

Smart working in the Italian Public Administration: a Socio-Technical Analysis

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Abstract

In the last two decades, digital transformation is significantly changing the relationship between organizations and their workers, introducing new ways to organize the job, like remote working, responding to 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 named as Covid-19), countries have adopted policies to limit the mobility of people for containing the contagion, favoring a large acceleration of remote working. Around 35-40% of employees in developed economies has been working at home some or most of the time. Adopting the socio-technical perspective, this paper aims to shed some lights on the impact of remote working (often-called agile or smart working) on the Public Administrations (PAs) performance, organization, job design, task management, workers' behavior. The focus of the study is on the Italian PAs giving insights and evidences from some experiences through a multi case study methodology.

Keywords: smart working, public administration, socio-technical approach, people, processes, organization, technology.

1. Introduction

Over the past two decades, remote working, conceived as working elsewhere than at the office (Krishnakumar & Choudhury, 2014), has been representing a widespread practice. Starting from the 90s the innovations of digital technologies have allowed many organizations to introduce flexibility in managing the time and geographical location of the work, defining and introducing organizational practices referred to as teleworking (Niles, 1998). Following the Covid-19, the percentage of remote workers in Public Administrations (PAs) has increased exponentially estimating that more than 40% of the workforce will continue to work remotely in 2021. However, numerous doubts and criticisms exist about whether PAs are carrying out remote working practices effectively and in a profitable manner.

Adopting the socio-technical system (STS) perspective, this paper aims to investigate the adoption and the implementation of remote working in the Public Administration (PA), to identify the major factors encouraging agile working and clarifying their nature and aims. Using the multiple case study methodology, the study provides evidence from the Italian public sector, where few experiences have been investigated according to the STS approach.

In the following sections we will provide some data about the state of art of smart working, and how it has been changed in the last years, we will sketch out the research question. Then the framework of analysis will be described, taking into consideration the most common variables of STS framework of analysis. These variables will be used to study the process of digital transformation and how remote working adoption is evolving due to the exogenous tension caused by Covid-19 pandemic. The analysis refers to the period from Jan 2020 up to June 2020, and focuses on some significant Italian PAs. Individual diaries of PA managers, testimonials, interviews, and documents have been collected, codified, and organized according to the STS framework of analysis. From a research point of view the paper demonstrates that STS framework can be used to unveil a list of critical aspects and interdependences between social and technical aspects that enrich the model and improve innovation and change management in a more evolutionary perspective.

From a more practical point of view the paper underlies the needs of a new set of norms and policies for PA managers.

2. Smart working: state of art and changes in times and methods

Over the last decades, the prefix “smart” has been gradually recognized as a term to qualify the innovative use of digital technologies in many business areas, even 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, 2019; 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, park or any other place that has internet connections and online platforms (e.g. Skype, Hangout, Slack, Hibox, Asana) which guarantee communication and coordination;
- 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 refers to a new approach for designing work addressed to the efficiency and effectiveness of activities through the combination of flexibility, autonomy, agile collaboration and coordination, optimization of work tools. Bednar & Welch (2019) found out that with smart working, organizations and workers are invited to substantially rethink their relationships, by creating new jobs, acquiring new and more innovative skills (multitasking, virtual team work, etc.), choosing more independently spaces, hours and work tools, acquiring greater responsibility for results.

Unfortunately, the above-mentioned terms are widely used as synonyms in the managerial lexicon and in organizational practices, due to the lack of widespread and shared best practices. This paper wants to shed some lights on the real implementation of remote, flexible, agile, and smart working, identifying the critical variables for the management of organizational change in the PA.

3. The application of the STS approach to smart working

The evolution of remote work practices, described above, provides an exemplar use case (and probably the most representative during the coronavirus pandemic) of organizational change derived from technology. Indeed, the literature on this topic is very broad and still rests on mature basis of studies carried out far before the advent of the internet. Recently, Pasmore and colleagues (2019) effectively reviewed the progress of the research in this field, concluding that, in the current times of social and technical disruption (possibly made even harsher by the pandemic), the principles of STS represent a compass to interpret the transformation of organizations. Similar considerations mature adopting the lens of the fourth industrial

revolution (Margherita & Braccini 2020): the changes synthesized in the concept of Industry 4.0 find an appropriate representation “considering the socio-technical systems impact on people, infrastructure, technology, processes, culture and goals” (Sony & Naik, 2020: p. 1). Otherwise, already in 1993, Purser and Pasmore (1993) showed the applicability of STS to non-routine knowledge work. Leveraging on this and other foundational research, Bednar and Welch (2019) proposed to extend the result of the research using STS for Industry 4.0 to knowledge-intensive activities, and more specifically to smart working.

