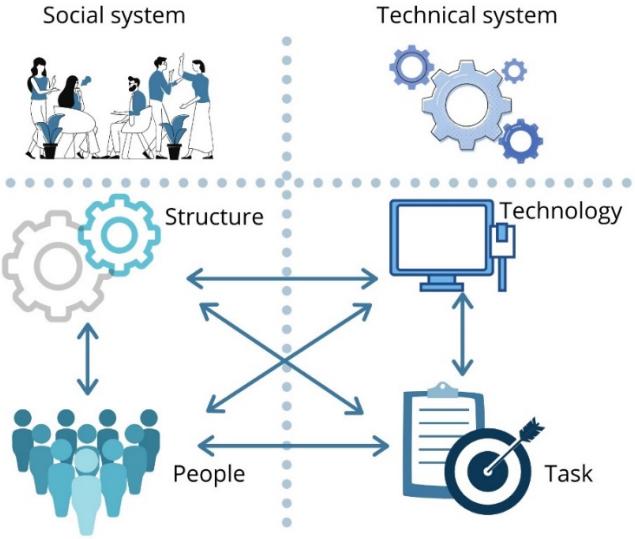
Hence, the conceptual framework of STS represents an excellent basis for interpreting SW as decomposable under both technical and social but strictly interdependent and complementary dimensions. Complementary refers mainly to communication processes, workflow management, co-creation of knowledge and competence, balance between private and working life, leadership oriented towards work flexibility and knowledge sharing, autonomy, proactivity, and workers' empowerment (Dossena & Mochi, 2020).

The STS approach is based on the assumption that changes require a human-centered design perspective since work systems require the participation of one or more individuals who interact with each other and/or with machines (Bednar & Welch, 2020). This approach, in a cross-disciplinary perspective, suggests combining the variables that are typically the subject of distinct disciplines (Mohr & van Amelsvoort, 2016). Figure 1 shows the typical representation of a STS (Bostrom & Heinen, 1977; Cherns, 1976; Cooper & Forest, 1971):

- A technical subsystem, including organizational variables interacting in business processes (subdivided into activities and tasks) converting inputs to outputs; and technological variables i.e., technologies, means and tools recognized as the main engine for implementing processes.
- A social subsystem, that includes human variables, related to the characteristics of the individuals who operate in the organizational system (qualification, attitudes, motivation, personality); and social variables i.e., the

set of interpersonal relationships that people create within the organizational system and formalize through the organizational structure.

Figure n. 1 - Socio-Technical Systems



Source: Cuel et al., 2020 (adapted from Bostrom & Heinen, 1977).

3 Domain of analysis and research method

3.1 Domain of analysis and research questions

The domain of analysis of this study is the Italian Public Administration, a field in which smart working had a major impact and was greatly regulated by the Italian Government during the Covid-19 pandemic.

Starting from the previous considerations concerning the lights and shadows of SW according to the STS approach, this study aims to identify the major factors enabling this new form of work and to investigate their nature and characteristics. More precisely, this paper addresses the following research questions, in the context of the Italian PAs:

- What are the most relevant critical variables (social and technical variables) affecting the implementation of smart working?
- Leveraging on these variables, how should the organization of work be rethought, redefined, and redesigned, with regard to its nature, content, and responsibilities?

This study aspires to exploit the STS approach – beyond its traditional and static application – as a lens to read and understand the dynamics of SW adoption and spreading. Therefore, third research question is addressed:

- What are the essential stages of the evolution of SW within the organizations and how the emergency of the Covid-19 pandemic affected such evolution?

3.2 Method and sample of analysis

A multiple case study is conducted in line with Eisenhardt (1991) and Yin (2009; 1984). The data collection refers to the diaries written by three Italian PAs between February and April 2020.

During the pandemic, several PAs were asked to compile a diary about the introduction of SW. These diaries were entitled "Diari Covid-19" and published on the periodic journal "Risorse umane nella PA" n. 3 (Authors, 2021). Heads of staff and IT executives were asked to describe examples and experiences of what was done before, during, and immediately after the first wave of the covid pandemic (during spring 2020 in Italy). The administrations involved were the Municipality of Brescia, INAIL, and the Union of Municipalities in the Bassa Romagna (the southern part of the Emilia Romagna Region). Whilst these institutions differ in size and institutional characteristics, they had all started to adopt remote and smart working as early as 2019. These first pre-pandemic experimentations were key in the effective adoption of SW, albeit under emergency conditions. To check the validity of data, the diaries were triangulated with official reports, and press reports in accordance with the classical guidelines of qualitative research (Yin, 1984).

