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Smart Working adoption in the Italian Public Administration: a study of the ongoing trends and observed impacts.

TESI DI LAUREA MAGISTRALE IN
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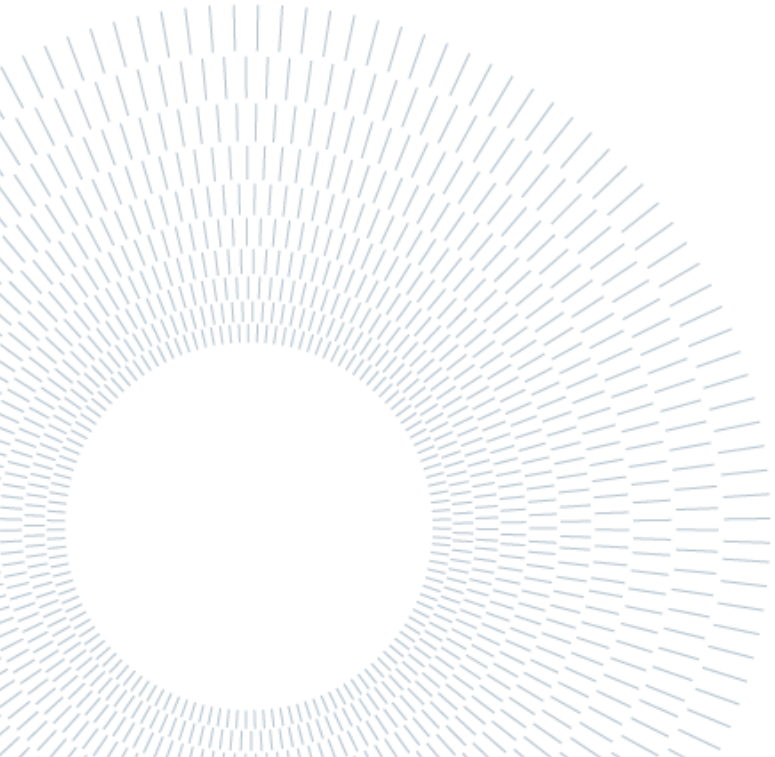


Abstract

Smart Working represents an opportunity for many organizations to innovate their work environment by introducing a more flexible approach to how employees perform their jobs. Although terminology and part of regulations already exist since late 2010s, until 2020 only a reduced share of working landscape exploited this tool. COVID-19 pandemic forced a considerable number of people to execute their job remotely. After the de-escalation of the sanitary emergency, many companies and organizations decided to try and adopt Smart Working as a flexibility tool for their employees. Also, Italian Public Administration (PA) seized the opportunity and allowed the use of Smart Working in different sectors to support people in achieving their job objectives. However, it is proved that Public Administration represents a field where introducing this kind of innovation is more treacherous than in private companies due to the intricated regulatory framework, the great variety of purpose and dimensions, and the difficulty in introducing innovations in this sector.

The research presented in this thesis is focused on understanding the present and future diffusion of Smart Working in Public Administration, with further focus on effects of team composition and leadership styles on performances of the working group. My research investigated on Smart Working application in more than 400 Public Administrations, thanks to specific data collected through targeted surveys that have been distributed in collaboration with *Osservatorio Smart Working*. This information contributed to develop an updated view on the present state for the PA with regards to Smart Working as an innovative flexibility tool. After that, the collected data showed the significance of focusing on main central Public Administrations due to their higher level of organization and organic adoption of Smart Working to continue the research with a second, more in-depth survey. This second investigation had as respondents more than 9200 employees of a main Public Administration and their answers helped in answering the questions about team composition and leadership style. The research highlighted the importance of adequate policy structures and organizational setting that should facilitate *smart* employees to work in the Administration. Also, data evidenced positive statistical correlation between smart behaviour of team coordinators and workers' performances.

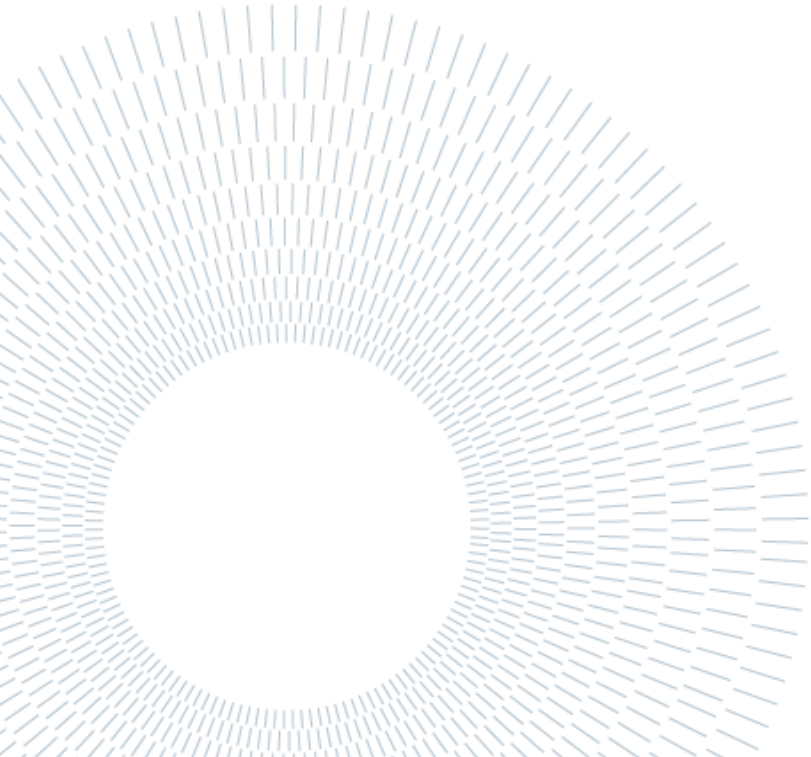
Key-words: Smart Working, Public Administration, Organizational Innovation, Flexibility Trends, Smart Manager

Abstract in italiano

La modalità di lavoro in *Smart Working* rappresenta un'opportunità per molte aziende di innovare il proprio ambiente lavorativo introducendo un approccio più flessibile al modo in cui gli impiegati svolgono il proprio lavoro. Benché la terminologia e parte della regolamentazione esistessero già dallo scorso decennio, fino al 2020 solo una parte trascurabile del panorama lavorativo sfruttava questo strumento. COVID-19 ha costretto un notevole quantitativo di persone a svolgere il proprio impiego da remoto. In seguito al calo dell'emergenza sanitaria, molte aziende ed organizzazioni hanno optato per provare ad adottare questa modalità come uno strumento di flessibilità per i propri dipendenti. La Pubblica Amministrazione italiana ha accolto tale opportunità e permesso l'utilizzo dello *Smart Working* in diversi settori per supportare le persone nel raggiungere i propri obiettivi lavorativi. È comprovato che la Pubblica Amministrazione rappresenti un campo più insidioso in cui provare ad introdurre un'innovazione di questo tipo, rispetto ad una compagnia privata, a partire dall'intricato quadro normativo, dalla grande varietà di obiettivi e dimensioni e dalla difficoltà generica nell'introdurre innovazioni in questo settore. La ricerca presentata in questa tesi si pone l'obiettivo di indagare la diffusione dello *Smart Working* nella PA, oltre a concentrarsi sugli effetti della composizione dei gruppi di lavoro e della modalità di leadership sulle performance dei team.

Nella ricerca è stato osservato l'effetto dell'applicazione dello Smart Working in più di 400 PA grazie a specifici dati raccolti tramite sondaggi mirati che sono stati distribuiti grazie alla collaborazione con *Osservatorio Smart Working*. Le informazioni rilevate hanno contribuito a sviluppare una visione attuale dello stato dello *Smart Working* nelle PA. Inoltre, i dati raccolti hanno portato l'attenzione della ricerca sulle PA centrali, per via del superiore livello di organizzazione che le caratterizza e dell'adozione organica dello *Smart Working* effettuata da queste entità. Il secondo sondaggio è stato compilato da più di 9200 impiegati di una PA centrale, ed i risultati emersi da esso hanno contribuito a rispondere alle domande riguardo la composizione dei team e la modalità di leadership di cui sopra. L'indagine ha sottolineato l'importanza di un'adeguata struttura delle politiche aziendali e dell'assetto organizzativo, che dovrebbero favorire i dipendenti smart a lavorare nell'Amministrazione. È altresì emersa una correlazione tra un atteggiamento smart da parte dei coordinatori delle unità e le performance dei loro componenti.

Parole chiave: Smart Working, Pubblica Amministrazione, Innovazione Organizzativa, Flessibilità, Smart Manager



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Introduction

Smart Working, also called Agile Working, is a system to execute a working contract which has experienced its greatest spread due to the COVID - 19 pandemic. This mode is featured by the absence of a fixed desk position for the worker inside their office, since the physical presence is not required for those workers who perform their jobs by the smart way.

It is considered an innovative way of intending the traditional job roles and its application should be executed vertically, through the different hierarchies of a company. This would allow for a change in the mindset of the business and a positive change towards a smarter and more proficient organization. Also, working habits of Smart Working and the working environment are different from the traditional ones. Being a Smart Working employee means taking advantage of performing a job in one's proper time and rythm, as well as benefit from being free to determine one's working schedule in a way that fits the personal life habits. Smart Working employees can have the freedom to organize their working pace in compliance with the macro-objectives that are concorded with the management. There is no need for a fixed working position, whether the productivity level is good and the safety measures for data privacy are respected.

There is a common misconception about Smart Working, consisting of mistaking this espression with the terms *Remote Work,* or *Work From Home* (WFH). Remote Work shares with Smart Working the eliminated need for the worker to be on-site during the working shift, but many differences characterize them. While Smart Working is based on a higher flexibility and autonomy of the worker, Remote Work requires working time, working place, and working schedule to be fixed and strictly respected by the contracted worker. Also, Smart Working requires a cultural shift for the company that decides to introduce it. Being *smart* means to change the perspective that the employer is having of their employee's working way significance, which means that it is not immediately adoptable in every company or business situation.

However, it is not simple to let this cultural shift to pervade every working environment at the same way, since each reality features its kind of way of thinking and organizational rigidities. This document will focus on how Public Administrations managed to elaborate the pandemic occasion to implement Smart Working in their structures and how those organizations are dealing nowadays with this innovation.

1 Smart Working Definition

After COVID-19 emergency, it became clear that Smart Working is no longer an extraordinary mode but it has the potential to become an integral part of everyday working life. Through an in-depth legal analysis, we will explore the regulatory boundaries of Smart Working, comparing them with other forms of work, to accurately outline its role and advantages in the context of Italian Public Administration. This detailed overview will emphasize the importance of making Smart Working a well-established and regulated practice, indispensable for promoting flexibility and innovation in the working environment.

1.1 The concept of Smart Working

The concept behind the term Smart Working, intended as an innovative methodology for work arrangements, features roots that go back years from the present days. However, the first structured definitions and the discussion about innovating traditional work practices emerged mainly in the previous 10 years, where there already was a growing recognition of the need for new approaches that incorporated flexibility, technology, and greater autonomy for employees. The definition of Smart Working has evolved steadily, but it strongly accelerated during and after COVID-19 pandemic, due to a significant acceleration in the adoption of this practice. This rapid transition has led to some confusion about the definition and application of Smart Working. Organizations, facing an emergency, had to quickly adapt, leading to varied implementation and different interpretations of the concept. The next section will be used to providing clear explanations and distinctions between the different flexibility models currently in use. It will be crucial to clarify the terms and outline the various approaches, considering that the implementation of Smart Working can vary greatly from one organization to another.

1.2 Definitions

Smart Working. MIUR (*Ministero dell'Istruzione e del Merito*) provides the following definition:

> *"Agile working (or smart working) is a way of executing a subordinate relationship of employment characterized by the absence of time or space constraints. It is also featured by an organization by phases, cycles, and objectives, established through an agreement between the employee and the employer. It is a way that helps the worker to reconcile life and work periods and, at the same time, to promote their productivity growth." (Ministero dell'Istruzione e del Merito, 2017)*
>
> *(Il lavoro agile (o smart working) è una modalità di esecuzione del rapporto di lavoro subordinato caratterizzato dall'assenza di vincoli orari o spaziali e un'organizzazione per fasi, cicli e obiettivi, stabilita mediante accordo tra dipendente e datore di lavoro; una modalità che aiuta il lavoratore a conciliare i tempi di vita e lavoro e, al contempo, favorire la crescita della sua produttività.)*

The previous extract highlights the presence of the double standard *Smart Working* and *Agile Working*. This definition underlines the nature of the concept, that is focused on the adoption of new working concepts for higher standards of the employees.

The Ministry of Work and Social Politics specifies that:

> *"Agile working (or smart working) is not a different type of employment relationship, but rather a specific way of executing a subordinate employment relationship introduced to increase competitiveness and facilitate the reconciliation of life and work periods." (Ministero del Lavoro e delle Politiche Sociali, 2023)*
>
> *(Il lavoro agile o smart working non è una diversa tipologia di rapporto di lavoro, bensì una particolare modalità di esecuzione della prestazione di lavoro subordinato introdotta al fine di incrementare la competitività e di agevolare la conciliazione dei tempi di vita e lavoro.)*

This distinction allows to understand that Smart Working not only is based on a different conception of work, but it also represents an innovative tool to help employees accomplish their tasks in the best way possible. (Gastaldi, et al., 2014)

There are different definitions of the term *Smart Working* that evidence the many features of this working model.

In this section, some of these definitions are provided with the objective of gaining a deeper understanding of how employers and employees can benefit from Smart Working, and the challenges that must be overcome to make it a successful practice.

According to *Osservatorio Smart Working* of Politecnico di Milano, this is a first definition of Smart Working.

> *"A management approach based on giving back to people the flexibility and autonomy of choosing spaces, schedules, and tools to use in return for greater result accountability". (Osservatorio Smart Working, 2023)*

With this definition, it is possible to define the main pillars of Smart Working: flexibility and autonomy for workers.

Another definition provided by *Osservatorio Smart Working* is:

> *"Smart Working means rethinking work from a more intelligent standpoint, questioning traditional obligations related to workplace and schedule, leaving people more independence to define work modalities based more on result-based responsibilities. Independence, but also flexibility, accountability, valuing talents and trust become the key principles of this new approach." (Osservatorio Smart Working, 2018)*

This second definition emphasizes the fact that Smart Working is not only a matter of giving employees more flexibility, but the overall purpose of the *smart* attitude aims at the redesigning of the whole working structure.

Another definition is the one proposed by the Italian Ministry of Labor and Social Policy, which defines Smart Working in the sequent way:

> *"A mode of execution of the employment relationship established by agreement between the parties, including forms of organisation by phases, cycles and objectives and without precise constraints of time or place of work, with the possible use of technological tools for the performance of the work activity" (Ministero del Lavoro e delle Politiche Sociali, 2023)*

This third definition relates Smart Working not only with time and space flexibility, but also with an organization focused on objectives and cycles. This suggests a new way of working where what's important is not the time compliance, but the completion of tasks.

Finally, the Smart Working Handbook states:

> *"Smart Working is a business-focused approach to flexible working that delivers more efficiency and effectiveness in work organisation, service delivery and organisational agility, as well as benefits for working people. Key features are management by results, a trust-based culture, high levels of autonomy, flexibility in the time and location of work, new tools and work environments, reduced reliance on physical resources and openness to continuing change." (The Smart Working Handbook, 2015)*

The definition above reinforces the importance of defining a new way of working guided by results and adds the fact that Smart Working is about being open to change and understanding that there is not one single way of working.

By taking into consideration all the previous definitions, Smart Working can be defined as a management approach focused on the achievement of results whose pillars are autonomy of workers, and spatial and time flexibility. This approach implies a redefinition of the company's culture which needs to be continuously updated. Furthermore, we need to consider the impact of technologies that are a necessary, but not sufficient, means to successfully apply a Smart Working model.

Also, the following definition shows is the main concept behind the term *Remote Working*.

> *Remote work (also known as work from home [WFH] or telecommuting) is a type of flexible working arrangement that allows an employee to work from remote location outside of corporate offices. For employees who can complete work offsite, this arrangement can help ensure work-life balance, access to career opportunities or reduced commutation costs. Benefits for the company include increased employee satisfaction and retention, increased productivity, and cost savings on physical resources. Remote work arrangements can be temporary or permanent, part-time or full-time, occasional or frequent. Remote work requires policies governing equipment use, network security and performance expectations. (Gartner, 2023)*

This explanation for the term *Remote Work* emphasizes the presence of an autonomous aspect of the job setting, to stress the flexibility that is supposed to be available for each worker that finds themselves in this working condition.

Smart Working is the Italian version for Work From Home. It is interesting to notice how the concept of Remote Working in its English language version natively comprehends a higher level of flexibility and autonomy, hence the superimposition of the terms *Work From Home* and *Remote Working*.

In Italian, the word *Lavoro da remoto* implies a different place where to execute the job that is not on-site, but with the same level of "strictness" that could be exerted in the office premises.

To clarify this issue, in 2020 the International Labour Organization proposed a report to identify and classify the different work modalities. Since the various terminologies are often used as interchangeable or with overlapping meaning, the document aims at the fully explanation and differentiation for each term. (International Labour Organization, 2020)

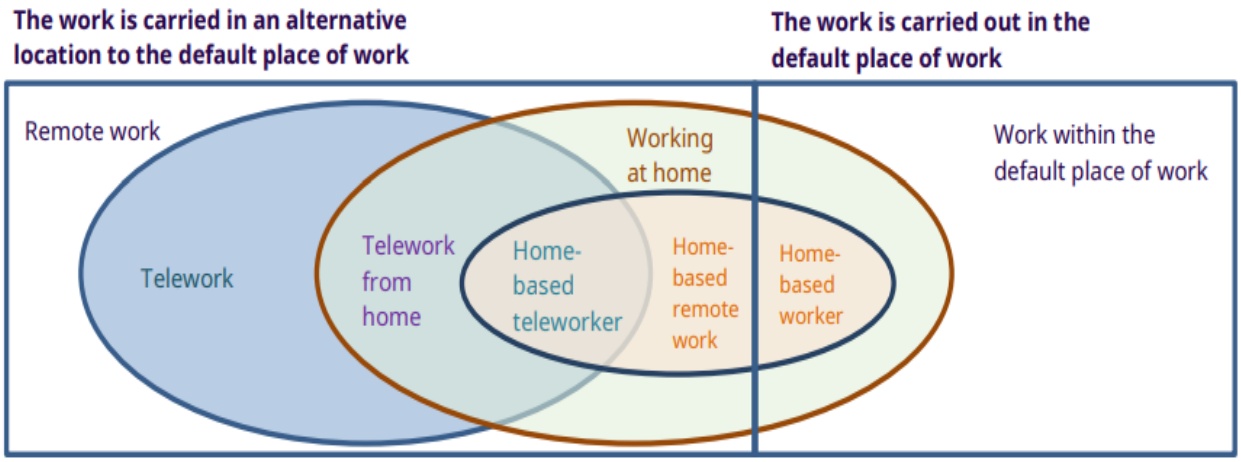

Figure 1.2.1 - Work Typologies Classification (International Labour Organization, 2020)

The issues are represented by the fact that Remote Working is oftentimes narrowed to a phrase only referring to employees, while the concept could also be applied to the independent workers. Moreover, different nations use same terms with different meanings. Also, it is important to consider the frequency of adoption of those behaviours, being them *remote* or *at home*.

Table 1.2.1 - Parameters for Work Classification (International Labour Organization, 2020)

Place of work	**Work at home**	**Remote worker**	**If personal electronic device is always or almost always used in combination with work at/from home**
Main place of work at home	Home-based worker	If dependent worker, then home-based remote worker	If dependent worker, then home-based teleworker
Work at home, remote work or telework at least once a week in the last four weeks, but the home is not the main place of work	Regular work at home	Regular remote work at home	Regular telework from home
Work at/from home at least once in the last four weeks	Occasional work at home	Occasional remote work at home	Occasional telework from home

It should be considered that Italy, with its definition of *Smart Working*, does not fall into this classification, since it mostly based on the occurrence of the *remote* behaviour rather than on the organization and autonomy of the worker.