With 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 operates in a continuously evolving relationship with the organization. Coherently with this definition, smart working 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.

Therefore, the conceptual framework of STS represents an excellent basis for interpreting smart working as decomposable along both technical and social dimensions, strictly interdependent and complementary to each other. 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 change requires a human-centered design perspective, since work systems see the participation of one or more people who interact with each other and/or with machines (Bednar & Welch, 2019). This approach, following a cross-disciplinary perspective, suggests combining in a single representation the variables that are typically the subject of distinct disciplines (Mohr & van Amelsvoort, 2016). Figure 1 shows the typical representation of a STS and contemplates (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, relating to the characteristics of the people 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.

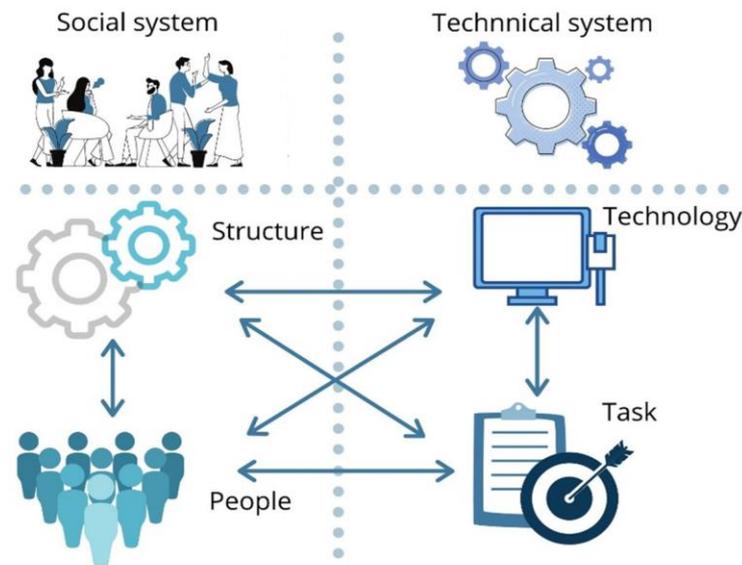


Figure 1. Socio-Technical Systems

4. The Italian PA case studies: from Jan 2020 to June 2020

Italy is chosen as research context mainly because it is characterized by a great presence and influence of PAs with a still slow digitalization including the adoption of innovative and much more flexible practices for working. Recently, the very complex Italian regulatory system on agile and smart working in the PAs has been radically improved. In 2015 a new Law 124/2015 (art. 14 “Promotion of the reconciliation of life and work times in public administrations”) spurred PAs:

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

In 2017, with the DPCM n. 3/2017 and the Law 81/2017 (Articles 18-24), new guidelines have been introduced to promote the reconciliation of employee life and work time and for encouraging flexible articulation 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) have drastically forced PAs to broadly adopt remote working through the introduction of simplified procedures.

In Italy, remote working (also called agile working or smart working) in PAs have registered an exponential increase passing 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 the 64% in May (87% for central administrations), up to 46% in September 2020¹. At the same time, the level of digitalization of the PAs has grown considerably: at the end of 2020, the 87% of executives has a digital signature, staff makes use of 60% of completely digitalized procedures, in 70% of PAs employees have acquired new digital skills. In the 48% of organizations, employees were more empowered and results-oriented.

Central entities have measured peaks in agile working about the 86%, local authorities have seen the spread of agile working only for an average of 47% between March and July for settling at 31% in September.

Despite this discrepancy, the working hypothesis underlying this paper is that the strong and accelerated diffusion of remote work structured as SW, during the emergency phase, unveiled those critical variables that in the PA may influence the diffusion of innovation and organizational change driven by technology.

For this purpose, in May 2020 some administrations were asked to make a diary about the introduction of SW between February and April 2020. Chiefs of staff and IT executives were asked to describe related examples and experiences what it was done before, during, and immediately after the first wave of covid emergency (Spring 2020). The involved administrations were the Municipality of Brescia, INAIL, and the Union of the Municipalities of the Bassa Romagna. While these institutions differ for size and institutional characteristics, they all – more importantly – had started to adopt remote and smart working already in 2019. These first pre-pandemic experimentations were key for them in adopting effectively the SW, albeit in an emergency form.