Each transcript was highlighted and coded using Nvivo software. The emergent key themes from the diaries were categorized into codes. After the analytical process, agreement was reached regarding the main codes and their connection with the core components of the STS approach.

3.3 Domain of study: Italian PAs from Jan 2020 to June 2020

Italy was chosen as the research context mainly because it features a notable presence and influence of PAs that still display a slow shift to digitalization, including the adoption of innovative and much more flexible practices for working. The former very complex Italian regulatory system on agile and smart working in the PAs had been radically improved: in 2015, Law 124/2015 (art. 14 Promotion of the reconciliation of life and work times in public administrations) encouraged PAs:

- to experiment new forms of working such as teleworking, and flexible working to achieve a better work-life balance;
- and to adopt organizational procedures aimed at measuring the achievement of organizational and individual objectives and performance.

In 2017, under the DPCM no. 3/2017 and Law 81/2017 (Articles 18-24), new guidelines were introduced to promote the reconciliation of employee life and work time, and to encourage flexible delivery in the times and places of subordinate work. In 2020, further legislative interventions (DPCM 01/03/2020; DPCM 11/03/2020; D.L. 18/2020; Law 77/2020; Law 27/2020) radically forced PAs to broadly adopt remote working through the introduction of simplified procedures.

In Italy, tele-flexible-agile-smart working in PAs registered an exponential increase from 1.7% of personnel in agile working in January 2020 to 56% in the first month of lockdown (March 2020), to the maximum peak of 64% in May 2020 (87% for central administrations decreasing to 46% in September 2020[**]. At the same time, the level of digitalization of the PAs grew considerably: at the end of 2020, 87% of executives had a digital signature, staff made use of 60% of completely digitalized procedures, and in 70% of PAs, employees had acquired new digital skills. Employees were more empowered and results oriented in 48% of organizations.

Central entities measured peaks in agile working of around 86% but local authorities saw the spread of agile working only for an average of 47% between March and July to then stabilize at 31% in September.

4. Results and discussions

By observing the evolution of remote working in the Italian PAs through the lens of the STS approach, its main components can be recognized and located in the four quadrants of the framework. In the following sub-sections, these components are analyzed and discussed. Only a few paradigmatic examples are reported since this activity constitutes an exploratory phase of the study. Further research with a more in-depth qualitative analysis through *ad hoc* interviews is planned for the second half of 2021.

4.1. Social variables: structure

Smart working requires a radical change, one that should drive institutions to move from a logic of fulfilment towards a logic of service. In this perspective, the objective of smart working is to enable workers to reconcile work and private life, encourage productivity through more efficient processes, and reduce the time associated with commuting. To protect workers an agreement between the employee and the employer is required regarding:

- the alternation of work outside the company boundaries and presence in the workplace;
- the direct interaction with superiors and the socialization with colleagues at certain times of the day;
- the compliance with the maximum limit of daily working hours in consideration of weekly rest periods;
- the right to disconnect from work electronic devices;
- the control and evaluation of the workers aimed at measuring their results.

In many organizations, in particular in those where SW had benne introduced in 2019, the pandemic emergency accelerated the processes of internal socialization. Managers stated that these socialization processes had already existed thanks to the

[**] http://www.funzionepubblica.gov.it/articolo/ministro/04-12-2020/pa-ecco-i-numeri-del-monitoraggio-sullo-smart-working Access online on December 20 2020).

sponsored national project known as *Lavoro agile* (agile work). In all these cases, the emergency facilitated the formalization of agreements between organizations and workers without officially negotiating with the trade unions. Paradoxically, the lack of rules facilitated and streamlined the implementation process of SW, enabling people to undertake working dynamics and the organizations to deal with their own self-regulations.

For example, in the case of the Union of Municipalities in the Bassa Romagna, interviewees declared: "*The organizational capacity to innovate was certainly the strong point that allowed us to cope with the entire emergency phase. A capacity expressed through three transversal skills to the entire technical structure: the ability to collaborate, to experiment, and to integrate*".