If used correctly, the term *Smart Working* could be also defining an employee that is momentarily working in the "traditional" office, but their mansions and job style differ from what they were doing on-site priorly to the *smart* revolution.

It can therefore be said that *Smart Working* and *Remote Working* share the need for adequate technological means, reliable internet connection and company structure, but the first one is a rather innovative way of interpreting the job paradigm for many different businesses.

Also, Smart Workers feature higher level of flexibility and autonomy thanks to the different mindset that they are allowed to share with their coordinators and managers. Those figures, on the other hand, must show that their subordinates feature the right characteristics of an innovative individual, ready to fully exploit the benefits coming from this implementation. It is therefore crucial to use trust as a major leadership driver to effectively implement the Smart Working attitudes and allow for a coherent and organic growth. (Iannotta, 2020)

2 Smart Working in the Italian context

In Italy, the debate on Smart Working already took place before the pandemic, but it was during and after COVOD-19 emergency that it took on a predominant role. The rapid and adaptive response of Italian organizations to the urgent need to continue working safely has accelerated the adoption of Smart Working. This approach revealed advantages such as flexibility in managing time and new challenges such as managing distance communication and the sense of belonging to the team. Despite the complexities, many organizations have chosen to maintain post-emergency smart working, recognizing it as an important resource to ensure business continuity and improve the quality of working life. The evolution of Smart Working in Italy will be explored in this chapter, starting with the expected discussion before the pandemic and moving on to the changes witnessed during the lockdown and its current integration in the Italian work context.

2.1 Before Pandemic

During the last 25/30 years, many jobs evolved thanks to the fast introduction of the technology inside many different working areas, such as production, accounting, sales, but also the services companies benefitted from this innovation.

However, the concept behind the Remote Working was theorized well before the 2000s, because since the first introduction of the computers in the offices and the houses, people dreamt of working directly from their houses. For the first significant applications, there was need for a reliable internet connection and security protocols good for the different companies that agreed on the experimentation on the Work From Home.

If the focus is moved on the last years, it can be seen how there are different solutions for the remote working. One of the brightest examples can be found in the co-working architectural spaces. Those spaces are offered to the workers for free or they come with an affordable fee. The key concept is the sharing of a common space between people with similar needs, in a collaborative and comfortable environment. There is also the possibility to have “quiet zones”, where people can attend online meetings or find more focus in the quietness. This experimentation raised before the pandemic and it

came back as soon as people were allowed again to share spaces, so after the lockdown period. The feedback is generally positive thanks to the innovative concepts that stand at the base of the co-working spaces.

Since Smart Working concept brings with itself some huge challenges for the workers, such as the non-dependence from the physical office, experimentations for this kind of job lasted long and, in some context, it is still ongoing. Also, difficulties related to the introduction of Work From Home contracts vary from country to country due to the different work cultures that every nation entails.

In Italy, in 2014 it has been proposed the terminology Smart Working in a law proposal (Camera dei Deputati, 2014). This law ruled the new and simplified ways of teleworking, introducing the flexible concept. However, the law that directly affects the Smart Working is the *Decreto-Legge 81/2017*.

This document introduced the basis for the correct usage of the Smart Working inside the Italian companies. The *Decreto-Legge* specifies that the Smart Working condition enables if both the worker and the employer agree on voluntary base to the initiative. Moreover, the employer and the employee must fill and sign a written contract to finalize the Work From Home agreement, so that both parts are kept safe and are fully informed of the mutual responsibilities.

This *Decreto-Legge* gave the opportunity to the Italian companies to innovate many of their working contracts. Unfortunately, until 2019, just 4,8% of the Italian workers were able to exploit this opportunity (Area Centro Studi Assolombarda, 2021). This was caused by some factors that are still present in the Italian working environment and that still causes difficulties when talking about work innovation.

Business owners in Italy were not ready to hear what the agile work concept represents. Italian companies are not prone to embrace the agile work culture. Many businesses feature an "old-style" management that comes from the historical origins of the firms. Those behaviours are grounded in the typical "family business" environment that most of the Italian companies have. Therefore, the business owners present a strong initial diffidence when the agile work concept is presented.

This working environment innovation expects to lever on the autonomy of the employee to decide their working pace and the self-reporting of the advancement to accomplish some pre-determined goals, so it is quite far from the traditional

management style of many Italian companies. Instead of innovation, the more traditional management style is preferred when talking about working habits.

On the other hand, also the workers were not ready to embrace this kind of change. Many employees feared to lose the benefits that came directly from the physical presence on the job site. The socialization aspect is one of the most significant when talking about deterrence from Smart Working. Also, the direct contact with the management represented an obstacle to the introduction of the Work From Home mansions.

Lastly, many companies were not ready to supply the workers with adequate technological infrastructure, such as personal computers and adequate internet access from the employees' house. Also, the cybersecurity issue represents an important theme because many companies prefer not to trust no internet infrastructures other than the internal one.

2.2 Advantages

Academic literature from the first time that Smart Working concepts are being introduced agrees on the fact that there are many proven advantages in the introduction of these flexibility innovations in the working environment. Since the first studies on the theme, it has been proved that Smart Working can actively help in achieving significant and concrete benefits, for both employees and employers (Greenwood & Hinings, 1996) (Klarner & Raisch, 2013)

Employees can mainly benefit from a higher level of flexibility and autonomy. Since many contracts allow the workers to freely manage their tasks during the working hours, everyone can adjust their routine according to the needs. (Kirk & Belovics, 2006)

Also, without the need for the physical presence in office, workers do not need to worry about moving everyday back and forth. This eliminates the moving expenses for the workers and saves a substantial amount of time, that normally would be spent travelling. Thanks to those benefits, employees can start their working day without spending their morning in the traffic, with a higher number of sleeping hours and lower stress levels.

This advantage represents a key step in a more balanced situation between work and life of the employees. People tend to be stressed and feel overwhelmed by the working rhythm that are imposed. Thanks to the time spared from the commuting and the

acquired flexibility from the adoption of the Smart Working concept, it is possible to say that on average, workers would be satisfied from this innovation. (Marino & Capone, 2021)

On the other hand, also employers can find many benefits in the introduction of Smart Working contracts. Since the smart workers do not need a fixed space in the company's premises, the offices can be downsized and consequently achieve an economic spare in terms of rent and all auxiliary services linked to the presence of the workers. Also, research suggest that productivity level is higher when employees are given higher responsibilities. (Peretz, Fried, & Levi, 2017) (Wheatley, 2012)

Work From Home efficiently promotes this kind of autonomy, hence it represents an opportunity for the companies in terms of optimization. Finally, thanks to a better work-life balance of the employees, the working environment is bound to be healthier. The workers are less stressed due to the avoidance of moving from home to work and they have more time to spend differently. (Shagvaliyeva & Yazdanifard, 2014)

If the concept of remote work is brought to a further step, it is possible to imagine that companies can eliminate the obstacle of geographical distance when looking for skilled people. Since there is no need for physical presence, specialists can collaborate with companies without the need for them to be on-site (Hu, 2020). This would allow companies to easily attract talents from all over the world, thanks to a new and efficient way of looking for skilled talents that can offer to companies the desired competitive advantages. Thanks to remote working, companies can attract skilled and expert people without the need of having them on-site. This possibility allows for the research of competences outside of the geographical zone in which the company has the office premises. (Lin & Wang, 2022)

2.3 Challenges

As many advantages can be found in the application of Smart Working, so there are some challenges that must be faced. Even if the *Decreto-Legge* gave the blueprints for the Work From Home regulations, those rules need to be adapted to the single situation. Every company is different and so are its needs, hence the regulatory activity must be specific for every different case. It is important to protect both employers and employees during the implementation of Smart Working policies. The workers must be ensured to be put in the best possible conditions to exploit their job, avoiding episodes of excessive stress or burn-out due to the too high workload. Similarly, companies expect people who ask for Smart Working to be as proficient as they would work on-site, without any loss of productivity and general cohesion of the firm. Many companies totally lack the rightful business culture to face the introduction of Smart Working. Since many procedures and more in general the whole structure can be made smart, the agile work culture needs to be pervasive at each management level. People should be correctly involved in the decision-making process for the introduction of Smart Working. (Cellini, Pisacane, Crescimbene, & Di Felice, 2021)

Also, the path that needs to be followed should be done in collaboration with different people coming from different management levels of the same company. The introduction of working through goals represents a key aspect for this kind of innovation. (Larsen, Rand, Schmid, & Dean, 2018)

There is also need for consideration about the working environment where Smart Workers do their job contract. Since this way of working requires adequate spaces and technological means to be correctly executed, not all workers can organize their living places to achieve those features (Shockley & Allen, 2007). Moreover, other studies indicate that a non-adequate space where to work damages the work-life balance, especially if the worker experiences the presence of children within those spaces (Capecchi & Caputo, 2022).

Lastly, also the technological instruments have a main role. Since the employees need to be accessing and exchanging files and information with all the colleagues, the internet connection and the devices should allow for a stable and reliable network on which the workers can exploit their job. Also, the cybersecurity aspects represent a considerable issue, since sharing sensitive data outside of a trusted company internet network could expose them to various threats (Olivieri & Spoto, 2021).

2.4 During COVID-19

Due to the Coronavirus outbreak and its subsequent regulations given by several nations, many people were forced to stay at home during the lockdown periods. This event helped with the rapid diffusion of the remote working usage since the world health issue strongly prevailed over the daily habits of people.

The Italian government supported this solution and thanks to a rapid intervention, many ways of implementing the Smart Working concept have been developed. Immediately after the lockdown started in March 2020, the Italian government proposed the *Decreto-Legge 18/2020* the March 17th. This document stated the mandatory use of the Smart Working where it was possible to implement, to protect citizen against the Covid-19 disease. Thanks to this situation, more than 7 million people experimented the Work From Home condition, reaching 30% of the total Italian population. Up to 70% of Italian companies were able to experiment the Work From Home condition during the 2020-2021 period.

The most affected sectors were services, industry, and commerce. In this time span, workers who were involved in Smart Working programs reported different positive thoughts about that. While people felt more autonomous and more able to achieve a better work/life balance, the perceived stress levels were lower, and the productivity was higher.

On the other hand, some downsides were also found. The lack of socialization was found to be an issue for the remote workers, and the feeling of discrimination suffered by people who worked on-site. Moreover, people often struggled to separate the working time from the free time. This brought some workers to a burn-out, making them debate the usefulness of Smart Working.

It must be noted that during the pandemic, Remote Working was used as an emergency tool. Many companies and businesses found themselves forced to introduce Work From Home in their daily routines, without a specific preparation. This caused many realities to not appreciate the positive aspects of remote working, since their structure was not ready for this radical shift. One of the main aspects that support this statement is given by the fact that many people found themselves to execute the same job mansions that they were doing on-site through a laptop in their houses.

Even if this situation helped in understanding that many jobs do not need physical presence to be done, the relational part of the working environment was damaged. People struggled to keep in touch with colleagues and customers, since all relationships were kept through technological means and not in presence.

Despite the drawbacks, the remote work seemed to help during this crisis period. The emergency regulation has been prolongated until the pandemic effects were deemed to be still a threat for people.

2.5 After Pandemic

On July 31st, 2021, the obligations towards this kind of remote work ceased, but some people continued to prefer this new work mode despite the possibility to go back to the offices. This possibility is regulated by the *Decreto-Legge 105/2021*, that enables the Smart Working on voluntary base without the need for a specific individual contract until March 31st, 2022. This solution allowed for further exploration of Work From Home for many companies and their employees, that where enthusiast to revolutionize their lifestyle with this new working paradigm.

On December 7th, 2021, the Ministry of Work published the *National Protocol for work in agile mode*, that is used to state the main principles that regulate the use of Smart Working politics. (Ministero del Lavoro e delle Politiche Sociali, 2021)

The most recent update is the *Decreto-Legge 18/2022*. This last regulation requests for individual agreements between the employer and the employees that request to be involved in Smart Working programmes. In the contract it must be specified how long the Work From Home condition is supposed to last, how much time the worker is supposed to spend effectively exploiting their job and how much rest time is allowed during the working day. Moreover, the agreement should also state which are the monitoring practices over the work done during the Smart Working period, to ensure that everything is correctly developed. Also, the newest *Decreto-Legge* allows the employer to revoke the Smart Working contract, but only if there are proven reasons behind this decision, such as constant negligence of the employee or periodic failure to reach the fixed goals, whereas the productivity level of the individual does not match what has been decided and signed in the contract.

According to ISTAT, in 2022 6,6% of Italian companies continued to exploit Remote Working even after the pandemic outbreak. This number is naturally lower than the

peak value reached during the lockdown, but it shows an increase from the beginning situation. Also, research state that those working contracts are going to grow, thanks to the new regulations. Those allow for precise agreement and encourage workers and companies to embrace the voluntary Smart Working condition. (ISTAT, 2022)

At the present state, people prefer to continue Work Form Home if they are resident in big cities. This is because workers take advantage of the already present infrastructures, such as the reliable internet connection and dedicated spaces for the coworking. The main Italian regions that show a higher concentration of Smart Working usage are Lombardy, Lazio, Emilia-Romagna, Veneto, Tuscany. Also, the mainly involved job sectors are the ones which natively present a higher usage of technological means. This eases and encourages the adoption of remote work solutions, due to the original nature of the jobs. So, sectors like services, research, ICT, and finance are more prone to be involved in Smart Working activities rather than others like production, primary education, and manufacturing.

3 Smart Working in Public Administration

In this next chapter, we will explore the implementation of Smart Working in Italian Public Administration. This context presents unique challenges, considering its complex structure and the specific needs of a unique sector. Smart Working introduction is currently eased thanks to the updated regulatory framework, which provides guidelines for its implementation in Public Administration. However, the nature of PAs, with specific hierarchies and procedures, has led to difficulties in the transition to a more flexible working model. We will explore the dynamics of this process, analysing how PAs are facing structural and regulatory challenges to successfully adopt Smart Working, thus contributing to the transformation of the work landscape in the Italian public sector.

3.1 Regulatory Framework

The focus of this research is about the application of Smart Working in Public Administration contexts. Since the Pandemic accelerated the application of agile working frameworks in many different sectors, the Italian government promotes it also in the PA companies and administrations.

The Italian government states that the Public Administration take active participation in the promotion of Smart Working activities. This statement is crucial because not only it implies an organic change and rearrangement through the Italian PA to enable this kind of working modality, but also it puts the premises for a strong innovation process for the public organisations.

This is because the emphasis is put on the Smart attitude of the remote work, implying that the employee would be able to enjoy more freedom and autonomy in their job settings.

Another important aspect that is evidenced in the national guidelines is the need for the research of an optimal work/life balance. This is because working from home can make difficult to acknowledge when the working time is over. It is one of the most common negative aspects that have been registered during the pandemic period.

Since the emergency made difficult to adopt remote working solutions that were fully structured, it often happened that workers felt overwhelmed with work from the company.

On the other hand, managers used to exploit too much the proximity of people with their working station at-home, asking for availability also outside of the office hours.

Finally, the present legislation states that PA should redact an annual document about the promotion and the diffusion of Smart Working in their premises. This document is called POLA (*Piano Organizzativo del Lavoro Agile,* Organizational Plan for Agile Working), and it should be updated every year. (Ministro per la Pubblica Amministrazione, 2021)

This would allow for a punctual processing of the results of the previous year to maximize the effort and steer the administrations' decisions to improve Smart Working levels.

The main points that the POLA should be able to address concern different aspects of the introduction of Smart Working in Public Administration. The adoption of Smart Working policies for at least 15% of the employees is a key aspect. Moreover, the remote workers should be treated with the same level of incentives, advancements in career and promotions that other "regular" workers feature.

Also, in POLA should be defined which level of formation the workers should reach to be proficient in Smart Working and which are the pre-requisites that allow for this innovative solution.

Recently, POLA has been absorbed by PIAO (*Piano Integrato di Attività e Organizzazione*, Integrated Plan for Activity and Organization), another important document that Public Administration must redact on a three-year base, to ensure that productivity levels and developments of the Administrations are correct and consistent. This document incorporates the plans for different dimensions of the involved organizations. (Dipartimento della Funzione Pubblica, 2021)

PIAO concerns the plans about the personal needs of the employees of each Administration, but also it is the document that states the equity of opportunity and the anticorruption systems that are in use. Thanks also to the importance that the guidelines underline about the digitalization of the organizations, the redaction of PIAO helps in developing the application of Smart Working in Public Administrations.

3.2 Implementation difficulties in Italian PA

Despite the encouraging premises, the Italian PA represented a challenging environment where to implement the Smart Working habits during the pandemic, and still struggles nowadays. Public Administration is characterized by several features that make difficult to innovate the working culture of those organizations. (Datta, 2020)

There are different aspects:

- *Hierarchy and complexity*. Many Public Administrations feature multiple levels of hierarchy inside their structure. This elevates the level of complexity when organizational changes are needed to be faced. Moreover, proposing such a relevant change as Smart Working can be in those highly structured complexes is difficult. Due to the stratification of the roles and the overlapping of the authorities of different figures, it is not always simple to debate about working habits and new ways of getting the job done.
- *Deep dependence from the past*. The Public Administration rules and procedure of the Italian system come from the continuous update of old directives that sometimes are older than Italy itself (first foundation of Public Administration is dated in 1853, hence 93 years older than the Italian Republic). This rich background allows for a broad application of the Public Administration for all needs and requests of users. On the other hand, often the presence of outdated regulations does not allow for a smooth introduction of innovations.
- *Age of PA employees*. People who work in Public Administration is, on average, older than the employees of other companies. According to ISTAT, in 2o22 the average worker in an Italian PA is 50 years old, against the 42 years that represents the national average (ISTAT, 2022). This abundance of elder people is given by the hiring policies that Italy adopted after the economic boom in 1960s and the subsequent need for working positions for the baby-boomers. While this action helped in developing a rather widespread PA, it caused people to remain stuck with a single kind of job and not to consider mobility choices. Because of this averagely high age, people who work in Public Administration tend to be more resistant towards changes about working activities. Being Smart Working an important innovation, somewhere it has been considered with a hostile mindset.

- *General lack of performing IT solutions*. For some of the already cited motivations, PA historically lacks in technological innovations. Many procedures are executed following outdated procedures and neglecting the possibility for the digitalization for many of them. This brings the procedures to follow pre-determined path that cause inefficiency and a diffused delay. The general feeling about Public Administration is negative from an average Italian user.
- *No benchmarking*. Since Public Administration is mostly exclusively in charge of many activities, there is no competitor when talking about performance. This causes the organizations not to seek improving in their performances, choosing not to innovate. This is another negative aspect that strongly hinders the adoption of new and innovative working habits.

If the focus is moved on introduction of agile working, one of the main issues is represented by the confusion caused by the different legislations that overlap in matter of guidance and directions, causing troubles in interpretation by the administrations.

Moreover, there could be the risk of different applications from the same regulatory framework, and those could be leading to unequal treatment between employees.

Also, the introduction attempt of a new work philosophy encountered some resistance. Some workers and managers do not agree on the modalities that Smart Working proposes, so they take active part in slowing down the introduction of this working culture. The main concerns are about the threat that Smart Working poses towards the traditional office culture, based on the physical presence of the worker and constant control over the exploited tasks.

In addition, some managers report concerns about a possible decrease in productivity, since there is no sufficient evidence about the absolute better working level that can be achieved thanks the agile and remote working culture. (Fabio Fortuna, 2023)

Another issue in the Smart Working diffusion is represented by the general infrastructure deficiency that features the Italian PA. It is often common that employees do not have the right equipment that is essential to face the change in working habits. One of the most common situations is represented by a lacking IT department that is not able to guarantee adequate laptops for the remote workers. This makes difficult for the PA to guarantee the optimal working state of the services that should be available to the public. Also, a not adequate setting puts people at risk of waste their working time due the not possibility to exploit their job.

This situation should have been prevented with adequate investments in devices and infrastructures for the employees. During the pandemic, unfortunately, it was common to have sub-optimal conditions for the remote workers due to lack of connectivity and/or poor device availability. Those problems and all the difficulties that can be found when trying to apply the Smart Working in the Italian Public Administration are caused by the inner complexity of those systems. Under the PA category are collected different realities that are totally or partly controlled by the Italian government, so the variety of matters and sectors that are covered is vast.