¹ <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).

5. Applying the STS approach to smart working: analysis and discussion of the Italian PA case studies

By observing the evolution of smart working in the Italian PAs through the lens of the STS framework, the four components described above can be recognized and in the following subsections we analyze and discuss each of them. Only 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.

5.1 Social variables (structure)

Smart working requires a radical change, which should push 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 reconciling work and private life, encouraging productivity through more efficient processes, also reducing the time associated with commuting. To protect workers, the weakest category, 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, considering 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 institutions, and in particular in the ones where SW was already discussed, developed, or introduced in 2019, the pandemic emergency has accelerated the processes of internal socialization. Managers stated that these socialization processes were already existing thanks to the project “Lavoro agile” (agile work), sponsored at national level. In all these cases the emergency facilitated the formalization of agreements between organizations and workers, without officially negotiating with the workers trade unions. Paradoxically, the lack of rules facilitated and streamlined the implementation process of SW, enabling people to take care of working dynamics and the institutions to deal with their own self-regulations.

For instance, in the case of the Union of the Municipalities of 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 skills transversals to the entire technical structure: ability to collaborate, to experiment, and to integrate.”*

This ability has been demonstrated through the strengthening of the ability to face problems in an anticipated and shared way. Technically speaking, they state: *“The problems were addressed at 360 degrees by comparing and integrating the contributions of different professionals, 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, have been extended, including those who had fundamental skills to deal with the emergency, such as the Head of Civil Protection, Competent Doctors, and the Head of Safety. We were able to create a synergy among the heterogeneity of the points of view, to develop the most suitable and creative solutions”*.

The Union of Municipalities of Bassa Romagna managed the emergency since the very beginning both from a managerial and a procedural point of view: the leitmotif of their actions was knowledge sharing between 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, INAIL’s IT division reduced radically from 700 to 15 (daily average) employees in presence. In this situation they activated new services to support both companies and workers injured 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 an 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 of 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 is 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 can use to monitor (and not control) how people are working inside the digital ecosystem of the Institute.”*

On September 1, 2019, the Municipality of Brescia activated the first 16 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 already joined the project in 2016, and it took 3 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 at work. As it 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 the need for family care. In Brescia the analysis of the data referring to 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 was organized. The preliminary stages were as follows:

- The study and the approval of an implementing regulation by the Human Resources division;
- The organization of training sessions for executives (30 executives) and other organizational roles (80 officers);
- 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 enable the successful adoption of SW in the Brescia Municipality can be summarized as follows:

- The enhancement of the role of the Comitato Unico di Garanzia (CUG), a committee composed by Unions and institutions representatives aimed to promote equal opportunities, enhance workers well-being, and act against any type of discrimination at work;
- The strong synergy, since the beginning, between the Human Resources division and Time Office,
- The involvement of trade unions in the process, which strongly promoted the project;
- The trade union confrontation, which took place quickly and with a high degree of shared point of views.

From an operational point of view, one of the enabling factors was that the remote, agile and smart working activity was addressed at individual level, calling the project as “individual project of agile work”. In details, 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 case), and accepted by a special committee made up of technical experts and managers of the institution. 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 (out of 1082 with staff). Even in the pandemic phase, the logic already implemented with the experimentation was maintained even if contextualized to the situation.

To cope with this, a working group was promptly activated consisting of 6 IT experts, an administrative coordinator, an expert in agile work, and an IT officer who was also a well experienced systems engineer. The working group defined the criteria for identifying the professional profiles and workers to be placed in agile work, with a measure of priorities and needs. These criteria have been shared both with the top level managers and all other manager and service executives. The priority was established among workers with a more compatible professional profile, based on the condition of greater fragility and needs linked to the state of health, presence of minor children at home, need to use of public transport to commute, and so forth. The working group has identified and shared an intervention methodology and the operational tools necessary to implement it, such as:

- 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.

To conclude, all those who held the most suitable professional profiles for agile work were enabled to work remotely from home.

5.2 Human variables (people)

The adoption of smart working is associated with the recognition of (Bednar & Welch, 2019; 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;
- job enrichment and greater involvement in work activities (empowerment).

The Union of Municipalities of the Bassa Romagna has developed an *ad hoc* project that received regional funding concerning 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, goal-oriented approach and less task fulfilments, restoring flexibility to people, higher autonomy and empowerment in the choice of*

spaces, times and tools, a greater responsibility and commitment to the results. As a consequence, it requires organizational changes and training investments in the ordinary phase (after the pandemic emergency)”.