These skills were demonstrated through the strengthening of the ability to deal with problems in an anticipated and shared fashion. Technically speaking, they stated that: "*The problems were addressed at 360 degrees by comparing and integrating the contributions of different professionals, and the decisions were made following the logic of appropriateness to a context that was changing day by day. The mechanisms already in use for the exchange of points of view, such as the Committee of Executives in the Union or the managers in the Municipalities, were extended to include those who had fundamental skills to deal with the emergency, such as the head of civil protection, competent doctors, and the head of health and safety. We were able to create a synergy from among the heterogeneity of the points of view to develop the most suitable and creative solutions*".

The Union of Municipalities in the Bassa Romagna managed the emergency from the outset from both a managerial and a procedural viewpoint: the leitmotif of their actions was knowledge sharing of both the technical and the political perspectives in the adoption of organizational measures and procedures aimed at protecting the health and the safety of employees and citizens.

INAIL experienced the emergency as an assessment phase of practices and policies previously adopted for remote and agile working. In the critical phase of the pandemic, the INAIL IT Division radically reduced employees in the workplace from 700 to 15 (daily average). In this situation they activated new services to support both companies and workers affected by Covid-19. As the manager wrote, "*It is quite clear that, to be efficient and effective, a completely new working context cannot be improvised. Moreover, a switch from traditional towards remote work requires adequate preparation and a long-term implementation process. Not surprisingly, this path had already been outlined in 2017 when defining the three-year (2017-2019) IT plan for INAIL. This plan, together with an overall adaptation and renewal of the information and organizational systems, predicted new agile working methods. The speed with which it was possible to switch to a very generalized adoption of remote work was therefore enabled by the setting up of an 'Lavoro agile (agile work)' project, the experimentation of which was launched in 2018, involving around 360 people*".

In this case, technology became a trigger of innovation since, "[…] *an adequate and virtualized governance capacity was developed with the provision of a dashboard that managers could use to monitor (and not control) how people are working within the digital ecosystem of the Institute*".

On September 1, 2019, the Municipality of Brescia activated the first sixteen smart working projects as part of the national project *Lavoro Agile per il futuro della PA* (Agile work for the future of the PA). The Municipality had joined the project in 2016 and had taken three years to organize the adoption of remote working. The main goal of the project was the conciliation of the work-life balance and a greater inclusion of women. As often happens in many Italian local governments and PAs, part-time is preferred by women since they are forced to seek a balance between the need for income and that for family care. In Brescia the analysis of the data indicating the type of hourly part-time chosen and the reasons for requesting the part-time showed the same trend. Thus, in spring 2019, the processes for the adoption of remote working were organized and the preliminary stages were as follows:

- the study and the approval for implementing regulations by the Human Resources Division;
- the organization of training sessions for executives (30 executives) and other organizational roles (80 middle managers);
- training meetings with the employees in the various workplaces with IT, administrative, and technical professionals.

From a strategic point of view, the fundamental factors that enabled the successful adoption of SW in the Municipality of Brescia can be summarized as follows:

- the enhancement of the role of the *Comitato Unico di Garanzia (CUG)*, a committee formed by trade unions and institution representatives to promote equal opportunities, enhance workers well-being, and act against any type of discrimination at work;
- the strong immediate synergy between the Human Resources Division and Planning and Control Office;
- the involvement of trade unions in the process who strongly endorsed the project;
- and the trade union confrontation, which took place quickly and with a good degree of shared views.

From an operational viewpoint, one of the enabling factors was that the remote, agile and smart working activity had been addressed at individual level, the project being called the "individual project of agile work". In detail, an articulated procedure was carried out in which the interested worker – assisted by an expert – proposed her/his own project. This project was then verified, revised (in some cases), and accepted by a special committee made up of technical experts and managers. The agile work projects were then constantly monitored and assessed.

In the emergency phase, the Municipality went from 16 to 811 workers in remote working (1082 entire staff). Even in the pandemic phase, the logic already experimented was maintained even if contextualized to the situation.

As a result, a working group consisting of six IT experts, an administrative coordinator, an expert in agile work, and an IT officer (an experienced systems engineer) was promptly activated. The working group defined the criteria to identify the professional profiles and workers to be placed in agile work according to priorities and needs. These criteria were shared both with the top managers and all other manager and service executives. A priority was established for workers with a

more compatible professional profile, based on the condition of greater fragility and needs linked to the state of health, presence of underaged children at home, need of public transport to commute, and so forth. The working group identified and shared an intervention methodology and the operational tools necessary, for example:

- the creation of an online form for the collection of data from the employees;
- these data were used to establish the order of intervention and to configure the technical settings;
- the improvement of Virtual Private Network (VPN) connections with the purchase of new IT devices and in-cloud service licenses.