So, covering all the possible variations in needs for the PA companies represent a huge issue for the legislators, that tend to hand out general guidelines that should well cover the main aspects. The single and wise application of the rules is entrusted to the local managers and directors of each PA.

3.3 Need for performance indicators

Looking into the public sector, most of the organizations deliver one or more kind of services to the customers. Furthermore, the PA entails many different sectors with different needs, processing times, procedures, and proper issues. Lastly, the PA environment is one of the most difficult when talking about innovation, due to the high presence of documents, rules and hierarchies that represent a challenging field.

This highly complex environment is in need for measurement systems that help in understanding the performances. The main issue is represented by the research of a meaningful set of indicators that would effectively measure the performances in different sectors of PA. The indicators have an important role towards the introduction of Smart Working in the public environment.

The use of common indicator would allow for direct comparation between entities, through the elaboration of statistics that would be useful to support the decisional processes for each Public Administration. Thanks to them, it is possible to correctly monitor the ongoing activities and set goals the performances. Moreover, the indicators will be useful also for the benchmarking of the operations between different entities. It is not easy to effectively measure the performances in a Public Administration context. Since the main objective of a PA structure has always been the delivery of the requested service to the customer, the introduction of a monitoring system for the performances can represent a challenge.

In fact, it can be said that in the public environment the ability to carry out a service has a much higher importance that being able to do it in an efficient way. This often brings the different administrations to neglect the performance topic, causing high rates of inefficiency.

The introduction of Smart Working in Public Administration can represent a new opportunity for the Italian public system. Thanks to the shift in working organization that is requested for the *smart* approach, it is possible to control, regulate, report, and improve the performances of the different sectors included in the PA.

In 2018, thanks to some experimentation in the *CoWorkingLab* experience, it has been possible to analyse and select some indicators and divide them in clusters to have an overview on the activities and conditions of some PA. (Dipartimento della Funzione Pubblica, 2019)

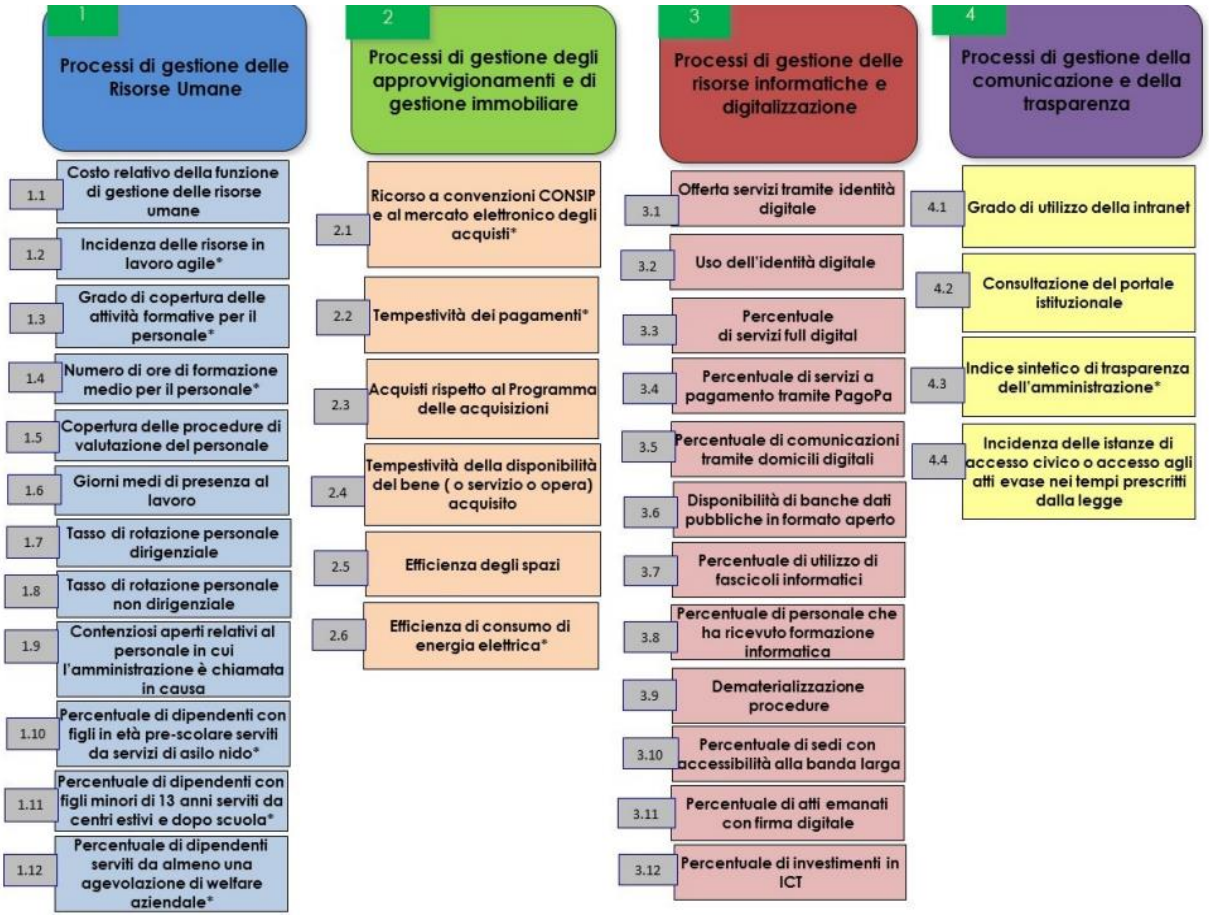

Figure 3.3.1 - Output parameters of CoWorkingLab experience, 2018 (Dipartimento della Funzione Pubblica, 2019)

This experimentation tested those indicators on a selected group of PA companies, to understand how much data was possible to retrieve. Moreover, the testing period ended in 2019, to make this set of indicators available in the subsequent 2020-2022 period. In December 2019, the Italian Government chose 15 indicators among the initial 34 and diffused them through a *Circolare* dated 30/12/2019. (Ministero per la Pubblica Amministrazione, 2019)

This measurement system is currently used by the Italian Government to understand how the Public Administrations behave on selected matters, and the indicators' value are requested to be updated once a year by each entity. This dataset is useful to investigate some ongoing trends in the different organizations and to forecast the possible interventions for each sector.

Although this practice allows for a thorough analysis of some information, there is more that can be examined. Since the indicators were experimented and tested before the pandemic outbreak (and so before the massive remote working adoption), they are not able to keep into account what changed in the year immediately subsequent. There is lack of investigation about the working habits of the different employees, or data collecting about work/life balance or quality of job that the workers can achieve staying at home. Moreover, there is no research about the *Smart* evolution of the work habits and the implementation of new concepts for the development of workers' autonomy.

3.4 Role of Osservatorio Smart Working in Politecnico di Milano

Osservatorio Smart Working is part of *Osservatori Digital Innovation*. Those research groups were born in 1999 in Politecnico di Milano, with the goal of support and development of the culture behind the digital innovation. The vision of *Osservatori* consists in having the innovation at the centre of the development of Italy, so the research and studies aim at the diffusion of this idea through different methods. Every year many publications are emitted, and different events like seminars, conferences, surveys are carried out to support the continuous advancement of the innovation. (Osservatori.net, 2023)

In 2012, *Osservatori* founded the *Smart Working* division that focuses its activity on the research of this specific way of innovation and the possible different applications for that. Thanks to the collaboration of many important companies, this observatory can

offer quality studies and research on the matter. Covid-19 pandemic has been a great opportunity to try the application of *Smart Working* and the experience generated the availability of interesting data about the results. The elaboration generated by this data can play a key role for decision makers to choose which road to pave in continuing to foster the *Smart Working* culture.

Osservatorio Smart Working focuses on different aspects about the job innovation. Since the dimension of the company that provides the data, the sector in which it operates and the nature of it (private or public) are important to obtain a thorough analysis, every aspect is kept into account when the statistics are computed.

For this reason, *Osservatorio Smart Working* can provide specific data for the Public Administration. This allows to paint an accurate picture of how the emergency caused by the pandemic influenced the Public Administration employees. Their working habits needed to be modified to make them *smart*, but it often happened that the job just became *remote*, without the introduction of any innovative components. Thanks to the data coming from the surveys that have been used through the years, it is possible to understand how the *Smart Working* phenomenon evolved since its introduction. Despite the emergency period during Covid-19 lockdown, the growth of this work modality was already present and both private companies and Public Administration were considering it. Although the introduction of the innovations results more difficult in PA, there still were evidence of *Smart Working* contracts and habits in different entities. Now, in the post-pandemic situation, the challenge is represented by the sustaining of this innovation and the subsequent implementation of it in the most effective way possible.

Also, *Osservatorio Smart Working* is interested in measuring the performances of the different entities to understand which dimensions can be strengthened thanks to those innovations. Through different processes of measure, such as internal surveys delivered to the workers, researchers gather data about the level of service and proceed to make them available to the management level, as a powerful decision tool.

To achieve this, *Osservatorio Smart Working* identified four main principles through which analyse a *smart* oriented organization.

1. *Organizational policies.* The effective implementation of Smart Working requires clear corporate regulation, focusing on individual or company agreements and involving Human Resource Management to drive cultural change. Regulation must consider legal aspects, maintain flexibility to avoid rigidity and reflect on talent management. Smart Working becomes a crucial element in the company's Value Proposition, enhancing brand and engagement by responding to the growing demands for flexibility in the post-pandemic workforce.
2. *Digital Technologies.* Information and Communication Technologies, generally under the control of the ICT Department, represent the key fulcrum for enabling Smart Working, allowing for a virtualisation of the workplace. The effective adoption of new digital tools is more complex and requires a true digital culture, new skills, and the synergistic development of managerial and behavioural skills. The goal is to fully exploit the potential of digital technologies to improve productivity and quality of work, promoting mature and collaborative relationships. The challenge is not just to introduce new tools, but to ensure their positive adoption and beneficial influence on ways of working.
3. *Workers' physical layout.* The management of this dynamic is mainly the responsibility of the Facility Management Department. In the context of Smart Working, associating the concept only with remote working is a common mistake. The term "remote working" refers to the ability for a worker to carry out tasks from a location of their choice, which can be their home, communicating with colleagues and the organization through technological tools. This change must be supported by adequate spaces, which do not necessarily have to be outside the company headquarters, allowing the worker to choose how to work based on his needs even in the office.
4. *Leadership style.* In this lever, managers at all levels of the company play a crucial role. Through their leadership, they have the task of inspiring and involving employees in the implementation of the new work organization principles and models, promoting the necessary cultural change to realize tangible benefits from Smart Working. They must also be able to carefully evaluate all the positive and negative aspects of the implementation of Smart Working, ensuring balanced and aware management of change.

Those four fundamental levers have been proposed to a selected group of Public Administration during a specific Workshop organized by *Osservatorio Smart Working*. Representors of those PA validated the levers and acknowledged their validity in investigating the application of Smart Working in the context.

Those surveys about the use of *Smart Working* in PA and the confrontation with statistics before and mid-pandemic will be the starting point for the research on the performances in the Public sector.

4 Research Objective and Methodology

4.1 Research Questions

Literature on Smart Working implementation is vast and constantly evolving, reflecting the growing interest in new ways of working. In particular, the most recent research shows an increasing focus on the Public Administration context, delving into the significant differences that can emerge between different PAs in the adoption and effectiveness of Smart Working (De Marco, Marcone, & Scarozza, 2022) (Todisco, Mangia, Canonico, & Tomo, 2022).

A targeted approach to the specifics of PAs results important to fully understand the challenges and opportunities associated with implementing Smart Working in a public context (Di Tecco, et al., 2021). The variety of services offered, differences in hierarchical structure, and the specific needs of each Public Administration all contribute to a unique landscape that requires specific insights (Decastri, Gagliarducci, Previtali, & Scarozza, 2020). Those principles help in formulating the first Research Question for this thesis:

RQ1: How much is Smart Working diffused? Are there significant differences based on PA typology?

Other important insights that are suggested by the latest research concern the measurement of performances for employees that adopt Smart Working models (Cuel, Ravarini, Ruffini, & Varriale, 2021), but also how the organizational aspects can cope with the different attitudes and differences that working teams can present (Giacomini & Palumbo, 2023). Hence, the second Research Question for the thesis will be focused on those abovementioned aspects:

RQ2: How the modality of Smart Working application impact on the performances? How can the team composition impact on the performances?

In addition, new research highlights the importance of examining the different dimensions of Smart Working within PAs, including factors such as change management, technology adoption, and the role of coordinators (Veglianti, 2023).

This attention to organizational nuances is crucial to developing targeted approaches and customized policies that consider the particularities of each PA in successfully implementing Smart Working.

Those indications from literature suggest the third and last Research Question:

RQ3: How can the leadership style of the coordinator impact on the performance of the team?

Those three Research Question will guide the thesis around the central subject, to well clarify the investigated aspects and provide useful insights on the topic.

4.2 Research Objective

To answer the Research Questions, the thesis will follow a scheme that is here briefly schematized.

5. *Initial Framework.* The post-pandemic situation in the Italian PAs seems to be very heterogeneous for what concerns the usage of flexibility instruments such Smart Working. Due to the extreme differences in dimensions, objectives, and organizational structures of the Administration it is not simple to find trends that goes horizontally between different organizations. The first part of the analysis will be focused on understanding how to group different PAs in macro categories, according to similar behaviours and other features. This will be possible thanks to the analysis of the first survey, which can reach more than 400 Public Administrations in the collecting period of the responses.
6. *Choice of the target PA for the study*. Once that the analysis on the first survey is complete, it will be possible to choose which groups of Public Administrations to address to obtain coherent and consistent data for the subsequent analysis. This will be evaluated through a comprehensive set of indicators and statistics coming from the data gathered in the responses of the first survey. At the end of the process, it will be possible to understand and process the data of the targeted PA that will provide the further information for the research. Also, at the end of this phase it will be possible to answer to RQ1.
7. *Performance and behaviour analysis.* The chosen Public Administration is studied by the researchers thanks to the responses of the second survey. This questionnaire aims at the investigation of the performances that employees in the specific PA report to achieve and other significant parameters, such as the well-being levels during their working activities and the level of engagement achieved. Also, the

survey allows to classify each worker according to different parameters, so that is possible to test some correlations between descriptive factors and overall evaluation of the employee in their proper working environment. This phase will allow to find some possible answers to RQ2 and RQ3.

8. *Takeaways and conclusions*. The analysis and elaborations coming from the surveys will give the possibility to validate the correlations that are investigated. Moreover, the data will be tested with the appropriate statistical instruments to confirm the correlations that the survey suggested. The information resumed in this phase will give the main takeaways of the research, but they will also evidence the possibility of further analysis about flexibility applications, Smart Working evolution in the Public Administration and understanding of best practices and patterns that can be used to confirm the validity of those implemented methods.

4.3 Surveys Description

All numerical data that will be used in the sequent chapters comes from exclusive surveys that are designed in collaboration with *Osservatorio Smart Working* from Politecnico di Milano.

The activity of the research teams focuses on different working environments, and it provides every year useful information and insights. Since *Osservatorio Smart Working* collaborates with many different stakeholders, coming from either public or private networks, its research presents a broad spectrum through all different typologies of organizations.

Designed to gather information of various kinds, these questionnaires consider several dimensions, from travel logistics to the more nuanced aspects of work-life balance. The goal is to gain quantitative and qualitative insights.

Thanks to the usage of this resource, our research explores the complexities of smart working adoption in Italian Public Administrations, deciphering patterns and revealing the nuances that characterize modern work dynamics. These surveys are key tools for understanding trends, challenges, and opportunities in the evolving context of professional practices.

The first, more general survey aims to capture current trends regarding Smart Working and flexibility initiatives in different government departments. The questions focus on the general attitudes of the entire organization toward innovation, which can

be pursued in different ways. For example, it is asked to assess spatial or technological aspects typical of PAs, but also the actual level of use of Smart Working concepts and flexibility measures for different roles.

The second survey is more specific and intended for all PA employees, exploring appropriate habits and perceptions of the performance of an organization's internal structure. This questionnaire includes several questions about employee performance under specific conditions to understand what factors influence it and to what extent. In addition, employees are asked to rate their personal levels of well-being, commitment to the organization, and satisfaction.

Through these distinct approaches, the research provides a comprehensive view of the dynamics of Smart Working in PA, from the general perspective to individual perceptions and habits within individual organizations.

4.3.1 First questionnaire: Italian PAs

The first survey involves several different Public Administrations, that have their premises spread in all regions of Italy. Furthermore, the respondent administrations feature different dimensions and different level of technological advancements.

The only requirement for the participant was a minimum number of 10 workers for the respondent PA. Each administration expressed the interest in being contacted by being previously in touch with *Osservatorio Smart Working*. This allowed for the identification of a responsible figure in each Administration that is responsible for the completion of the survey. Hence, only one answer for every different PA is considered for this questionnaire.

The population for the survey consisted of 2500 Administrations from all over Italy. When the questionnaire was closed to new answers, more than 400 samples were completed and ready to be analysed. The survey focuses on different aspects of the working habits of the respondent PAs. The following list points out the focus points of each question.

- *Monitoring Adoption and Evolution of Smart Working*: question 1 asks about the flexibility and Smart Working initiatives that are currently present within the PA and those that are planned for the following months and years. This is useful to collect information about ongoing and future Smart Working initiatives, to enable a comprehensive overview of the evolution over time.
- *Assessing the Presence of Agile/Smart Working*: question 2 aims to understand if Smart Working is already a part of the everyday practices of each organization. The following questions (2.1-2.4) provide a detailed insight into the model that is employed, the roles involved and the number of employees who take part into the projects. These questions help to quantify the extension of the Smart Working adoption and how it is being implemented in different environments.
- *Identifying Objectives and Supportive Initiatives*: Questions 2.5 and 2.6 are set to understand the organization's objectives concerning Smart Working and the actions that are currently adopted or planned to support the desired goals. These insights help in evaluating the PA's priorities and strategies related to Smart Working.
- *Environmental Impact Assessment*: Question 2.7 asks the PA to assess the environmental level of impact of Smart Working. This parameter is set to help understand the contribution of Smart Working to environmental sustainability, whether it is possible to estimate this measure.
- *Identifying Barriers and Limitations*: Question 3 asks to identify any obstacles or limitations that hinders the implementation of Smart Working within the PA. This question is useful to identify whether there are common causes of a limited adoption of those Smart Working initiatives and to propose possible solutions.
- *Assessing Policies, Behaviours, Technologies, and Workspaces*: Questions 4, 5, 6 and 7 focus on the collection of data about the ongoing situation of the organization concerning policies, behaviours, technologies, and workspaces. These typical dimensions can strongly impact the adoption and the effectiveness of Smart Working.
- *Understand Workspace Modifications*: Questions 10 and 10.1 focus on the most recent workspace evolution and the driving factors behind these changes. The details examined here are needed for understanding how working premises are being adapted to accommodate Smart Working practices.

- *Evaluating Changes Over the Last 3 Years*: Question 12 analyses which are the changes that the PA faced in the last three years in relation to Smart Working. The data coming from this question helps in understanding which are the trends that involve the different PA when talking about Smart Working introduction.
- *Exploring Territorial Enhancement Initiatives***:** Question 13 focuses on initiatives aimed at the enhancement of the local zone to achieve a better diffusion of Smart Working. This can include, for example, new set up of the already existing premises to accommodate the agile workers or the creation of agreements with other public or private companies to obtain more workspace that is aligned with the needs of the workers.
- *Assessing Future Smart Working Adoption*: Questions 14 asks about the PA's perspective on the future implementation of Smart Working and the number of employees who will be involved. These insights are useful to provide information about the long-term adoption of Smart Working practices.
- *Analysing PIAO***:** Questions 17 aims to understand how the responding PA intend to implement and adopt PIAO and the benefits that can derive from it. Also, the question tries to analyse the difficulties that are found it the implementation of this Plan.