In INAIL, at the end of the first pandemic phase, a survey was shared in collaboration with the Politecnico of Milano within the Smart Working Observatory. This provided interesting results: about 60% of the participants believes 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 short time to the 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 have to work for objectives instead of tasks and need to learn how to report the results, strengthen digital skills, ensure effective interactions with colleagues, 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 pathologies treatments;
- and higher savings in travel costs.

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

According to the testimonials, in the post-emergency phase the institution *“is focusing on the search for effective strategies and methodologies for managing and stabilizing agile work on large numbers. In particular, we are thinking about programming and control procedures, and to refine 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 coordinate remote workers and employees are not used to work 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 environment?”*

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

- enhance both time and availability of employees, also 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 backlog of workloads;
- increase workload in some offices and a significant decrease for others. Spontaneously many agile workers with reduced work intensity made themselves available to support offices in high workload, such as the IT services, Cemeteries, Social Services. These practices facilitated virtuous organizational flexibility which pushes 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 a remote teamwork;
- improve the internal communication due to a positive experimentation of new forms collaboration;
- empower the self-training and online training of employees.

5.3 Organizational variables (tasks)

Smart working implies radical changes also in the organization of the work of 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.

Also, following the strong push to digitalization generated by the pandemic, researchers and executives have been questioning how business processes should be redesigned to make remote work effective. Some 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 deriving from 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 to all a good balance between private life and work, the management of diversity and disabilities;
- to favor the management of work spaces in the domestic arena;
- to reduce the *shortage* of digital skills for managing 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 the Municipalities of Bassa Romagna, the emergency approach focused on health prevention, despite having changed habits and operational practices, has not reached an effective organizational change. The manager reported: *“The change was sudden and intense, accompanied by a situation of uncertainty and a change in the habits, including the ones of the individuals. Personal life and working life have often overlapped, 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, a fundamental critical issue remains for HR managers the primary competence is to manage relationships, doing it remotely certainly requires new skills and tools to learn and experiment.”*

In INAIL, the IT director identified some organizational dynamics that should be strongly 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 in to identify new organizational solutions and practices, capable of managing changes, 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,*

strengthen the employees' digital skills ensuring effective interaction with colleagues. It is required clarity in the communication and a high ability of sharing and defining the assignments and the objectives to achieve. New abilities are required to define and plan tasks and activities, scheduling them, and optimize 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 point of view, since INAIL was involved in the management of the pandemics at national level, new services were activated that radically changed the jobs and the procedures workers have to deal with. In particular, *“the user assistance channels for the management of user's requests were strengthened, both in telematic and telephone means. The procedure to book appointments via telephone with officials of the local offices has been 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 disease practices, as well as numerous other personalized information. The telephone or telematic triage service has been activated, with which the users are 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 an overall satisfaction of the agile work experience, some important critical organizational issues have been raised. The manager in charge wrote: *“First of all, we realized that we lack in 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 a great difficulty in planning and monitoring agile work and has brought out how far we are from an approach to work by objectives.”*

The second criticality is given by the fact that *“there was an initial resistance to agile work and with a low level of digitalization of some management figures. The management of the Municipality must face 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 new awareness, new methods and management strategies of services and people active in services.”*

Finally, there are some pitfalls underlying the introduction of agile work, some already emerged in the experimentation phase, others linked to the emergency. The elimination of the freedom of free choice of the place from which to work and the obligation to work from home for all weekly working hours introduce new risks and possible disadvantages for the worker.

More generally, the following possible risks in the implementation of agile work have been identified within the institution (already in the testing phase):

- Possible increase in the gap for employees with IT skills deficits and with disabilities;
- Use of agile work as a benefit with consequent injustices,
- 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;
- Isolation.

5.4 Technical variables (technology)

From the point of view of the structure of IT systems supporting smart working, a central issue is to guarantee to workers an 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 a help desk services (Davis, 1993).

At the individual level, the choice of the technological equipment should first of all take into account - as regards the applications - the different familiarity with digital technologies and the different technical skills in the use of software. Therefore, a *one-for-all* model could prove highly inadequate (Hitchcock, Laycock & Sundorph, 2017). With regards to the hardware infrastructure, during the pandemic, organizations were concerned with providing employees with a personal computer, a mouse and a keyboard.