All those who held the most suitable professional profiles for agile work were enabled to work remotely from home.

4.2 Social variables: people

The adoption of smart working is associated with the recognition of (Bednar & Welch, 2020; Sarti & Torre, 2017):

- greater control of workers over their activities;
- the reduction of phenomena of alienation and routine at work;
- the creation of a more articulated and creative professional network;
- and job enrichment and greater involvement in work activities (empowerment).

The Union of Municipalities in the Bassa Romagna developed an ad hoc project that received regional funding for training activities and technological changes. According to the testimonials, "*We believe that the innovation managed in an emergency phase should be capitalized in the institution. Moreover, Smart Working should be considered as a new model of work organization based on trust and less on control, a goal-oriented approach and less task fulfilments, restoring flexibility to people, higher autonomy and empowerment in the choice of spaces, times and tools, and a greater responsibility and commitment to the results. As a consequence, it requires organizational changes and training investments in the normal phase (after the pandemic emergency)*".

At the end of the first pandemic phase, INAIL conducted a survey in collaboration with Milan Polytechnic University within the Smart Working Observatory. This provided interesting results: almost 60% of the participants believed that the remote work completely ensured the continuity of the working activities highlighting, among the best-evaluated aspects, a high level of responsibility and goal-oriented approach, and the effectiveness of team coordination and work, autonomy, knowledge sharing and ability to react in a short time to upcoming requests.

According to the Central Director of INAIL (based in Rome), the greater virtualization and delocalization of work require innovative leadership models in which managers are called to identify new organizational solutions and practices capable of managing change, redesigning the forms and methods of verification, and monitoring work. Employees should work for objectives instead of tasks and need to learn how to report the results, upgrade digital skills, ensure effective interactions with colleagues, and improve soft skills of communication, and time management (Authors, 2021).

The Municipality of Brescia obtained the following advantages in the experimentation of agile working (Authors, 2021):

- reduced stress levels caused by commuting times and difficult relationships in the offices;
- improved peace of mind and comfort due to hourly flexibility, better conciliation of work-life balance and medical requirements;
- and higher savings in travel costs.

New skills are increasingly needed to properly organize work, communicate with other colleagues and superiors, and work in teams for the provision of services or the implementation of innovative projects. Such activities must be developed using virtual teams, building spaces, cultivating stable connections between colleagues, and effectively managing participation and communication.

According to the testimonials, in the post-emergency phase the Municipality, "*is focusing on the search for effective strategies and methodologies for managing and stabilizing agile work in large numbers. In particular, we are thinking about programming and control procedures, and refining the tools we set up quickly at the beginning of the emergency. In fact, this issue was immediately overwhelming: middle and top managers are not used to coordinating remote workers and employees not used to working alone at home without a daily or periodic 'handover'. Today the challenge seems to have shifted to this aspect and we are wondering about:*

- *how to empower people in agile labor?*
- *how to work alongside the management board to develop more structured and concrete approaches, methods and tools for planning and control?*
- *how to improve and sustain organizational trust in remote or distance working environments?"*

However, the Municipality of Brescia believes that in terms of organizational structure, the accelerated experience of agile work during the pandemic has allowed it to:

- Enhance both time and availability of employees, allowing the freeing of "mental" energies to propose new services or rethink innovative ways of working and relating to colleagues.
- Launch projects for the elimination of the backlog of workloads.
- Increase workload in some offices and implement a significant decrease for others. Many agile workers with reduced work intensity spontaneously made themselves available to support offices in high workload sectors, such as the IT Services, Cemeteries, and Social Services. These practices facilitated virtuous organizational flexibility that forced the Human Resources Division to manage and coordinate the temporary mobility of staff between organizational offices, units, divisions, and functions.
- Improve the adaptability of workers to remote team-works.
- Improve the internal communication because of the positive experimentation of new forms of collaboration.
- Empower the self-training and online training of employees.

4.3 Technical variables: tasks

Smart working also implies radical changes in the organization of the work in PAs, in the articulation of the tasks and in their management, as well as in the operating models with which tasks are implemented by workers.