The questions had different modalities to collect the answers. While some questions offered the person who was in charge to complete them a Likert scale to graduate the PA position towards some aspects, some others proposed fixed options for the employee to choose between. Each question has its own *Comment* section to be complemented with as an optional feature. This allowed for better clarification if the person that completes the survey needs to explain some of the discussed points.

It is possible to track down each submitter for every answer. This allows for a thorough and complete data analysis and it enables many possibilities to classify data via different variables.

4.3.2 Second questionnaire: single workers of a PA

The second survey aims at the collection of data about the Smart Working and flexibility habits of several Italian PAs. While the first questionnaire was focused on capturing the whole maturity and advancement level of a single PA, this survey is designed to hear the voices of as many employees as possible for each interviewed company. This allows to have refined and on-point information about job conditions, working habits, typical behaviours, common beliefs, and procedures that are relevant to understand how well the company is performing in terms of flexibility and Smart Working implementation. This specific questionnaire was distributed to selected Organizations, among all the Public Administrations that are invited to attend *Osservatorio Smart Working*'s directional meetings about Smart Working.

Through a complete and comprehensive set of questions, PA workers can express a plethora of opinions about their working situation. Since RQ2 and RQ3 need data about flexibility implementations and Smart Working efficiency levels, this survey is designed to gather information about those Research Questions. To understand the context of the survey, the following list explains the content of each question, or group of them.

First part: general question to all employees.

- *General information about the worker*: Questions 1-9 aim at the categorization of the worker based on their age, gender, role in the company, Italian region of residence and coordinative position.
- *Commuting habits***:** Questions 10-12 ask the employee which are their habits when talking about work commuting. It is asked to explain which means of transport is mostly used, which is the actual distance between the residence and the work premises and the average trip time to work.
- *Remote work level***:** Questions 13-16 ask to explain which is the current flexibility and Smart Working level for the employee. Also, it is asked to acknowledge whether there is the possibility to have the same level of service with a different number of working days allowed for Smart Working.
- *Working experience rating***:** Question 17 oversees the working conditions and tries to understand the overall satisfaction of the respondents. The question investigates about several parameters, such as the personal satisfaction, the freedom to express thoughts, level of integration with colleagues and supervisors, and adequateness of the technological means that the workers can exploit to complete their tasks.

- *Energy levels and engagement rating*: Question 18 asks the workers to rate different aspects related to engagement, satisfaction and energy levels that feature the typical working day.
- *Bonding with the Organization*: Question 19 investigates whether the employees feel bonded to the organization and how much they sympathize with the organizational goals. The more the employees feel involved, the more the level of bonding is higher.
- *Self-reporting of performance evaluations*: Employees are asked in question 20 to self-report their performance ratings according to six different parameters. Those value help in understand which kind of worker has the highest valuations and to test whether there is some kind of correlation between those features.
- *Self-evaluation of working conditions*: Question 21 asks the employee to value different aspects of their working life, including work/life balance, organizational capability, quality of life inside and outside the working environment, psychological and physical well-being, and overall effectiveness.
- *Over-working and technostress check*: Questions 22-23 try to understand whether the worker is currently experiencing a too high level of stress and/or the working hours are too higher than the number that is agreed on the job contract. Those factors are important to keep into account because those conditions could lead to a severe dissatisfaction for the employee, also resulting in a lower performance.
- *Focus during working hours*: Question 24 asks the employee to rate their focus and dedication to the job mansions during working hours, but it also asks whether it is possible to clearly distinguish between working time and rest time, especially if the respondent is a Smart Worker.
- *Impact of digital technology*: Question 25 investigates the impact of technological means for the workers in both home and office accommodations. On the other side, the abuse of technology could also harm the worker, making harder to disconnect from the working environment. This aspect too is investigated in this question.
- *Manager evaluation*: Question 26 tries to classify which are the most common habits among coordinators of all employees. Here it is asked about their ability in coordination, correct empowerment of all workers, general knowledge of the norms and procedures, and their general behaviours towards the company.

- *Organizational spaces and premises*: Question 27 asks to evaluate the quality of the spaces that companies dedicate to workers. Many different parameters are considered, such as the possibility to collaborate with others in the allowed spaces but also the presence of innovative drivers like co-working zones.

Second part: for managers and coordinators.

- *Smart Working and Remote Working habits*: Questions 28-31 asks the coordinators which level of Smart Working is present in their team of workers. Is it also asked how many days the workers can effectively spend on remote working, but also some insights on the organizational aspects of the remote work. Lastly, it is asked to evaluate how much the remote work differs from the on-site work.
- *Performances of the controlled team*: Question 32 asks to the coordinators the same set of performances that has been asked to the workers in Question 20, to understand if the perception of workers and managers are aligned. Furthermore, it allows to understand how different working groups perform varying the features of their coordinator.
- *Overall quality of the team*: in a similar way to Question 21, also in Question 33 it is asked to evaluate stress levels, overall satisfactory feelings, and general well-being of the employees.
- *Focus points for team improvement*: Question 34 consists of 12 possible suggestions that coordinators can choose as the most appropriate to improve in their team. Those parameters help to understand which kind of workers need more attention in matter of different areas of interests to achieve a greater working quality.

Third and last part, composed by a single question: general for all employees.

- *Smart Working adoption*: In question 35 is asked to evaluate on a 1-10 scale whether adopting a hybrid solution between full remote work and on-site work could be useful and productive.

In a similar way to the previous survey, also this questionnaire entails different ways in which the respondents can give their answers. While some questions require to rate how much the respondent agrees to the proposed statement, some others ask the employee to enter numbers and data about the question that is being asked. Every question comes with a *Comment* section for each question. In this survey it is ensured to the respondents the maximum level of anonymity, to protect the personal data.

4.4 Evaluations and ANOVA testing

Information coming from the surveys provide the core data for the analysis that will be performed in the elaboration chapter. General data coming from the first questionnaire will be used to set the descriptive component of the research, since polling a high number of Public Administration is useful to understand the general environment about Smart Working introduction and practices.

Since the nature of the second survey is more specific and bonded to the typical habits of one single PA, data coming from it will compose the second part of the research. This section is more focused on understanding the correlations between workers' habits and performances. Also, the analysis of the coordinators' role in employees' performances and well-being statuses is possible thanks to the contribution of the survey.

To validate the numerical data of occurrences and their percentages, the research will be based on the statistical test of the Analysis of Variance, also called ANOVA test. (Qualtrics, 2023)

The use of the ANOVA test, especially its one-way version, proves to be a wise choice in the context of statistical validation of a survey. This test is particularly well suited for examining significant differences between distinct groups and it can provide an in-depth overview of variability in responses in a survey research context. One-way ANOVA allows to compare the averages of three or more independent groups, assessing whether these averages are statistically different from each other. In the case of a survey, this can result in comparing average responses across different categories of respondents or across different sections of the sample. (Chatzi A, 2023)

A key advantage of using ANOVA is its sensitivity in detecting differences even when within-group variability is significant. This is particularly relevant when working with survey data, where diversity of opinion is inherent. ANOVA allows to discern whether differences between groups exceed those expected based on natural variability, providing an accurate assessment of differences in response between the categories examined.

In addition, ANOVA the handling of multiple independent variables simultaneously, allowing the exploration of complex interactions between different factors. This is useful in a survey context where multiple variables may influence responses. For example, one might want to analyse how differences in responses to a question vary

not only among demographic groups but also in relation to factors such as age, income, or education.

In general, the analysis is performed with the objective of obtaining a confidence interval of 95% to consider the hypothesis of correlation. Determining the confidence interval provides an estimate of the accuracy of the responses obtained from the survey. In the context of ANOVA, this can translate into assessing the accuracy of mean differences found between groups. A 95 percent confidence interval indicates that there is a 95 percent probability that the true difference between groups is within the calculated range. This provides a measure of robustness to the conclusions drawn from the ANOVA, allowing us to understand how confident we can be that the observed differences are not due to chance. The thorough use of the ANOVA test, together with the assessment of the 95 percent confidence interval, is a robust approach for statistical validation of a survey. (Hazra, 2017)

Also, it could be necessary to confirm in a stronger and more organized dimension the validity of the correlations, hence the data analysis is correlated with the Bonferroni correction. Using Bonferroni's correction in conjunction with the ANOVA test adds a crucial dimension to the statistical validity of the survey. Bonferroni's method is an alpha correction procedure that is applied when making multiple comparisons between groups. In surveys, where multiple variables are often compared, this correction is essential to avoid Type I errors, that is, wrongly concluding that there are significant differences when in fact there are not.

Imagine performing a series of between-group comparisons, for example, across different age groups, education levels, or geographic regions, following an ANOVA analysis. Without adequate control, the risk of obtaining falsely significant results increases significantly because of the overall increase in comparisons performed. Bonferroni intervenes by reducing the critical significance value (alpha) for each comparison. In practice, this correction results in greater stringency in accepting as significant only those differences that exceed a corrected confidence level.

The reason for this caution is that as the number of comparisons increases, the probability of observing at least one significant difference by pure chance increases. Bonferroni corrects for this probability, reducing the possibility of Type I error and ensuring that the differences deemed significant are indeed significant.

Implementation of Bonferroni's corrective is particularly relevant in survey contexts, where multiplicity of variables examined is the norm. For example, it might be interesting to compare responses on different dimensions such as gender, geographic area, and educational level. Bonferroni assures that even with numerous comparisons, the differences that emerge are indeed significant, minimizing the risk of misleading interpretations. (Napierala, 2012).

Data analysis in the present research was conducted with a precise methodological approach, using Excel and STATA as analytical tools. For the first survey, characterized by descriptive data, Excel was chosen as the ideal platform because of its intuitive interface and ease of use. The nature of the data did not require complex calculations, and Excel proved to be a flexible tool for processing exploratory-type information.

For the second survey, which provided statistical-type data, needed to be analysed with a more performing software, hence the choice fell on STATA 14/SE Version. The choice of STATA was motivated by its analytical power, which is particularly effective in performing advanced statistical analysis. The robustness of STATA was further highlighted by the ability to create *do-files*, allowing for effortless repeatability in calculations. (STATA Corp., 2023) This feature was critical in ensuring the consistency and reliability of the complex statistical analyses required by the second survey. (STATA Corp., 2023)

The combined use of Excel and STATA allowed to take full advantage of their respective peculiarities. Excel facilitated the management of descriptive data, while STATA proved crucial for performing more advanced statistical analyses, ensuring a complete and detailed picture of the data set. This synergy between tools helped consolidate the methodological soundness of the research, ensuring the precision and accuracy of the analyses performed.

To make data cleared and more comprehensive, data subjected to correlative evaluation is distinguished by an asterisk (*), indicating a rigorous statistical analysis process. This means that whether the statistical conditions of relevance for each correlation are met (ANOVA Testing with Bonferroni correction, with a Confidence Interval of 95%), the information is reported with an asterisk.

The use of ANOVA tests allowed to identify significant differences between groups, while Bonferroni correction ensured reliable handling of the multiplicity of

comparisons, avoiding Type I errors. The 95 percent confidence interval also helped provide a detailed picture of the precision of the estimates. The inclusion of this distinctive symbol (*), therefore, underlines the robustness of the methodology adopted, ensuring that the relationships and conclusions drawn are anchored in statistically sound and reliable foundations.

5 Data Analysis

5.1 Descriptive Analysis for Italian PAs

The first survey gives the opportunity to outline an overview on the general ongoing trends about flexibility initiatives and Smart Working practices in different typologies of Public Administrations.

By exploiting the data coming from the first survey, it is possible to understand which is the actual and future usage of Smart Working in different typologies of Public Administration, and so to give RQ1 an answer based on recent data, coming from the observed organizations. In Italy each Administration is classified through an IPA code (IPA: *Indice delle Pubbliche Amministrazioni*, Public Administration Index), that univocally identifies the role and the intervention area of each organization.

It is created to help organizations and administrations to better communicate and exchange data between entities. (Agenzia per l'Italia Digitale, 2023)

Since RQ1 is focused on understanding Smart Working application differences between Public Administration, IPA code helped in study the taxonomy of the involved Organizations and was the primary basis for the division in eight macro categories. Moreover, there are other features than IPA code that are kept inco consideration to define the eight macro categories, such as size of the organization or territorial distribution.

Table 5.1.1 - Definition for the classified macro categories

Macro category	*Definition*
Central PA	Main PA, with important administrative roles and important dimensions.
Other central PA	Other main PAs that do not fit in the first categorization due to different roles or dimensions.
Other local PA	Local PA. Their activities are restricted to a specific geographical zone or a region.
Regions	Self-governing territorial entities with executive, legislative and judicial powers.

Municipalities	Fundamental unit of local government, widespread in all Italy
SSN agencies	Public Health Administrations, they take care of several aspects of the Sanitary System.
Research and University	Public Universities and Research Centres.
Public School	Public Institutions for Education, from Primary School to High School.

The following table represents the occurrence and the frequency of the Public Administration that responded to the survey.

Table 5.1.2 - - Macro categories values and percentages

Macro category	*Occurrence*	*Frequency*
Central PA	7	1,75%
Other central PA	35	8,75%
Other local PA	44	11%
Regions	8	2%
Municipalities	240	80%
SSN agencies	8	2%
Research and University	20	5%
Public Schools	38	9,5%
Total	400	100%

This first division will be useful during the different descriptive analysis that are conducted on the sample.

It can be noted that a significant part of the answers come from the macro category Municipalities. This is because this Public Administration represent many Public Administrations that are present in Italy. To give perspective to this data, in 2017 ISTAT classified all Public Administration in Italy and it was found that there were 7978 municipalities on a total number of 12848 Administrations, representing 62% of the total. (ISTAT, 2019)

Another useful insight about the respondent Administration is the average number of employees that work in the premises. This will help in have an overview of the average dimension for each PA.

Table 5.1.3 - Average and total number of employees for each macro category

Macro category	*Average number of employees*	*Total number of employees for the investigated PA*
Central PA	10014	70101
Other central PA	203	7107
Other local PA	127	5606
Regions	2592	20736
Municipalities	299	71786
SSN agencies	2944	23553
Research and University	1502	21032
Public School	150	5714

To better clarify the typology of Smart Working activities for the different PA, which helps answering RQ1, the survey presented a dedicated section about the initiatives already introduced and the future planned adoptions of new solutions. Each Administration had to choose an appropriate level of Smart Working usage in their organization, according to this classification:

1. Smart Working introduced with structured rules.
2. Smart Working introduced with non-structured and informal rules.
3. Smart Working not implemented, but it will be introduced.
4. No implementation of Smart Working.

By keeping into account this division, those are the values about Smart Working introduction in the investigated PA.

Table 5.1.4 - Percentages of Smart Working introduction at different levels

Macro category	*1*	*2*	*3*	*4*
Central PA	100%	0%	0%	0%
Other central PA	74%	6%	0%	20%
Other local PA	73%	7%	7%	14%
Regions	88%	0%	0%	13%
Municipalities	44%	14%	5%	37%
SSN agencies	75%	0%	25%	0%
Research and University	80%	10%	0%	10%
Public School	18%	8%	0%	74%

This information offers a first interpretation of the actual situation about Smart Working introduction among different kinds of Public Administration. It can be noted that 100% of Central PA typology already adopts Smart Working in a structured way. This is probably because main public institutions are featured with a structured organization model.

As can be deducted from previous insights, this kind of Administration needs to manage on average more than 10000 people, so the organizational level must be adequate. Moreover, main PA are also correctly equipped with technology, spaces and organizational skills that allowed in the previous year a smoother transition to a working model that could also include Smart Working.

On the other hand, other typologies of Administration, such as Other central PA, Other local PA, SSN Agencies, Research and University and Regions adopt either a structured introduction of Smart Working or an informal usage of it. The percentage in this case goes from 75% to 90%.

SSN Agencies, Research and University and Regions feature an average number of employees over 1000 but under 3000 people, so they can be dimensionally compared to the PA that have been previously described and benefit from the already present level of high organization. Other central PA and Other local PA feature on average a

much lower number of workers (203 and 127 respectively), but they still show that is possible to achieve this level of Smart Working introduction.

The last tier in matter of Smart Working introduction is represented by Municipalities and Public School. With an average number of employees between 150 and 300, those Administration feature a high heterogeneity inside the macro category.

Italian municipalities manage many different territorial activities that often need the physical presence of the worker on-site, such as the garbage disposal services or local police forces. Moreover, Italy has many municipalities in its territory, with sometimes less than 50 employees. In those cases, the percentage of Smart Working adoption is lower than other PAs due to the intrinsic features of the Administration, being around 58%.

Lastly, Public Schools come with a less significative percentage of Smart Working introduction due to the prevalent presence of teachers and other roles in this kind of PA that strongly require physical presence. Therefore, the value of 26% still represents an experimentation in a not particular simple field where to apply Smart Working. There is although a percentage of work that can be still done through Smart Working, so also this kind of Administrations can implement it in their habits.

The survey also allows to analyse which are other important statistics about Smart Working habits in those macro categories of PA, such as the average working days that Smart Workers are allowed to work per week and how many workers are involved on average in Smart Working programs. When looking at this statistic, it must be noted that Italian Public Administrations depend on national directives about prevalence of physical presence for the employees.

Those protocols require the PA to have all workers in presence at least for 50% of the working time, hence the regulations restrict the possibility to adopt elongated period of remote working.

Table 5.1.5 - Other statistics for macro categories

Macro category	*Average Smart Working days per week*	*Average percentage of involved workers*
Central PA	2,18	68%
Other central PA	1,59	49%
Other local PA	1,21	28%
Regions	1,31	44%
Municipalities	0,82	10%
SSN agencies	1,00	5%
Research and University	1,39	56%
Public School	0,63	1%

This subsequent part of insights on Smart Working habits shows how the different macro categories that adopted more the Smart Working initiatives, also try to involve the highest possible number of employees in these flexibility programs.

If the focus is moved on large PAs, we should consider that Central PA tend to involve almost 70% of their personnel in Smart Working activities, achieving 2,18 days of Smart Working per week that allows for a total of 9 days a month for the employees. Then Other central PA, Other local PA, Research and University and Regions involve from 28% to 56% of their personnel in Smart Working programs, but the average days of availability range from 1,59 to 1,21 per week.

Lastly, SSN Agencies, Municipalities and Public Schools have a lower rate either for the average days of Smart Working (from 1 to 0,63 per week) and for the involved personnel (from 10% to 1%). These observations confirm what has been deduced before about size of the PA and typologies of workers that are involved in the Administration.

To complete investigations for RQ1, a sequent part of the survey aims at understanding the future intentions of the different categories of Public Administration. Here are the four different levels for the Smar Working future adoption.

1. Future structured usage of Smart Working.
2. Future informal usage of Smart Working.
3. No future usage of Smart Working.
4. Data not available.

The table below collects the data about the future development of Smart Working programmes for the Public Administration.

Table 5.1.6 - Future implementations Smart Working projections for each macro category

Macro category	*1*	*2*	*3*	*4*
Central PA	100%	0%	0%	0%
Other central PA	73%	6%	18%	3%
Other local PA	75%	2%	9%	14%
Regions	88%	0%	0%	13%
Municipalities	46%	9%	24%	21%
SSN agencies	100%	0%	0%	0%
Research and University	80%	0%	0%	20%
Public School	24%	8%	34%	34%

Complementing this data with the previous table, it is possible to create a graph to understand the trends about the actual situation and future adoption of Smart Working practices in Italian PAs.