From a technical point of view, the introduction of SW in the Union of Municipalities of Bassa Romagna was allowed by the introduction of the Digital Agenda which already provided for the adoption of suitable solutions prior the Covid-19 emergency phase. In addition to the operational supports needed to introduce new remote working methods, such as online meetings have been organized (videoconferencing between Executives, among the members of the Executive, Municipal Councils or Union), continuous assistance was provided to employees who experienced a new form of work.

The IT director of INAIL wrote that the digitalization process was a “complex and articulated path that involved me for 8 years in an organization that in recent years has significantly rethought its operating model and its model service, 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);
- 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 a direction and address the institution strategy, the need to implement procedures of planning and control, and of internal and external resources enhancement.”

During the pandemic emergency, INAIL managed to secure its employees, allowing them to work from home, through the use of individual tools (the new digital workplace), collaboration and communication tools (Teams and the entire Office365 suite), access to corporate applications via VPN or Virtual Desktop Infrastructure (VDI). At the same time, video tutorials about the utilization of the tools (in particular Teams) were provided to train the whole staff and provide useful problem solving tricks 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 been replaced - for most of INAIL staff - the traditional and fixed workstations, developing a working setting coherent with the innovation strategy planned by the Institute and such as to allow the transition to a smart working perspective. Along 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.

5.5 The three evolutionary phases of STS in PA Smart Working

Analyzing the above-mentioned experiences according to a time span lens, the following phases are identified: the pre-emergency with the experimentation phase, the emergency phase with the massive introduction of new tools and methods, and finally the post-emergency phases with the process of consolidation. In each phase, some common elements have emerged.

- 1) Pre-emergency/experimentation phase: the process of innovation is very slow, the experience wants to take into consideration all the aspects (technical and social), a lot of discussions will emerge to protect the status-quo and the workers' right, the discussion between innovators and unions is mainly oriented to social and personal variables. The experimentation usually involves a very limited number of individuals, usually under a voluntary willingness 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 few individuals, few changes in the tasks, and so forth. Technology is an enabling factor, but the effects of its introduction are controlled and delimited;
- 2) Emergency/massive introduction of new tools and methods. 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 only where there is a need for new services to citizens/users. The attempt is to replicate the previously and well establish behaviours in the new technological settings. Some tensions may occur, due to the fact that the new settings have generated a strong change in the work-life balance and in all workers' habits. The more autonomous and empowered workers crafted their job, adopted some tools to measure and asses the activities, changed the nature of job, but the majority were keep maintaining the well-established behaviours;
- 3) Post emergency/consolidation phase. The technological variables are consolidated but a stronger need of social aspects are needed. The development process can take two directions: to keep the changes and improve the social side, go back to the previous pre-emergency state recalling pre-emergency behaviours, attitudes, incentives, tasks, processes, and so forth. As depicted in some cases the choice to keep the change and improve the organization seems the most challenging ones, since all the workers, at all levels, need to learn new form of work organization.

The Institutions, like those analyzed, that have been able to consolidate the experience, have done so thanks to the pre-pandemic experimentation which has made it possible to:

- technologically enable the organization and the workers to accept the new form of job;
- create a situation of internal consensus regarding individual and social variables;
- act in a protected environment with limited effects on the organization.

These elements made possible the institutions to adequately align the various socio-technical variables, which is impossible to do in emergency and on a large scale.

6. Concluding remarks for both research and practice

Despite the recording of significant resistance to the deep organizational changes, most PAs have adopted smart working as a new form of work organization oriented towards flexibility, autonomy and empowerment, but the changing process is still going on and very complex.

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

In any case, the presence of a strong external contingency factor, such as the pandemic emergency, forced all the institutions to stress the organization in the adoption of new technological tools and implement a new form of remote, flexible, agile, and smart working environment. As often happens, a pandemic situation becomes a trigger of radical innovation. A radical change was made possible only during the pandemic push, only in reference to specific and limited contexts of the administration services. It follows those radical changes in the PA are very difficult, not only in relation to its bureaucratic characteristics, but also in relation to the fact that being multi-service organizations with ambiguous objectives in general, at the organizational level even very strong external partners affect part and not the entire organization.

The legislation on the one hand and the managers on the other do not emphasize the need to change the traditional and binding practices of the work management models of the 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;
- missing metrics for systematically measuring work and performance.

From a theoretical point of view, 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. At the same time, this research highlights that the STS approach, just like any attempt of modeling, has a limited explanatory power. In particular, the resistance to change at the individual and organizational level observed in the examined PAs appears related to the fact that in these contexts the technology and task components show blurred borders and appear at least partially embedded with the people component. Further research is advisable to explore this issue.

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