Following the strong drive to digitalization generated by the pandemic, researchers and executives have been questioning how business processes should be redesigned to make remote work more effective. Various issues to consider are (Schenk & Dolata, 2020; Amirul & Mail, 2020):

- To redesign the articulation of the set of tasks of a process and their distribution among the individuals involved.
- To take into account the constraints on interpersonal communication caused by the physical distance between individuals, the distribution of tasks, the increase in autonomy in the management of activities, the temporal distribution of the tasks of each individual to ensure everyone a good balance between private life and work, the management of diversity and disabilities.
- To favor the management of workspaces in the domestic arena.
- To reduce the shortage of digital skills to manage increasingly complex technological tools.
- To manage communication and the sense of belonging of workers.

PAs should develop abilities in the design, planning and control of objectives (Mergel, Ganapati & Whitford, 2020; Marović & Bulatović, 2020).

According to the Union of Municipalities in the Bassa Romagna, the emergency approach focused on health prevention, despite having changed habits and operational practices, has not yet achieved an effective organizational change. The manager reported, "*The change was sudden and intense, accompanied by a situation of uncertainty and a change in habits, including those of the individuals. Personal life and working life often overlapped, and digital tools have become, for some, the only contact with the outside world. Employees were catapulted into a new way of working without having had the time to provide them with adequate training. This is a gap that will be filled in the consolidation phase of smart working, with the aim of introducing a new organizational paradigm, a model projected towards results and not procedures, aimed at creating added value and enhancing work […]. However, the fundamental critical issue for HR managers remains the primary competence to manage relationships, doing it remotely certainly requires new skills and tools to learn and experiment*".

In INAIL, the Head of IT identified organizational dynamics that needed to be supervised. He wrote, "*In a context that sees greater virtualization and relocation of work, it will be necessary to prepare managers for the new roles. Smart working programs must be addressed correctly through an adequate use of a different leadership model, in which managers are called to identify new organizational solutions and practices capable of managing changes and redesigning the forms and methods of work monitoring and assessment. In the relationships between managers and employees and vice versa, this translates into a greater ability to work for objectives rather than deal with procedures and tasks, report on results, and strengthen the employees' digital skills ensuring effective interaction with colleagues. Clarity is required in good*

communication when sharing and defining the assignments and the objectives to achieve. New abilities are required to define and plan tasks and activities, scheduling them, and optimizing time and process management. Finally, abilities to deal with digital meetings and feedback management are required."

These aspects, which in his opinion will allow the creation of synergies between technologies and organization, are all in progress and in part bely the rhetoric that radical changes are developed in a short time.

From a practical viewpoint, since INAIL was involved in the management of the pandemic at a national level, new services were activated that radically changed the jobs and the procedures workers had to deal with. In particular, "*the user assistance channels for the management of user's requests were strengthened, both in telematic and telephone methods. The procedure to book appointments via telephone with officials of the local offices was optimized. Furthermore, the new telematic services improved a lot allowing users (injured workers) to directly and rapidly check the most updated information about their accident and their occupational health practices as well as numerous other personalized information. The telephone or telematic triage service was activated, with which the users were directly contacted by the staff of the territorial office for the management of the Covid-19 Injured Identikit card*."

In the Municipality of Brescia, although general satisfaction with the agile work experience exists, some important critical organizational issues have been raised. The manager in charge wrote: "*First of all, we realized that we lack organizational analysis tools, which would have been useful for planning and better supervising remote work. […] Having a structured and shared organizational analysis of processes, roles and skills would have facilitated the reorganization of work remotely. The lack of such tools has generated great difficulty in planning and monitoring agile work and has shown how far we are from an approach to work by objectives*."

The second criticality is that "*there was an initial resistance to agile work and an inadequate level of digitalization of some management figures. The management of the Municipality had to deal with a revolutionary change imposed by external factors in a sudden and unexpected way: it is necessary to focus on accompaniment and continuous training strategies that can support managers and provide them with a new awareness, new methods and management strategies for our services and the people active in the services*."

Finally, there are pitfalls underlying the introduction of agile work, already evident in the experimentation phase, and others linked to the emergency. The elimination of the freedom to choose the work location and the obligation to work entirely from home on a weekly basis introduce new risks and possible disadvantages for the worker.

The following possible risks in the implementation of agile work have been identified within the Municipality (even in the testing phase):

- possible increase in the gap for employees with IT skills deficits and/or disabilities;
- use "to stay home" as a benefit with the consequent risk to organizational justice between workers, some who may perceive this benefit as unequal;
- use as a punishment with consequent segregation effect;

- use as a teleworker, diminishing its potential;
- use as a piece of work instead of work for shared objectives;
- worsening of the climate if organizational trust is not built;
- and isolation.