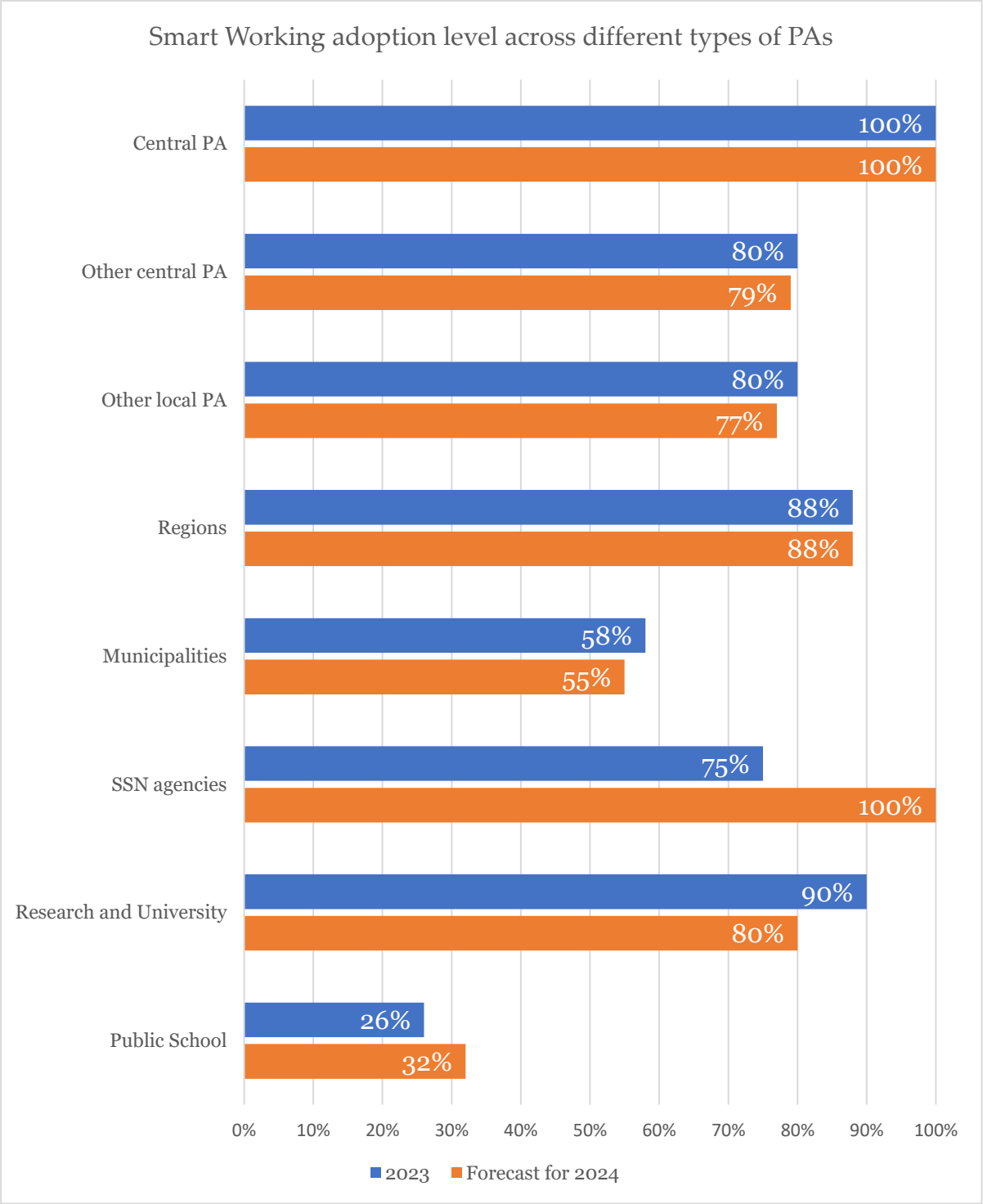

Figure 5.1.1 - Present and future trends in Smart Working usage

As it is shown in the graphs, each typology of Public Administration comes with a different trend about the evolution of Smart Working Adoption. This depends on the different dimension features each macro category of PA, and other organizational characteristics that differ from one Administration to another.

The largest PA, such as Central PA and Regions tend to confirm the organizational positions that are implemented nowadays. This is because the effort level in the large Administrations that is needed to implement Smart Working is meant to be permanent.

Moreover, it is also probable that the developing plans for Smart Working forecasts to extend this kind of flexibility to other typ0logies of employees inside the same Administration, to maximize the benefits that come from it. Similarly, also SSN Agencies forecast to adopt Smart Working solutions whether they are not already implemented.

On the other hand, other Public Administrations like Other central PA, Other local PA, Municipalities, and Research and University are showing a slight decrease in future Smart Working adoption.

This can be because many realities intended to use any kind of remote working as an emergency solution during the Covid pandemic, without understanding the potentials that this innovative way of working could bring to the Administration.

The most interesting and surprising case of this statistic is represented by Public Schools, that show a future increase in the usage of Smart Working for the oncoming years. This could signal a possible implementation in this typology of Public Administration for those roles that do not require physical presence at all, such as back-office operations in the teaching sector.

The sequent part refers to the evaluation of the levers studied by Osservatorio Smart Working and approved by involved PA. The measure of maturity level of those parameter will provide insights about the structured implementation of Smart Working for each organization.

Each one of them represents a dimension in which the Administration can organize whether to implement new solutions and innovations to improve the employees' condition not only in Smart Working regime, but also in general. In the table are reported the valuations that each PA is entailed with for each category.

The valuation for the maturity level goes from 1 (no mature at all) to 5 (completely mature).

Table 5.1.7 – Average maturity evaluation for each parameter

Macro category	*Policies*	*Behaviours*	*Spaces*	*Technologies*	*Average*
Central PA	2,83	2,50	1,50	3,00	2,46
Other central PA	2,50	2,43	1,68	2,75	2,34
Other local PA	2,06	2,71	1,66	2,43	2,21
Regions	2,57	2,29	2,00	2,43	2,32
Municipalities	1,57	2,26	1,45	2,33	1,90
SSN agencies	1,50	2,17	1,50	2,50	1,92
Research and University	2,83	2,56	2,06	2,72	2,54
Public School	1,70	2,40	1,80	2,50	2,10

Each macro category has different evaluations for the different areas of maturity, but some common behaviours can be found. For example, it is common for most of Public Administrations to have the driver value Spaces around 2 out of 5 marks.

This is because most of Public Administrations have their premises in historical city buildings or not so recently built structures. Therefore, it is not easy to innovate the spatial dimensions offices and working places due to constraints, but Research and University shows a positive value of 2,06 as a modest positive usage of spaces.

The dimensions Technologies and Behaviours show a more encouraging marking for all macro categories. While the technological factor is about the right equipment and software solutions for the various job requirements, the behavioural aspects reflect the supportive mindset that Public Administration employees tend to show towards this kind of innovation.

Looking at Policies dimension, it can be noted a more heterogeneous marking among the different macro categories. While wide organizations such as Central PA or Regions tend to have a good positioning with almost 3 out of 5, there are some critical evaluations for SSN Agencies and Municipalities, being respectfully 1,50 and 1,57.

This can be attributed to the informal adoption of Smart Working in the Municipalities case, because as explained before the dimension of this typology of PA tend to be

small, so there is no massive introduction of structured policies. The criticalities concerning SSN Agencies could be represented by the difficult economic situation that the Health sector is having in Italy during this period, hence there is no such stability to fully implement some stable and structural changes to embrace Smart Working innovations and benefits.

By having an overview of all data, it is possible to say that wider Public Administrations tend to embrace Smart Working (and in general any innovation) in a more organized and organic way, thanks to the structured levels of hierarchy and the experience in management of hundreds of employees.

This is confirmed by the percentages of PA with large dimensions that successfully implemented Smart Working in the previous years and that still intend to implement it in the following periods. Also, the maturity evaluations about the four Maturity Drivers states that large Public Administration tend to be more advanced with respect to the smaller ones.

On the other hand, smaller Administrations or organizations that come with unique conditions (such as the Health sector) not always succeed in Smart Working implementations nowadays, and in some cases the forecast is to slowly dismiss the remote working habits to come back to exploit the jobs on-site.

So, data coming from the first survey serve the purpose of answering RQ1, due to the capability of understanding the general trends of Public Administration about Smart Working usage, but also the future intentions of the different typologies of organizations.

5.2 Focus on central PAs

The information available for the different macro categories gave the opportunity to evaluate which group to focus to understand which are the aspects that feature the application of Smart Working, and which are the effects on productivity and wellness of the employees. The first survey helped in analyse the general situation of all kinds of Public Administration, but to well capture the real essence of Smart Working implementation, there is need for specific study of a real case.

The choice of focusing on the main and central Public Administrations has its base in various aspects that make this macro category more capable of giving information and more interesting to study.

As previously explained, the great dimensions of those realities help in the systematic adoption of innovative solutions and the correct implementation of them. This is due to the strong managerial forces that the organization needs to correctly control and administer thousands of employees.

Also, those large Administrations are frequently spread through all Italian territory, hence they well capture different perspectives for each region in a single and comprehensive organization. With data and workers coming from different zones from Italy, those organizations show that is possible to manage diversity in working needs, objectives and scopes through a diffused and effective controlled mechanism that features Italian bureaucracy.

This brings the Administrations that fall in this macro category to be more similar to great private companies and less commensurable with other features of smaller Public Administrations.

Moreover, as can be seen in Table 5.1.3, Central PA employs more than 70000 people according to the respondents. This value is second only to Municipalities, but this macro category is represented by 240 different realities that show great heterogeneity of dimensions in the same category, hence the statistics coming from the study of these PA would be too much general.

Also, remembering the values of the four Maturity Drivers previously described, it can be calculated an average of them. The average is shown in Table 5.1.7, always on a scale from 1 to 5. This value helps in the decision of focusing on Central PA due to its positive average between the others.

Even if Research and University present a higher average, the number of people employed in Central PA is 3,3 times greater, hence this macro category represents a more interesting study field for the research. Data analysis from the first survey was crucial in shaping the direction of the research. Examination of the descriptive information highlighted that a large central PA presents particularly interesting characteristics for further study of Smart Working implementation. The decision to focus the investigation on such a large PA was guided by diverse factors.

First, the considerable size of this organization makes it representative of a broad and diverse reality, reflecting various facets of agile work dynamics. This allows for more generalizable results and captures the specific challenges that can arise in large settings. In addition, the selected central PA has an average level of maturity in the management of Smart Working. This is of particular interest, as it allows for an in-depth examination of the transition phases and organizational adaptations needed to successfully implement agile working.

Through the analysis of an environment with an average level of maturity, the research can help identify best practices and the most relevant challenges that may arise during this change process. Moreover, the study of Smart Working applications in a broad Public Administration allows to capture some of the best practices that the coordination team developed to make possible the introduction of this kind of innovation, allowing to learn about the approach with the intentions of replicate it, in a scalable and controlled manner to improve the general Smart Working experience of different Public Administrations.

5.3 Performance Evaluation of a main Italian Public Administration

Choosing a main central Public Administration as the target of the direct observation can offer different possibilities. It is indeed shown in the previously illustrated data that greater PAs can be an interesting field of exploration for Smart Working application and introduction of various possibilities of flexibility. Information coming from this typology of organization reflect the feelings and the thoughts of several employees that work in diffused entities all around Italy. This is one of the most impacting factors for the choice. Also, since great PAs tend to be more structured, it is therefore more immediate to register and work on the extracted data.

The following data comes from a diffused PA that is present in each region and in most of the main localities of Italy. Total number of employees for this organization is over 9200 workers. There are several mansions that are covered by this PA, hence there are many different roles that benefit from the introduction of flexibility initiatives and Smart Working implementation.

Moreover, other explanations about the decision of the focus are given in the following list.

- *Broad impact and greater representativeness: size and territorial coverage*. A large central organization involves a significant number of employees and features a wide presence over a large territory than other smaller Public Administrations. Analysis of Smart Working in such this typology of entity provides a more comprehensive view of the impact of more flexible policies on a larger scale, and better represents the complexity of organizational dynamics in such a specific public sector.
- *Diversity of roles and operational complexity: variety of sectors and tasks*. In a large central PA, the diversity of sectors that are covered by the operations and tasks that are needed to be carried out is usually wider than in smaller organizations. This variety allows for a deeper and more precise assessment of how Smart Working can be applied in various operational contexts, to understand the specific challenges of each different sector and analyse the impact of this innovative flexible kind of working agreement for the different roles.
- *Synergies and standardization of practices: possibilities for standardization*. The study of Smart Working application in a large central PA enables the identification of possible synergies caused by the innovative way of working. Moreover, the

assessment of those practices can kickstart opportunities for standardization of practices. This implementation could help to promote the implementation of homogeneous policies across the organization, that could improve efficiency and could be useful to achieve consistency in the application of those new innovative ways of working.

- *Resource management and optimization: human resources and tools***.** In a large central PA, human resource management and the availability of technological tools are with higher probability more complex than in a smaller Public Administration. Analysis of Smart Working in this context can focus on the best optimization of human and technological resources, considering aspects such as staff training, performance management, and cybersecurity on a broader scale.

Also, other aspects about the analysis of Smart Working application in this kind of context can be relevant.

For example, larger Public Administrations can rely on average on much substantial financial resources for their innovation processes. The presence of those funds and more technological resources than other typologies of organisations provide an opportunity to implement advanced solutions. This allows targeted investments in cutting-edge technologies, facilitating the adoption of flexible working models and improving operational efficiency through tools that facilitate agile working.

Other motivations can be conducted to large-scale change management guidelines of the organizations. Those attitudes represent a hallmark of large central PAs. Addressing large-scale organizational change is a challenge that such entities are more likely to tackle successfully. Analysing Smart Working in this context allows for a close examination of organizational change processes, including managing resistance to change and the cultural adoption of new working models.

Finally, the demographic representativeness of large central PAs, with greater diversity among employees, is a determining factor. This context provides a significant opportunity to assess how different age groups react to the organic implementation of Smart Working practices in the organization.

Such diversity allows Smart Working policies to be tailored to the specific needs of each demographic group, giving the opportunity to consider the possible generational differences among employees and determine the most effective strategies for each different working subpopulation.

The second survey represents the basis for this research, and it is intended to gather more responses than the first one, since it asked to all employees of the interested Public Administration to answer. Thanks to this data, we will be able to answer RQ2 about Smart Workers' performances based on their working conditions. Also, thanks to a specific section of questions about coordination and management, RQ3 will be answered.

Osservatorio Smart Working collected 2491 answers on the total number of employees, hence almost 30% of workers gave their opinion. In statistical terms, a sample of 2491 people over a population of 9000 individuals lets the calculation to have a 95,75% confidence interval, therefore it can be considered significant being this value over 95%.

People interviewed in this survey were asked to specify whether their role comprehended the administration of other people. If an employee has this role in the organization, a dedicated part of questions is unlocked and some data about the coordinators' group is collected. The questionnaire highlighted that of the 2491 interviewed workers, 692 of them had a coordination role.

The first statistics allow to understand which is the distribution of the basic information of the employees. One of the main indicators that can be extracted from the survey is the percentage of different ages through the workers. This information is described in the table below.

Table 5.3.1 – Master data statistics for employees

Age group	*Number of Employees*	*Percentage*
Under 30 years	13	1%
Between 31 and 35 years	87	3%
Between 36 and 45 years	291	12%
Between 46 and 55 years	980	39%
Over 55 years	898	36%
Total	**2269**	**91%**
(Data not Available)	(222)	(9%)

As can be seen from the data, not all employees gave information about their age, but the data is still significant.

The values show that a high number of workers (more than 75%) is over 46 years old, with a significant component of even older employees, over 55 years, that reaches 36% of percentage.

This first data depicts this Public Organization as composed of mature people, that historically are shown to be more resistant to organizational changes and less prone to use their energies to learn new skills and/or improve the existing ones.

If the focus is moved on the managerial and coordination aspect, also here the general percentages are respected. The table below reports the same data but extracted for the coordinators.

Table 5.3.2 - Master data statistics for coordinators

Age group Coordinators	*Number of Employees*	*Percentage*
Under 30 years	3	1%
Between 31 and 35 years	16	2%
Between 36 and 45 years	68	10%
Between 46 and 55 years	295	42%
Over 55 years	247	36%
Total	**629**	**91%**
(Data not Available)	(63)	(9%)

This age distribution of the coordinators shows that also the managing team is composed by the same percentages of the total group. As highlighted previously, having an elevate average age for the workers can be considered harmful for Smart Working introduction. This Public Administration, however, showed a satisfactory level of application of the flexibility measures that have been proposed, and the following data demonstrates it.

5.3.1 Focus on workers based on their flexibility level

In the survey, the employees answered to several questions about their working habits and the different way of completing the job tasks are present in the everyday activities. The questions concerned the organization that each employee must deal with when talking about the task and the jobs that are assigned, but also which is the nature of the interaction with the coordinator. The classification used in this section directly refers to Osservatorio Smart Working's guidelines and it is based on the previous years' analysis and observations. Furthermore, data coming from this section allow to answer to RQ2.

This data helped in the classification of the employees according to three different groups:

1. Smart Worker
2. Non-Smart Remote Worker
3. On-Site Worker

The three dimensions reflect which is the flexibility level that each employee is able to exploit in their working routine. While Smart Workers have the highest levels of flexibility of spaces and working time, Non-Smart Remote Workers can only work from remote with more restrictive rules about time. Lastly, On-Site Workers do not have access to any kind of flexibility. The pie chart below shows which are the proportions between those groups in the population of the respondents of the survey.

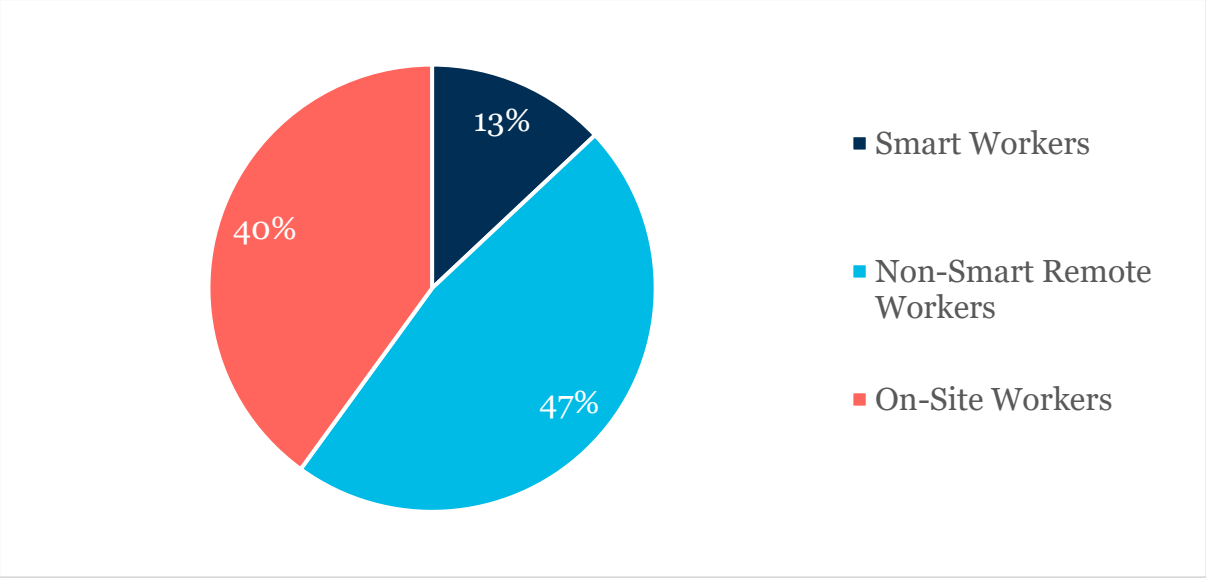

Figure 5.3.1.1 - Distribution of typologies of workers

As can be deducted, there is a consistent percentage of respondents indicating that their working style is Non-Smart Remote Worker. This could be due the impact of the forced introduction of Smart Working habits as consequence of the Covid-19 Pandemic. This contingence had a double-sided effect on the general diffusion of Smart Working practices, and this case could be affected by the too fast implementation of it.

On the other hand, there is also a substantial part of employees that do not work using Smart Working implementation. This could be due to their mansion, that could not be suitable for Smart Working application. It could also happen that those workers are still not involved in the agile working process and that in the future they would be able to enjoy this kind of flexibility. Lastly, a solid 13% of employees classify as Smart Workers.

This means that in this organization there are workers that benefit from Smart Working and the flexibilities that derives from it, but also managers and coordinators that were able to successfully implement this innovation, with a positive impact on the organization and the overall productivity and effectiveness. By looking at their experience, much information can be deducted and analysed with immediate benefit for all the Administration.

The partition of workers based on their working attitudes towards Smart Working is useful in the next block of data analysis, that is inherent to the performance evaluations of employees and the feedback about the working environment in which they spend their time.

These next values refer to the part of the survey that is dedicated to performance evaluation. The choice for each parameter was between a score of 1 (strongly under the expectations) and 5 (strongly over the expectations), with also the possibility of inserting 6 as the “I don’t know/I don’t remember” option.

Since performance evaluation can be considered a non-objective measurement, employees were asked to report the scoring that their coordinator expressed for their activity. Hence, the usage of the Expectation scale should help in reducing subjectivity of this evaluation. The bar chart below reports the percentage of employees that answered the six different questions about the self-reporting of performance evaluation with 4 or 5, corresponding to “Over the expectations” and “Strongly over the expectations”.

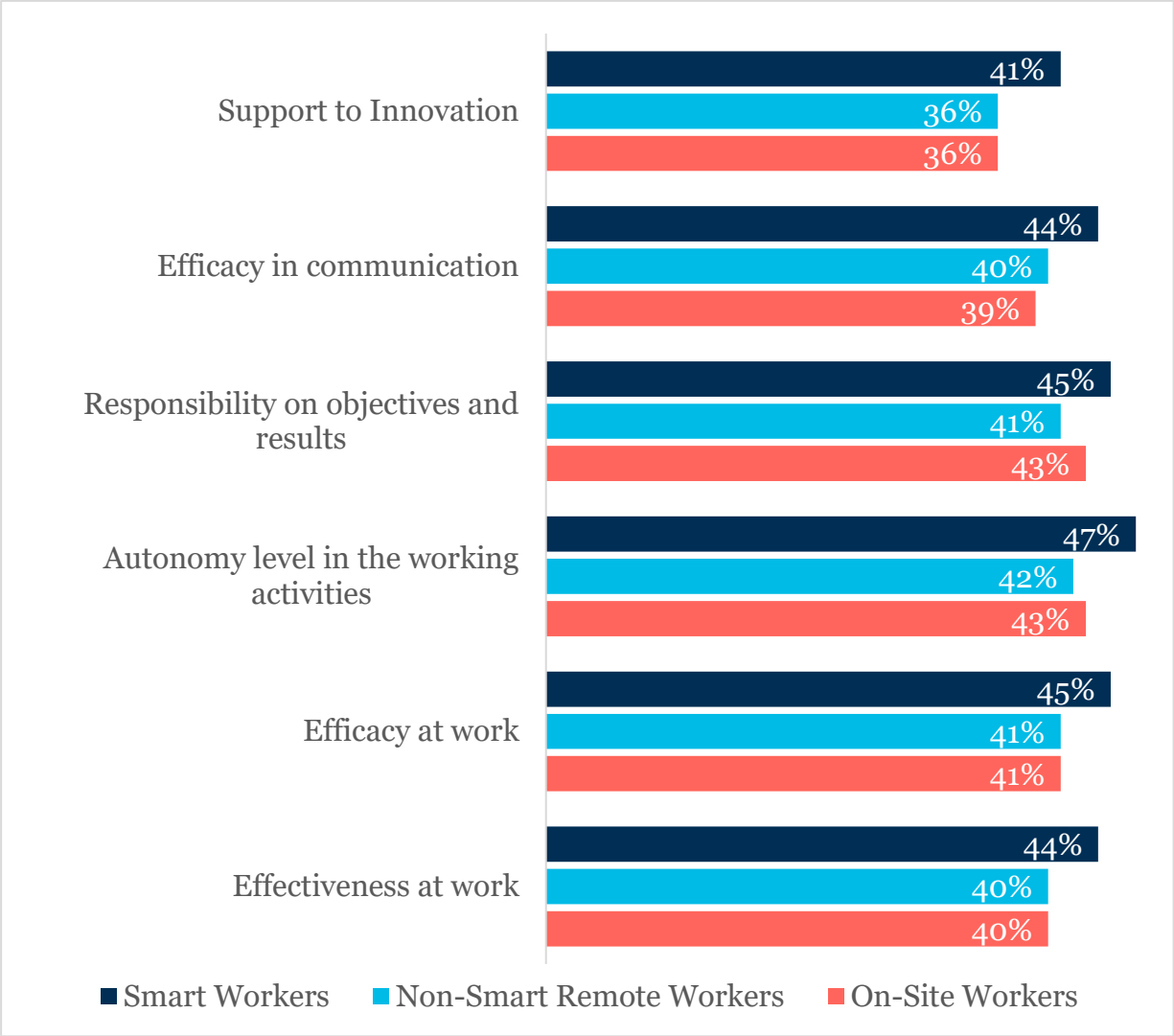

Figure 5.3.1.2- Self-reporting of performance evaluation, divided by workers' typology

This first round of information coming from the survey shows an overall situation that can be perceived as quite positive across all the Organization. Since all statistics are above 36%, this implies that at least that percentage of employees are above or well above the expectations in those evaluating parameters. However, there are some differences between the group of workers that can be detected.

The main information is that for each parameter, Smart Workers are found to perform slightly better than On-Site Workers and Non-Smart Remote Workers. This result is quite significant when talking about Autonomy level in the working activities and Support to Innovation. The result in the first parameter comes from the original need for autonomy and self-regulation when employees are introduced to Smart Working models, hence this result can be considered a confirmation of the positive impact of Smart Working for those workers. The second result, on the other hand, could be given

by the fact that employees that benefit of a higher level of flexibility can more successfully develop useful ideas and innovations for their workplace thanks to their positive approach to work. It is also interesting to note that two important parameters like Efficacy and Effectiveness at work have similar distributions, with both 4% higher scores for Smart Workers than the other two typologies of employees. This also means that, according to this survey, Non-Smart Remote Workers and On-Site Workers have similar levels of productivity, with no (or little) impact of their working accommodations.

Continuing the analysis of the questionnaire, the workers in subsequent questions are asked to report their feelings and beliefs about their wellness and the evaluation of different aspects concerning their quality of life at work. The marks could range from 1 (Terrible) to 5 (Great). As previously stated, also this bar chart reports the percentage of employees that answered Good (4) or Great.

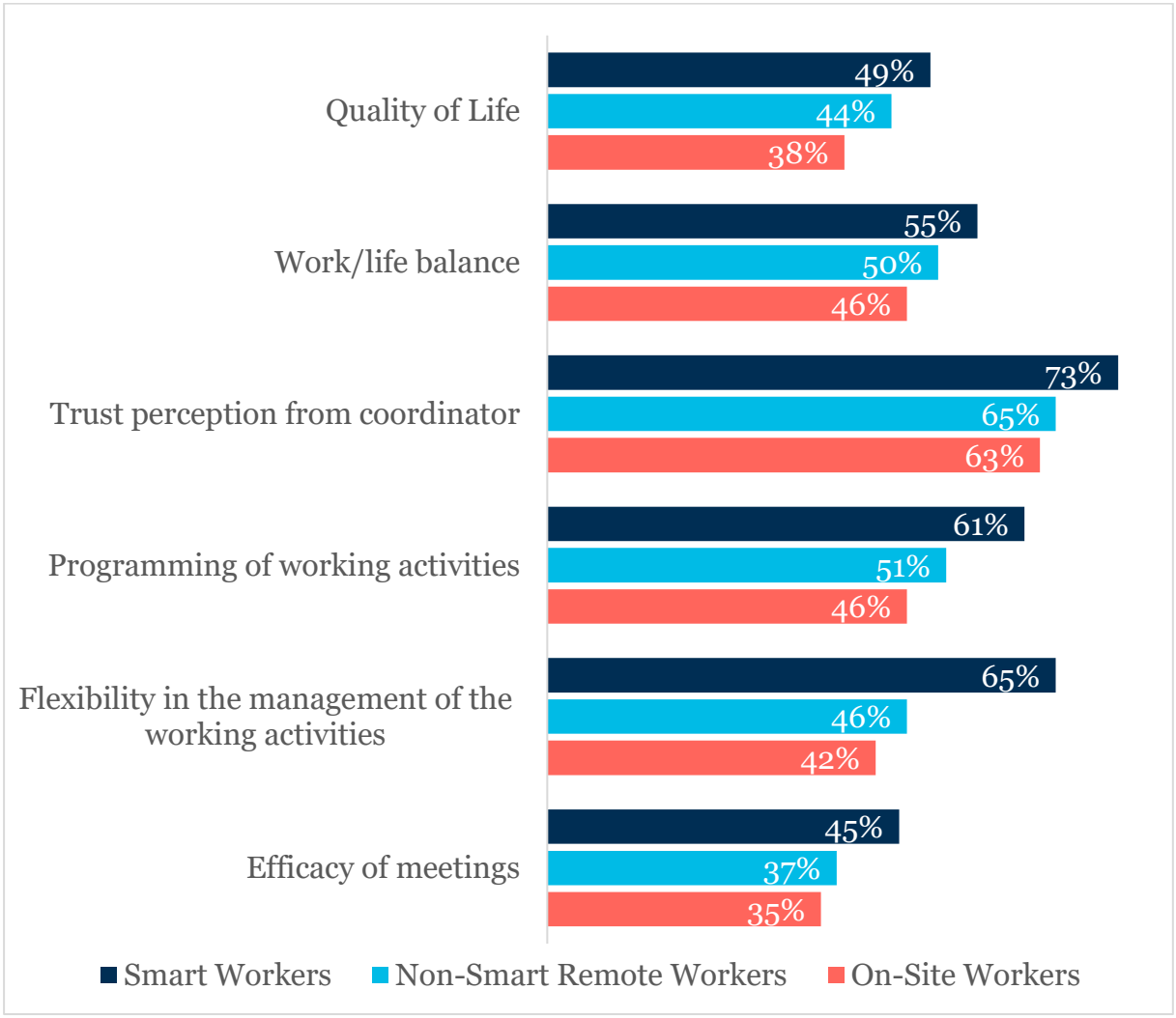

Figure 5.3.1.3 - Reporting of workers' situation, divided by workers' typology

This data, in a similar way to the first part but with some more incidence, shows an overall better evaluation of the parameters from the Smart Workers. Since the parameters of this question are completely individual, they tend to be reliable and adherent to the real feelings and beliefs of the respondents.

For all the values, it can be observed a common trend: On-Site Workers are less likely to report positive evaluations than Non-Smart Remote Workers. This last group, on the other hand, always scores lower than the Smart Workers.

As can be predicted, the parameters that are more inherent to the autonomy and flexibility show a prominent score of the Smart Workers in comparation to the other two classes of employees. Looking into the details, Trust perception from coordinator and Flexibility in the management of the working activities let the class of most flexible workers to score 73% and 65%. Those percentages have respectfully a difference of 8% and 19% from the first near other class of workers. This can be considered as a clear indication of higher satisfaction and positive sensation from the employees' point of view.

Another important parameter is Programming of working activities that lets the Smart Workers score 61%, that is 10% ahead of their colleagues Non-Smart Remote Workers. The same evaluation structure has been proposed to three parameters to evaluate the different levels of well-being for the employees. The following graph shows the occurrence of the most positive answers (scores 4 and 5).

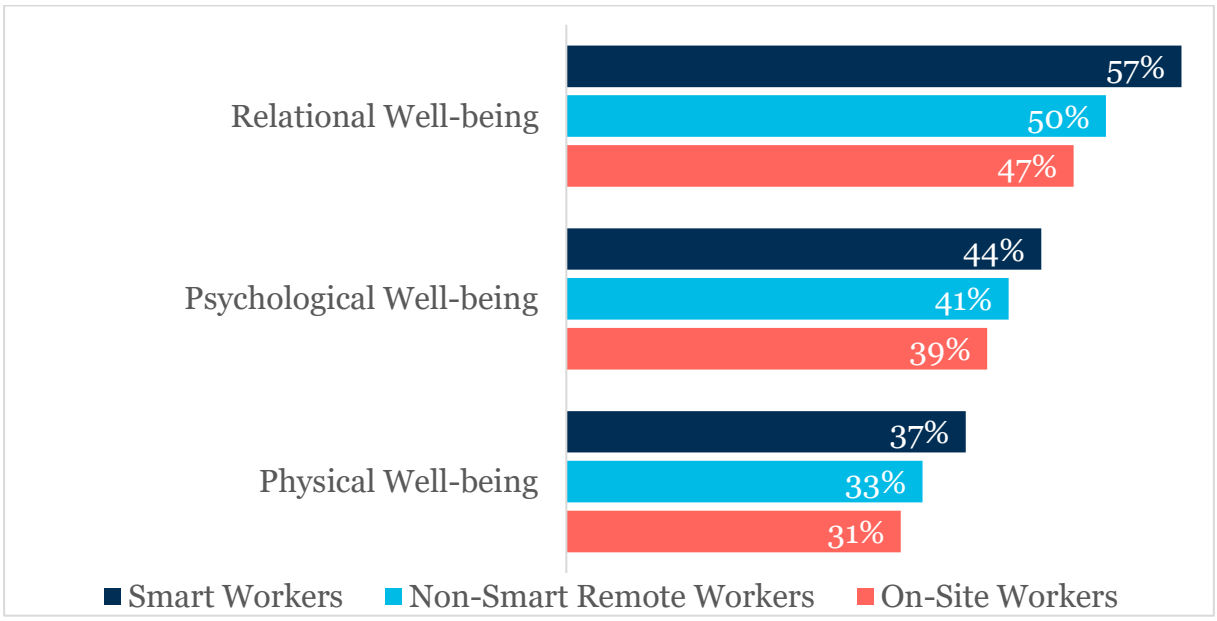

Figure 5.3.1.4- Self-assessment of worker's well-being, divided by workers' typology

Here the trends of the evaluation for those items are similar and show that Smart Workers report better results in the different parameters. To measure the well-being of employees, the focus is on three dimensions: physical, psychological, and relational well-being.

For those categories, Smart Workers tend to be more positive, with peaks for the relational well-being of 57% against the 50% and 47% for their colleagues that do not classify as Smart. This information could be useful to evaluate the overall well-being among different working organizations to find solutions and improve the general feeling of employees towards their positions.

Although the analysis performed in this section yielded insights that are adherent to what was previously theorized, there is no statistical correlation for the data, as can be seen consulting the ANOVA test in the Appendix.

5.3.2 Focus on team typology: the coordinator's perspective

The previous part of the survey kept into account all 2491 employees that answered, to have an optimal overview of the situation for this Public Administration. This new section of research will focus instead on the answers provided by the 692 coordinators among the workers. The managers' point of view represents a key point to analyse when talking about Smart Working, because the implementation of such structural changes in the way of working represents a significant management shift.

There is no possibility of just impose new ways of thinking about roles, jobs, responsibilities, and time scheduling. Coordinators that are called to manage the introduction of Smart Working principles need to efficiently handle the working environment and be able to imagine it during and after the implementation of the innovations that are proposed.

Also, coordinators can be called to manage different group of workers, that feature different characteristics and flexibility levels assigned, hence there is no standard guide for the management of the working team. Thanks to this, managers can evaluate the condition of wide groups of workers, to understand some trends that are created by the evaluation of the working groups.

The first division concerns the typology of workers that each coordinator is called to manage. Since the working groups can feature variable number of workers, also the levels of flexibility can change, creating different kinds of groups.

There are three main categories that the coordinators can confirm to manage:

1. On-Site Team
2. Mixed Team
3. Hybrid Team

The three team typologies differ for the internal composition of the workers. While employees of On-site Team do not have the possibility of working remotely, Hybrid Team members have all the opportunity to execute Smart Working. Mixed Team feature either Smart Workers or On-site only workers.

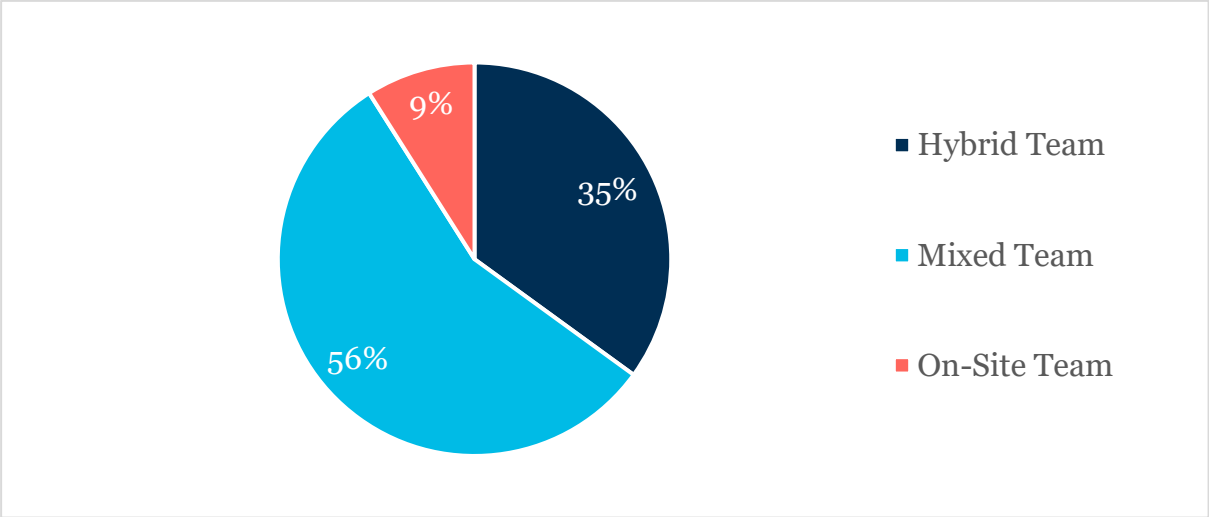

Figure 5.3.2.1 - Distribution of typologies of teams

The distribution shows how coordinators refer to manage mostly teams that at least feature a mixed use of Smart Working.

On the other hand, having more than 90% of teams that benefit from higher levels of flexibility can be considered as a positive indicator for the development of the Public Administration that is taken into exam with this specific survey.

It is an indication of the integration of this innovation inside the structure and can be used to measure the responsiveness of the PA to the novelties when talking about organizational flexibilities.

Also, when confronting this data with the previous batch of information, having a higher number of workers that benefit from Smart Working means that, on average, more workers have a better general feeling towards the organization and the workplace itself.

Continuing with the data examination, the sequent part of the survey focused on the evaluation of the teams from the point of view of their coordinators. As can be seen, the parameters of this part are the same that have been asked directly to each worker.

By turning around the perspective and by seeing the evaluation from the evaluator viewpoint, it is possible to understand in a more direct way which are the outcomes of the adoption of Smart Working practices.

As for the previous charts, also here it is reported the percentage of coordinators that answered to the performance evaluation with 4 or 5, corresponding to "Over the expectations" and "Strongly over the expectations".