4.4 Technical variables: technology

From the viewpoint of the structure of IT systems supporting smart working, a central issue is to guarantee workers easy access to the systems. This can be achieved with technological solutions such as the integration of platforms and the improvement of the user experience of software applications, or with organizational solutions such as the provision of help desk services (Davis, 1993).

At the individual level, the choice of technological equipment should primarily take into account the different familiarity with digital technologies and the varied technical skills when using software applications. Therefore, a one-for-all model could prove highly inadequate (Hitchcock, Laycock & Sundorph, 2017). Regarding the hardware infrastructure, during the pandemic organizations were mainly concerned with providing employees with a personal computer, a mouse and a keyboard.

Technically the introduction of SW in the Union of Municipalities in the Bassa Romagna occurred following the introduction of the Digital Agenda which had already provided for the adoption of suitable solutions prior to the Covid-19 emergency phase. In addition to the operational support needed to introduce new remote working methods, such as organized online meetings (videoconferencing between executives, among members of the Boards, Municipal Councils or Union), continuous assistance was provided to employees who were experiencing a new form of work.

The INAIL Head of IT wrote that the digitalization process was a "*complex, articulated and personal 8-year path in an organization that in recent years has significantly rethought its operating model, its service model, and the workers' skills and roles. The story [he mentioned] has been long and started with an alternative choice:*

1. *keeping the organizational model of substantial full-outsourcing unchanged (in 90% of the areas) or;*
2. *undertaking a profound process of organizational and process reengineering (in compliance with the international standards - ITIL, COBIT, PMI, UNI-ISO, etc.,), the redesign of the service model and the role of the management board within the institute. In terms of governance, the management board needed to redefine the ability to give direction and address the institutional strategy, the need to implement procedures of planning and control, and of internal and external resource enhancement."*

During the pandemic emergency, INAIL managed to protect its employees by allowing them to work from home using individual tools (the new digital workplace), collaboration and communication tools (Teams and the entire Office365 suite) and providing access to corporate applications via VPN or Virtual Desktop Infrastructure (VDI). At the same time, video tutorials on the utilization of the tools (in particular

Teams) were provided to train the staff and provide useful problem-solving methods and insights.

The new digital workplace (currently consisting of a tablet or PC, a smartphone to allow connectivity if not present at home, headset and virtual disk space in the cloud) has replaced - for most INAIL staff - the traditional and fixed workstations thus developing a work setting coherent with the innovation strategy planned by the institute and the transition to a smart working perspective. Together with the ability to operate remotely, however, it is essential to develop an adequate "*virtualized*" governance capacity. For this purpose, as mentioned above, a dashboard was designed and made available to the management board, to monitor and to keep in touch with people working within the digital ecosystem of the Institute.

5. Theoretical and practical implications

5.1 An evolutionary approach to a STS: the phases of PA smart working

By analyzing the above-mentioned experiences under a time span lens, it is possible to identify the following phases: an *experimentation phase* (or *phase 0*), pre-pandemic; a *crisis phase* with the massive introduction of new tools, a *resilience phase* involving partial introduction of new methods to adapt the organization to the tools, and finally the *new normal*, a post-emergency phase when a process of consolidation takes place. In each phase of the pandemic, common elements have emerged in the PAs under study.

Figure n. 2 - The evolution of SW during the Covid-19 pandemic: a time span lens

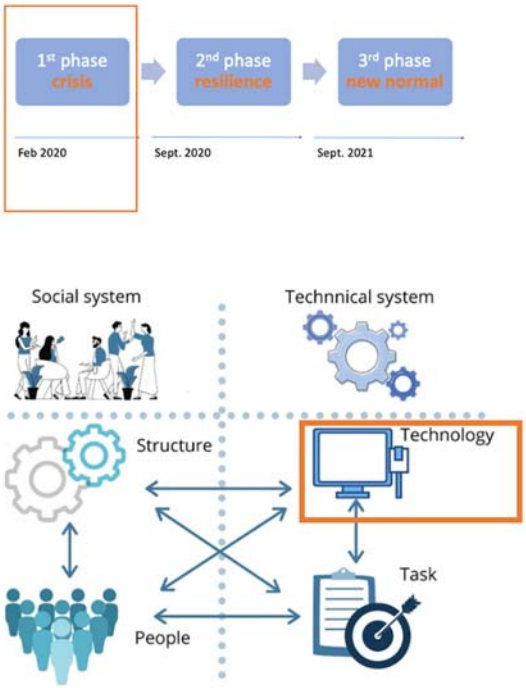
Source: authors' elaboration.

1. The experimentation phase: the process of innovation is very slow as the experience requires the consideration of all the aspects (technical and social), discussions will emerge to protect the status-quo and the workers' right, and the debate between innovators and unions is mainly oriented on social and personal variables. The experimentation usually involves a very limited number of individuals, who are voluntarily willing to innovate and to test the new solution. Changes are incremental and usually refer to a small and non-significant part of the whole organization such as a few individuals, limited changes in the tasks, and so forth. Technology is an

enabling factor, but it is leanly adopted and – most of all – the effects of its introduction are controlled and delimited.

2. The crisis phase: new tools and methods are massively introduced (Figure 3.). The innovation is mainly driven by the technological variable. The social and individual variables formally and substantially take a back seat, and task changes are limited to only where there is a need for new services for citizens/users. The attempt is to replicate the previously well-established behaviors in the new technological settings. Tensions may occur because the new settings have generated a strong change in the work-life balance and in workers' habits. The more autonomous and empowered workers realign their job, adopt tools to measure and assess the activities, and change the nature of job, but the majority maintain the well-established behaviors.

Figure n. 3 - The evolution of SW during the Covid-19 pandemic: the crisis phase



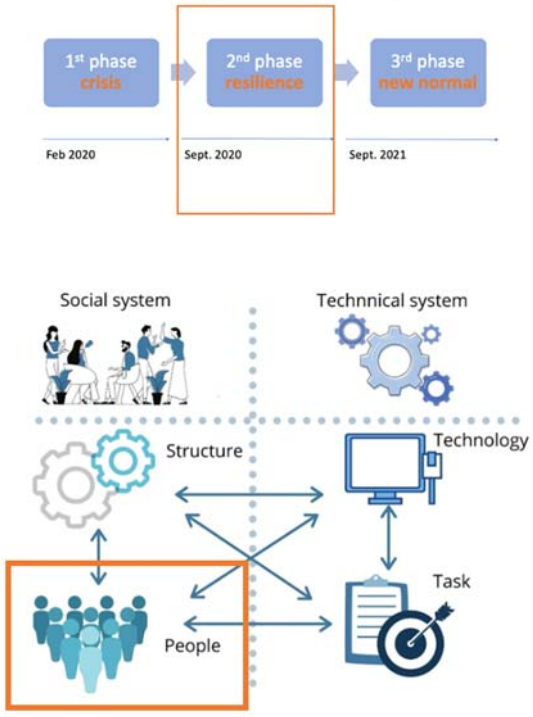
Source: authors' elaboration.

3. The resilience phase: workers get used to the digital technology and start to correctly use and personalize the new IT devices (Figure 4.). In organizations where the *Lavoro Agile per il futuro della PA* (Agile work for the future of PAs) project has already been experimented, the impact of the negative effects of the emergency, namely the crisis period, has been dramatically reduced. On the other hand, in the PAs where no tele/smart

working project had been introduced, the emergency phase was radically prolonged, and the resilience phase started very late and continued until September 2021. During the resilience phase, the phenomena of alienation at home lessened, workers began to use more articulated and creative professional networks, and to improve their involvement in empowered working activities and enhanced jobs.

4. The new normal phase: technological variables are consolidated but a stronger need for social aspects is required (Figure 5.). The development process can take two directions: keep the changes and improve the social dimension, and/or go back to the previous pre-emergency state recalling and/or reintroducing pre-emergency behaviors, attitudes, incentives, tasks, processes, and so on. In other words, in this phase the PAs start to measure changes and improvements in processes, organizational cultures, leadership, etc., which were absent in the resilience phase. As depicted in various testimonials, the choice to keep the changes and improve the organization seem the most challenging since workers, at all levels, need to learn a new form of work organization.