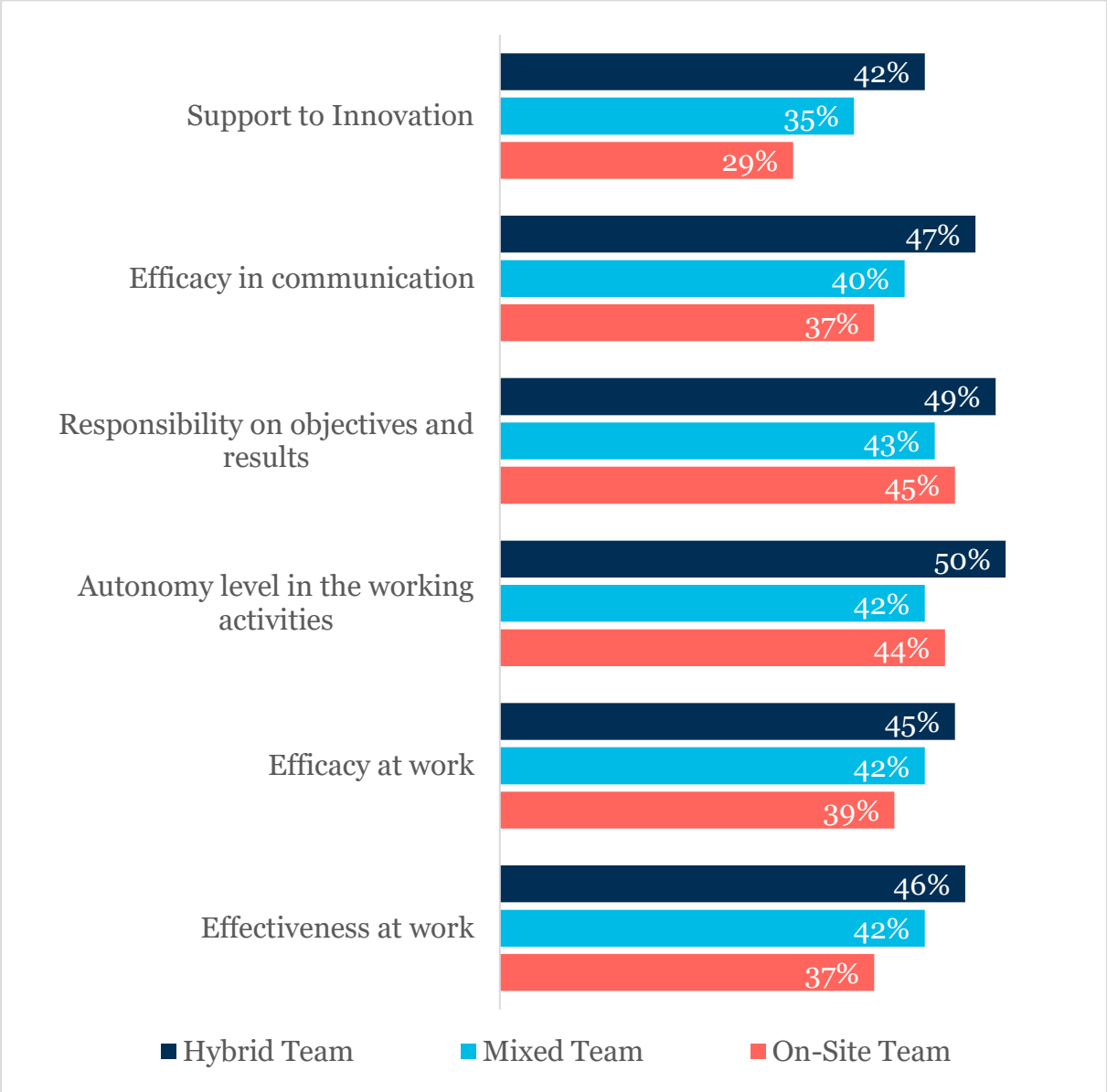

Figure 5.3.2.2 - Reporting of performance evaluation, divided by team typology

The evaluation of the 692 coordinators towards different typologies of teams tend to confirm that Hybrid Team, corresponding to 100% employees free to choose whether to work in remote (and so with high levels of flexibility), get better scores also from the managers' point of view.

While in all six parameters Hybrid Team performs better than the other typologies, it is not always true that Mixed Team gets better scores than On-Site Team.

For example, in the parameters Responsibility on objectives and results and Autonomy level in the working activities, the completely on-site team scores 2% better than the mixed team.

This data helps in understand that some features and qualities, like the ones that those parameters describe, could be not linearly related to the introduction of flexibility options for the workers.

Furthermore, it could happen that the evaluation of those typology of characteristics can be harmed by the presence of a heterogeneous team. Some team of workers could find difficult to integrate different working conditions in the same group.

For example, people that do not have benefits in terms of flexibility could feel less considered and left on a lower level and so have an overall worse working experience, with subsequent lower efficiency.

The possibility of the presence of this isolation effect could be one of the possible explanations about this phenomenon, but the percentage differences are more significant when comparing Hybrid Teams with non-hybrid teams in general.

This helps in confirm that adding flexibility to the working conditions helps in achieving better results, and this information comes from both managerial side and employees' side.

Other information that can be collected from the coordinators concern the possible improvement points that they find when asked to choose among some of the most common.

The final part of the survey for the management focused on asking which, out of twelve, were three of the most urgent or important aspects that the team needed to fix. The questions were intended for managers which had experience in coordinating people both with flexible features and non-flexible ones, hence only coordinators of the first two typologies of teams are interviewed.

Furthermore, the question was specifically about the focus points based on the possibility of alternating on-site working days and remote working days.

Figure 5.3.2.3 – Adjustment reporting, divided by team typology

When looking at the general positioning of the two teams in this chart, it can be seen that in almost all parameters Mixed Team needs more attention than Hybrid Team.

Some interesting considerations can be done based on some specific values that come from this question. Increased isolation of team members is one of the most selected parameters. While for teams that are completely hybrid, the value for this suggestion is 17%, while for the Mixed Team it reaches 23%, meaning that almost 1 manager out of 4 registers this criticality in mixed working group.

This could be because of different reasons. For example, people that have the possibility to choose whether to work remotely, could feel emarginated by other on-site workers due to their flexibility advantages. On the other hand, also workers that do not have this possibility could feel disadvantaged and so lose interest and engagement in the teams' activities.

Similarly, other parameters such as Difficulty in disconnection and burnout risk, that is typically an issue directly related to the implementation of Smart Working is actually 2% more relevant in the Mixed Teams rather than Hybrid Teams. It is also interesting to note that Mixed Teams suffer from higher difficulty in the evaluation of the working performances more than the Hybrid Team. This could mean that coordinators that manage those teams struggle to stretch their performance measurement tools through different ways of working.

Another possibility is represented by the not so easy blending of the team due to not homogeneous levels of flexibility given to the employees. This information is related to the parameter Difficulty in evaluating work performance, that reports 4% worse conditions for mixed teams.

There is a specific evaluation that does not report a better value for Hybrid Teams with respect to Mixed Teams, and it is the parameter about Tutoring and supervision difficulties. In this case, the coordinators of totally hybrid teams report 26% of occurrences, while the mixed ones 3% less. This factor could be due to the difficulties of performing the tutoring sessions when employees choose to work from remote.

As can be easily understood, the tutoring and feedback sessions can be considered more effective whether they are conducted in full presence, to easily and intuitively solve problems that the mentee worker can face during training programs or problem-solving situations. This brings the attention to a possible debate on whether is needed a certain level of maturity before have access to some levels of flexibility, to prevent

situations where there is no possibility to perform the tutoring sessions correctly and efficiently.

The overall image that is depicted from the coordinators' point of view reflects positive outcomes for the Hybrid Teams, with also interesting insights about the feelings and thoughts of workers that not always share in the same working team similar treatments in terms of flexibility. As for the previous section, neither this data is corroborate by ANOVA testing, since the intra-group variation is too low to make this piece of study statistically significant.

5.3.3 Focus on the attitudes of the coordinator: the *Smart Manager* figure

The survey investigated different perspectives of what concerns the working experience of the Public Administration that is put to test. Many questions were focused on the spaces that each employee had to exploit in the office premises, and which was the impact of them towards the productivity. Also, there were some investigations about the technologies that form the equipment of each worker and the attitude of the employees towards the most recent innovations in the technology field.

However, the third and last part of analysis on the survey intended to focus again on beliefs of people employed in the organization, since the role of workers in the economy of the Public Administration is still fundamental and cannot be ignored or misinterpreted.

In order to answer RQ3, the survey was designed to ask the respondents to evaluate their coordinator, based on nine different parameters. Those indications were about the capability of the manager to correctly assign responsibilities to the different members of the team, or other aspects about the proactiveness, levels of energy and engagement that the manager can induce in their subordinates.

Other elements that are kept into account concern the capability of the manager to boost the sense of belonging of the workers to the organization, that strongly impacts the familiarity of them with the shared objectives and hence it helps in motivating though the working days. Also, there is a component that evaluates the ability of the supervisor to accept hints and nudges from their workers to better face difficulties and new challenges.

Lastly, it is also asked to grade the capacity of the manager to help the subordinates to decide whether to use and how the flexibilities that are given to them, such as the

remote working in some days or the preference of a physical rather than an online reunion for certain themes.

The evaluation of those peculiarities happened with the assignation of a range of marks from 1 to 5. If the coordinator of the respondent happens to score 4 or 5 on all nine parameters, this classifies it as a Smart Manager and it becomes useful to understand trends and tendencies in this perspective, based on the comparison of employees and their coordinators.

The results coming from the survey are summarized in the graph below. On a total of 2491 respondents, 865 of them reported to be managed by a Smart Manager.

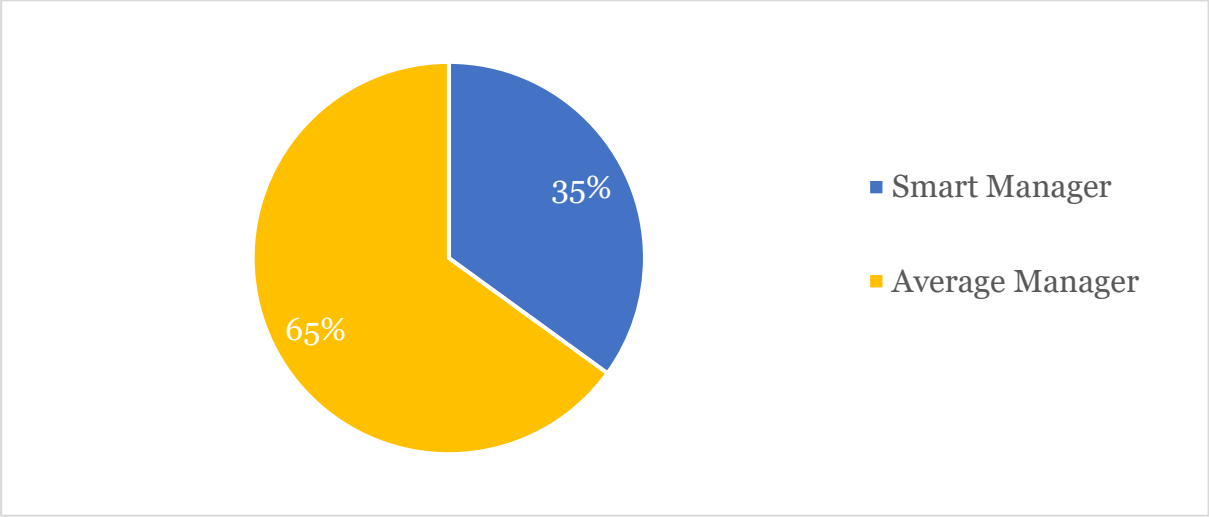

Figure 5.3.3.1 - Distribution of typology of coordinator

This information is interesting and shows that a consistent percentage of employees recognises in their coordinator a set of tendencies that are useful and positively impacting the working environment.

The introduction of the figure of the Smart Manager can help in better understand the previous data. The new classification allows to shed another light on the evaluations that employees reported to get in the precedent period. Since the evaluation were given by their coordinator, it could be that the attitude of this person influences the results of the statistics.

Hence, it is now reported the percentage of people who reported to score 4 or 5 ("Over the expectations" and "Strongly over the expectations") in the performance evaluation, classified by the typology of coordinator that the worker reported to have.

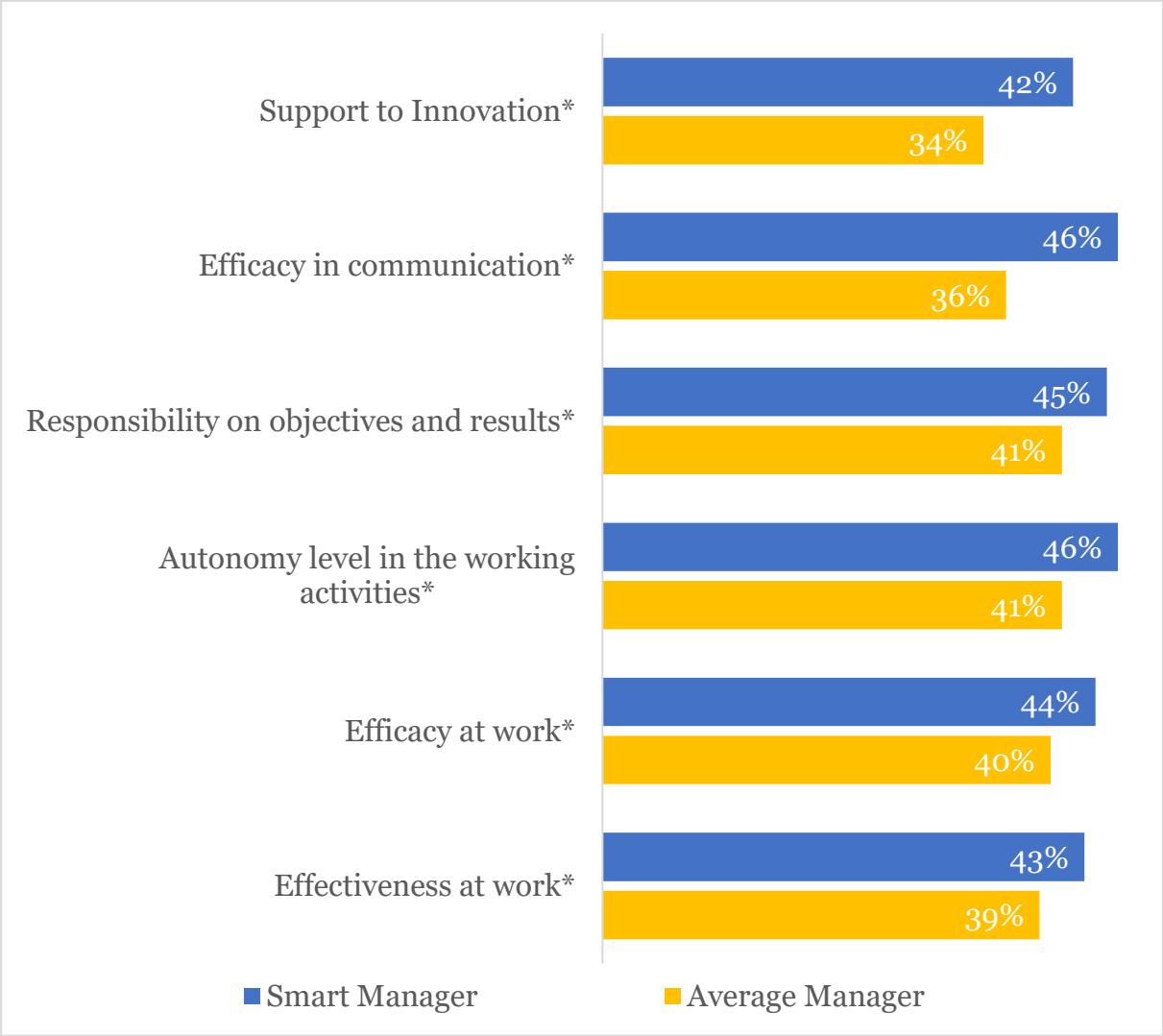

Figure 5.3.3.2 - Self reporting of performance evaluation, divided by manager typology

With respect to the previous classification of the same data, this categorization allows to have more distinct results between the two categories. It is possible to state that the correlation between higher scores and presence of Smart Manager is even stronger than the correlation between higher scores and presence of flexibility conditions. This is shown by the difference in the gaps between the different categories.

While the parameters about efficiency and efficacy tend to keep the same distance of the previous classification, that is 4%, the other values show a higher performance for people managed by Smart Manager in a quite clear pattern.

For example, voices like Efficacy in communication scores a 10% difference between the two typologies of bosses.

Also, Support to Innovation shows a gap of 8%, suggesting that a manager with smart attitudes is more prone to help their team to develop innovative solutions and new ways of getting the job done using flexibility.

Finally, both autonomy levels and responsibility of the single worker are respectfully 5% and 4% higher for employees with Smart Manager at the coordinating position of the team. This confirms that it is likely to have higher chances of autonomy if the manager lets the worker higher levels of trust based on the smart attitudes.

When looking at those performance evaluations according to Smart Manager's categorization, data show a significant correlation that ANOVA tested. It is therefore possible to analyse the results with the awareness of having some statistically tested correlations.

The same way of interpreting data can be used also with the self-evaluation of well-being status performed by the single workers. Also here, it is reported the percentage of people who scored 4 or 5, meaning "Good" or "Great".

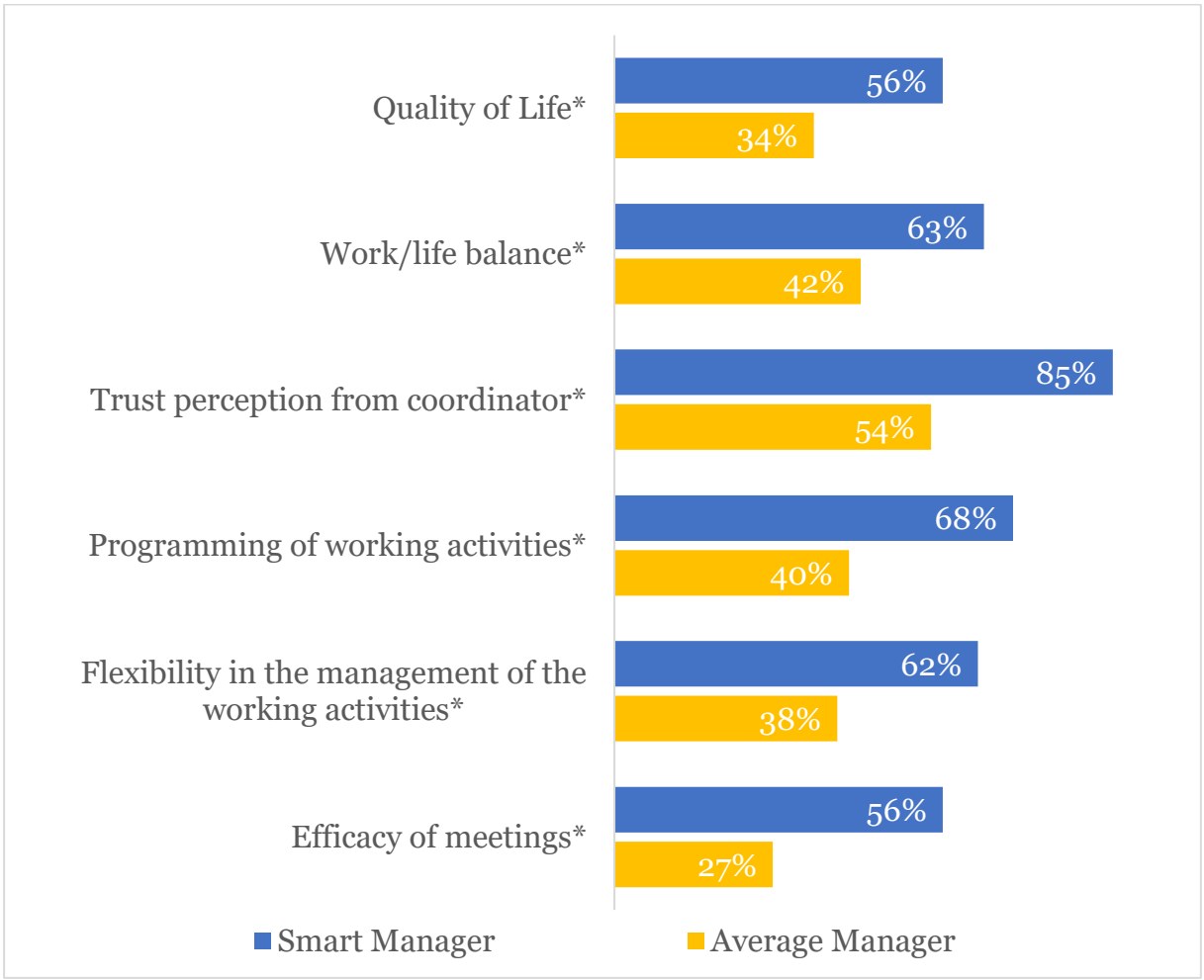

Figure 5.3.3.3 - Reporting of workers' situation, divided by manager typology

Those percentages show an absolute better evaluation for people who reported to have managers with smart attitudes. This trend is present in all six parameters.

It must be noted that these evaluations differ from the previous ones. While the first that have been analysed after the introduction of Smart Manager figure were relevant to an evaluation that each employee received in a previous period, this data is directly related to a personal evaluation of the worker for their job situation, hence it is more accurate and less biased.

Of all those six values, there are some that are more relevant than others when talking about managers' attitudes towards the employee. One above all is Trust perception from coordinator.

This parameter is scored to 54% when average managers are coordinating the employees, while this percentage jumps to 84% whether the coordinator is a Smart Manager. This information shows that it is possible to imagine a correlation between the attitude of the coordinator and the perception of the employee in terms of trust and autonomy.