Figure n. 4 - The evolution of SW during the Covid-19 pandemic: the resilience phase



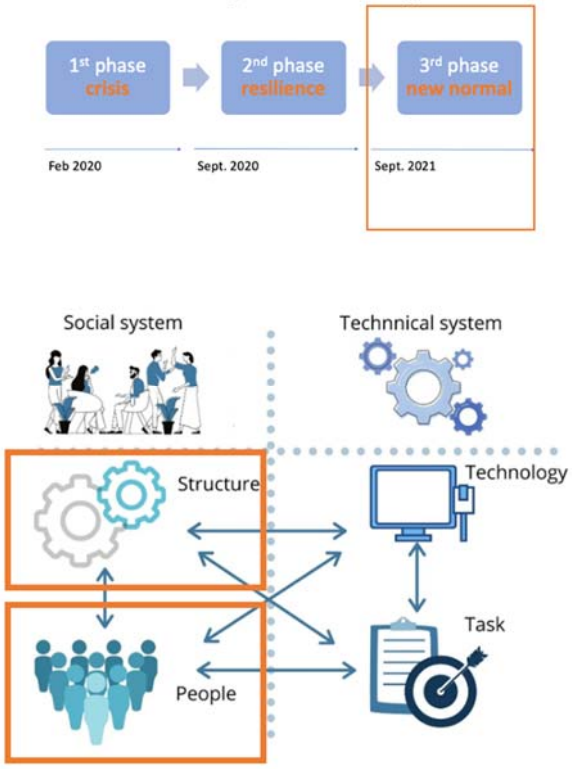
Source: authors' elaboration.

In conclusion, PA institutions like those analyzed have been able to consolidate their knowledge because of their pre-pandemic experimentation which:

- successfully introduced technologies enabling the organization and the workers to accept the new forms of work;
- created a situation of internal consensus regarding individual and social variables;
- and acts in a protected environment with limited effects on the organization, thus becoming best practices which are easily exportable to other PAs.

These experimentations allowed the institutions to adequately align their various socio-technical variables, an outcome that might have been impossible in an emergency and on a large scale.

Figure n. 5 - The evolution of SW during the Covid-19 pandemic: the new normal



Source: authors' elaboration.

5.2 Practical implications

Despite the impressive acceleration towards smart working caused by the Covid-19 pandemic, there is still strong resistance to change by PAs, especially regarding the deep-rooted orientation to a particular method of organizing work.

However, the presence of a powerful external contingency factor, such as the pandemic emergency, forced the institutions to drive the adoption of new technological tools and implement from scratch a new form of a remote, flexible, agile, and smart working environment. As often happens, a crisis represents a trigger for

radical innovation. Yet, such a radical change was made possible only during the height of the pandemic and, only in specific and limited contexts of the administration services. This implies that radical innovations in a PA are very difficult, not only in relation to its bureaucratic characteristics, but also their multi-service structure with generally rather ambiguous objectives.

Although significant resistance to the profound organizational changes is apparent, PAs have adopted smart working as a new form of work organization oriented towards flexibility, autonomy, and empowerment. It is important to notice that the change process is still ongoing and is extremely complex. A good deal of work is still required to redesign the set of tasks and processes, and their allocation to the individuals who now are/may be working in a completely different setting. To this aim it is not possible to prove a general recipe, but this study unveiled that the following aspects should be taken into consideration:

- the constraints on interpersonal communication processes and behaviors;
- the increase in autonomy in the management of activities and the need of worker empowerment;
- the temporal distribution of tasks to ensure a proper work-life balance;
- diversity and disability in a remote working setting that should protect the weaker workers;
- the management of workspaces at home;
- and the development of new practices, rituals and habits that enable innovation, the sharing of value and organizational culture, the development of the sense of belonging and the affective commitment of workers.

Legislation on the one hand and managers on the other do not enforce the need to change the traditional and binding practices of the work management models currently in use in in PAs, such as:

- adopting strict standards relating to hours and places of work;
- maintaining motivational and remuneration mechanisms not based on results;
- preserving traditional career development policies which are not oriented towards productivity objectives and performance;
- and lack of metrics to systematically measure work and performance.

6. Conclusions

This study shows the effectiveness of the socio-technical system approach in supporting the understanding of the complex phenomenon of smart working through a multidisciplinary perspective. The application of the STS approach, allowed to read the qualitative data from three case studies - collected along the progress of the pandemic - not only to identify the organizational variables involved in the adoption of remote working, but also to track the evolution of these variables. This “dynamic use” of the STS model proved effective in recognizing and characterize the four essential stages of development of the transition: from the experimentation of remote

working practices to a quasi-mature adoption of smart working in the so-called "new normal".

Like any attempt at modeling, STS is not exempt from limitations. The resistance to change at the individual and organizational level observed in the PAs under investigation appears related to the fact that the technology and task components in these contexts show blurred borders and appear at least partially embedded in the people component. The limited explanatory power of the STS model, while highlighting the need of further investigation to fully understand smart working in PAs, suggests addressing the research efforts towards a review of the whole STS approach.

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