Other determining values like Programming of working activities and Flexibility in the management of the working activities show a gap of 28% and 24% respectively, with the employees controlled by a Smart Manager that reach 68% and 62% for each parameter.

This highlights the possibility of finding greater levels of personalization and flexibility in the job organization whether the team is controlled by a Smart Manager. Other aspects that can be perceived from this classification are for example the effectiveness of the reunions (29% higher for employees with Smart Manager) and indications about life quality and work-life balance (22% and 21% respectively in advantage to the most flexible coordinators). By looking at those themes, it could be said that being supervised by more innovative and smart people increases quality of several aspects of the working environment and helps with the overall satisfaction for the workers. This can be confirmed by the fact that correlation is confirmed by ANOVA testing.

Moreover, the survey presented even a dedicated section that was specifically designed to understand the different implications about the well-being of employees in various situations. Also, that parameter can be interpreted from the managerial

point of view, since there are some aspects that could be interested by the Smart attitude of the workers' coordinator.

There could be for sure some kind of correlation between the way of managing the team in which the employee finds themselves and the psychological and relational aspects of the well-being, due to the direct impact of the manager on those parameters.

The following graph groups, as the previous one, the percentages of workers that identified their well-being situation like Good (4) or Great (5).

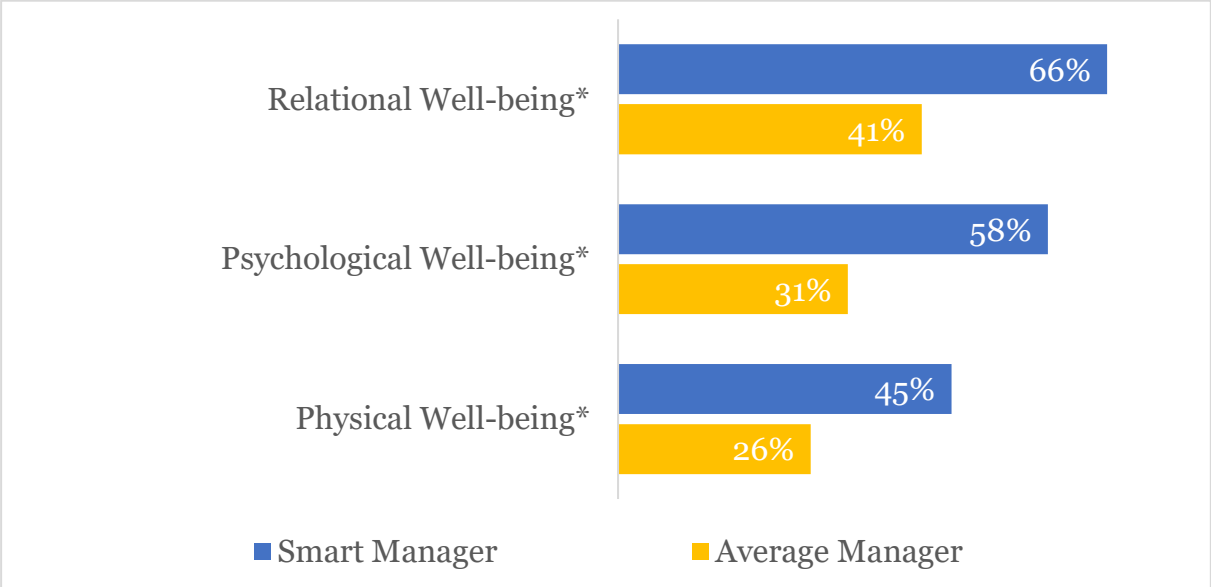

Figure 5.3.3.4 - Self-assessment of worker's well-being, divided by manager typology

It can be said that physical aspects of the well-being situation could be marginally impacted by the attitudes of the coordinator, like for example if the too much time spent in the working premises harms the person in some physical way.

On the other hand, the much more present difference of evaluation for Psychological well-being and Relational well-being can be considered with a certain degree of sureness correlated with the typology of coordinator that oversees the respondent.

The remarkable difference in percentage for both the most sensible parameters (27% and 25% respectively for psychological and relational aspects) puts people with Smart Managers in a more positive and mindful position, highlighting that the working environment could strongly impact those private aspects of each worker.

This part of the survey also gave the opportunity to test whether the employee consider themselves on a well-being situation or the opposite of it.

By checking if the worker evaluates the well-being situation over 4 when talking about psychological and relational aspects, hence the ones that are mostly influenced by the presence and the activity of the coordinator, it is possible to show on the sequent graph the different evaluations in a more aggregated way.

By doing this, it should be more immediate to understand the possible correlation of the coordinators' attitudes and the workers' beliefs and feelings.

Figure 5.3.3.5 - Well-being parameter, divided by manager typology

As can be understood, there is a percentage difference between people who do not have a Smart Manager to manage them and who has this feature recognized in their coordinator.

This graph shows that if the data is read through this specific lens, people with Smart Manager tend to report to have positive well-being situations two times more than people without Smart Manager (56% against 28%).

This information helps in definitively understand that the role of the coordinator can have considerable impact on those working aspects for employees.

The last part of data that is retrieved from this classification of respondents is about average levels of engagement. Through dedicated questions, it is possible to understand whether employees feel engaged in the organization's activities and objective. The following graph reports which are the engagement levels based on the typology of coordinator for each worker.

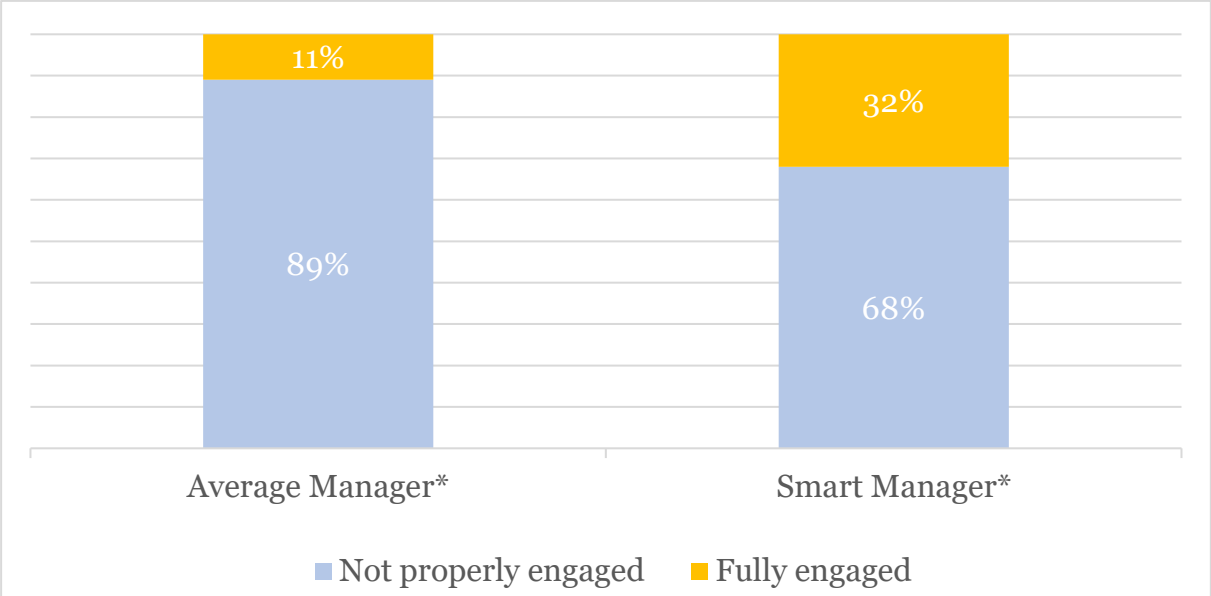

Figure 5.3.3.6 - Engagement parameter, divided by manager typology

This graph lets understand that engagement and well-being have different absolute values, even if the trend is similar. Having a Smart Manager can help also in the case of engagement to reach higher values, with 22% of difference among the two typologies of coordinators. However, it is not easy to engage employees and make them feel passionate about missions and objectives of the team, and more in general, about the organization for which they work.

This distribution of percentages lets understand that engagement is complex matter, independently from the manager. It is still possible to correlate the activity of the coordinator with the engagement, but it has a lower correlation than other dimensions that have been analysed during this examination. Still, the information coming from this survey and its sequent elaboration is useful to be the basis for other insights that the Public Administration could be interested in knowing.

Concluding this chapter, the analysis of different perspectives about the Public Administration allowed to understand and test different ideas about Smart Working usage in the different organizations. The first survey helped in the definition of different macro categories with internally similar features that used to be the basis. Then, with the second one, the analysis focused on the different feelings of workers, with particular focus on the Smart Manager figure and the importance of the coordination role.

6 Conclusions

6.1 Discussion

The analysis conducted on the surveys resulted crucial in retrieving data for answering the Research Questions.

RQ1: *How much is Smart Working diffused? Are there significant differences based on PA typology?*

The investigation of 400 Public Administrations provided an interesting overview of the dynamics of adoption of Smart Working in Italy. The classification of these PAs into 8 macro categories based on size and IPA code revealed several facets in the use of the powerful flexibility tool that is represented by Smart Working adoption.

One of the main findings was that differences in size between PAs significantly affected the adoption of Smart Working. Larger PAs, with more structure and resources, are more likely to apply Smart Working. This reflects the expected trend, where larger organizations can better support the complexity of organizational change that involves adopting new work models.

The analysis of Smart Working adoption trends and forecasts also highlights another interesting aspect: large PAs maintain roughly the same levels of adoption, indicating a stability in agile working practices. In contrast, smaller PAs such as municipalities, which initially adopted Smart Working due to the COVID emergency, show a decrease returning to pre-pandemic conditions. This underlines how the emergency has played a catalytic role in the adoption of new working practices, but once overcome, some local authorities tend to return to the traditional modalities.

A key aspect emerged from the survey concerns the four levers of maturity for the implementation of Smart Working: Policy, Technologies, Spaces and Behaviours. Interestingly, on average, large PAs are more advanced in all these levers. This suggests that maturity in Smart Working implementation requires a holistic approach involving clear business policies, appropriate technologies, adapted workspaces, and flexible organizational behaviours. Leadership emerges as a crucial factor in this context; hence it is further examined with RQ3. Moreover, data and trends retrieved from the first survey made clear that the most suitable PAs for an in-depth study on

internal trends and performance evaluation are larger organizations, due to their higher level of organization and organic adoption of Smart Working for different working positions.

RQ2: *How the modality of Smart Working application impact on the performances? How can the team composition impact on the performances?*

Analysis of Central PA statistics provides an interesting perspective on the relationship between work flexibility and performance. Although the statistical correlation is not strong enough to be validated by the ANOVA test, data show and confirm some already known trends. Looking at six performance parameters, we see an improvement proportional to the level of flexibility granted to the worker. This trend not only underlines the importance of Smart Working in the workplace context, but also the overall possibilities that its introduction allows to enable.

A similar evolution emerges when examining the parameters related to the perception of the working environment and the well-being of employees. Again, despite the lack of a strong statistical correlation confirmed by the ANOVA test, it is noted that the introduction of flexibility initiatives, such as Smart Working, reflects a positive perception by workers. The three parameters that measure physical, psychological, and relational well-being show an improvement proportional to flexibility.

However, the perspective slightly changes when considering the opinion of coordinators, namely managers responsible for team coordination. A more complex picture emerges after analysing the responses of 692 managers about the teams they lead. While some aspects improve linearly with the introduction of flexibility initiatives such as Smart Working, there are also issues that can worsen with this transition. For example, there are problems related to the sense of abandonment by employees, the challenges of communication between people working in different ways and the sense of responsibility towards work.

These results, consistent with the observations of the Smart Working Observatory, indicate that an inadequately implemented Smart Working can have negative effects. This underlines the importance of careful and careful management in implementing flexibility initiatives. A not consistent approach could compromise communication, generate feelings of abandonment, and negatively affect employees' sense of responsibility.

The last part of the analysis focuses on the role of the coordinator when talking about Smart Workers' performance and well-being, hence it was tailored to answer RQ3.

RQ3*: How can the leadership style of the coordinator impact on the performance of the team?*

Employees' perspective analysis on coordinator characteristics emerges as a crucial element in understanding the importance of manager's role in Smart Working. Looking at performance statistics based on the presence of a Smart Manager, a positive correlation emerges in the results This connection is also reconfirmed by ANOVA test. The statistical correlation confirms that the presence of a Smart Manager is associated with better performance in employees.

Employee involvement is a key element in smart working, and smart coordinators seem to excel in this area. Statistics show greater employee involvement when guided by smart managers. This translates into positive assessments by employees of their working conditions, highlighting an environment in which innovation and attention to the needs of workers are valued.

In addition, the analysis extends to the psychological and relational well-being of employees. The data clearly show that the presence of a Smart Manager contributes to a significant improvement in both aspects of well-being. These coordinators not only foster a more positive and collaborative working environment, but also a climate that supports the mental health and interpersonal relationships of workers.

Other significant metrics, such as workers 'engagement, help in understanding Smart Manager's role in the organization. Despite the more complex nature of this parameter, also in this case the coordinator's attitude supports a higher level of engagement.

6.2 Limitations and future developments

The analysis of the second survey, while providing valuable data on the large Public Administration specification, presents some limitations that require attention. As the data is limited to a single PA, there could be the presence of some sort of biases that could harm the usability of data, since the influence of an homogeneous data source could be strongly present.

Therefore, it is imperative to consider this limitation and proceed with data validation, comparing them with other PAs of different sizes and purposes. It would be ideal to extend the experience gained in this research and try to scale the positive effects observed towards other PAs with different characteristics. This would allow to

evaluate the transferability of good practices and effective approaches identified in specific contexts to wider realities, contributing to a deeper understanding of the dynamics of Smart Working in diverse contexts.

When talking about data not confirmed by the ANOVA test, a deeper analysis is essential. Since those findings were on average supporting the forecasts about Smart Working trends, a deeper exploration of these data may provide further confirmation of the initial assumptions or, in case of negative results, allow new assumptions to be made to better understand possible trend reversals.

The figure of the Smart Manager is a key aspect that requires further insights at a quantitative level to fully grasp the beneficial effects on employee attitudes and performance. Detailed research on how managerial approaches specifically influence the effectiveness of smart working would help to better delineate the skills needed to successfully lead teams in flexible environments. The further research could focus on the cause-effects relationships that could be present among leadership styles and employees'performance, to corroborate the correlation found in this thesis.

Also, the correlation between concomitant factors is a crucial next step to fully understand the potential and limits of Smart Working in the PA. Exploring how different variables interact with each other would help to outline a more comprehensive and articulated view of the overall impacts of this mode of work. Correlation analysis can help identify positive synergies, identify possible challenges, and provide more detailed guidelines for the design and implementation of smart working initiatives.

Bibliography

Smart Working Observatory of Politecnico di Milano. (2018, 01 01). *Osservatori.net*. Retrieved from Osservatori.net

Agenzia per l'Italia Digitale. (2023). *Guida al Portale IPA*. Retrieved from https://indicepa.gov.it/ipa-files/help-portale/index.html#:~:text=Codice%20IPA%20%2D%20ovvero%20il%20codice,Codice%20Fiscale

Area Centro Studi Assolombarda. (2021). *Lo smart working in numeri.* Retrieved from Assolombarda: https://www.assolombarda.it/centro-studi/smart-working-2021

Camera dei Deputati. (2014). Disposizioni per la promozione di forme flessibili. *Atti Parlamentari.* Retrieved from https://documenti.camera.it/_dati/leg17/lavori/stampati/pdf/17PDL0019490.pdf

Capecchi, S., & Caputo, G. O. (2022). JOB SATISFACTION AND TELEWORKING: A STUDY ON PUBLIC ADMINISTRATION WORKERS IN ITALY. *Statistica Applicata*, 34(1), 141-156.

Cellini, M., Pisacane, L., Crescimbene, M., & Di Felice, F. (2021). Exploring Employee Perceptions towards Smart Working during the COVID-19 Pandemic: a Comparative Analysis of Two Italian Public Research Organizations. *Public Organiz Rev 21*, 815-833.

Chatzi A, D. O. (2023). The one-way ANOVA test explained. *Nurse Res*, 7;31(3):8-14.

Cuel, R., Ravarini, A., Ruffini, R., & Varriale, L. (2021). Smart working in Italian Public Administration: A Socio-Technical Approach. *Impresa Progetto - Electronic Journal of Management*.

Datta, P. W. (2020). Digital transformation: Learning from Italy's public administration. *Journal of Information Technology Teaching Cases*, 10(2), 54-71.

De Marco, M., Marcone, F., & Scarozza, D. (2022). Smart Working in Public Administration: Anti Pandemic Tool or Work Organization Model?

Decastri, M., Gagliarducci, F., Previtali, P., & Scarozza, D. (2020). Understanding the Use of Smart Working in Public Administration: The Experience of the Presidency of the Council of Ministers.

Di Tecco, C., Ronchetti, M., Russo, S., Ghelli, M., Rondinone, B. M., Persechino, B., & Iavicoli, S. (2021). Implementing Smart Working in Public Administration: a follow up study. . *La Medicina del lavoro*, 112(2), 141–152.

Dipartimento della Funzione Pubblica. (2019). *Indicatori Comuni*. Retrieved from Portale delle Performance: https://performance.gov.it/indicatori-comuni

Dipartimento della Funzione Pubblica. (2019). *Indicatori Comuni per le Funzioni di Supporto nelle Amministrazioni Pubbliche.* Retrieved from Ufficio della Valutazione per le Performance: https://www.performance.gov.it/system/files/incontro_plenario_11122018/Nota-indicatori-comuni.pdf

Dipartimento della Funzione Pubblica. (2021, 6 9). *Piano Integrato di Attività e Organizzazione*. Retrieved from https://piao.dfp.gov.it/

Doxa Bva. (2023). Retrieved from https://www.bva-doxa.com/were-bva-doxa/

Fabio Fortuna, L. R. (2023). Italians and smart working: A technical study on the effects of smart working on the society. *Technological Forecasting and Social Change, Volume 187, 2023-122220, ISSN 0040-1625*.

Gartner. (2023). Retrieved from https://www.gartner.com/en/information-technology/glossary/remote-work

Gastaldi, L. C. (2014). Smart working: Rethinking work practices to leverage employees' innovation potential. *Proceedings of the 15th International CINet Conference (Vol.100).* Budapest: CINet.

Gastaldi, L., Corso, M., Raguseo, E., Neirotti, P., Paolucci, E., & Martini, A. (2014). Smart working: Rethinking work practices to leverage employees' innovation potential. *Proceedings of the 15th International CINet Conference (Vol.100).* Budapest: CINet.

Giacomini, D., & Palumbo, R. (2023). Preparing the ground for smart working in the public sector: insights from an empirical analysis on municipalities. *Public Management Review*, 1-27.

Greenwood, R., & Hinings, C. (1996). Understanding radical organizational change: bringing together. *The Academy of Management Review.*, 21(4):1022-1054.

Hazra, A. (2017). Using the confidence interval confidently. *Journal of thoracic disease*, 9(10), 4125–4130.

Hu, R. (2020). COVID-19, smart work, and collaborative space: A crisis-opportunity perspective. *Journal of Urban Management,Volume 9, Issue 3*, 276-280.

Iannotta, M. M. (2020). Defining Leadership in Smart Working Contexts: A Concept Synthesis. *Frontiers in Psychology*.

International Labour Organization. (2020, 6 5). Retrieved from https://ilo.org/wcmsp5/groups/public/---dgreports/---stat/documents/publication/wcms_747075.pdf

ISTAT. (2019, 12 17). *Censimento Permanente delle Istituzioni pubbliche 2017: i principali risultati.* Retrieved from https://www.istat.it/it/files/2019/12/Report_CENSIMENTO-ISTITUZIONI-PUBBLICHE-_2017.pdf

ISTAT. (2022, 12 28). *Censimento permanente delle Istituzioni pubblice 2020: risultati definitivi.* Retrieved from https://www.istat.it/it/files/2022/12/Report-censimento-istituzioni-pubbliche-2020.pdf

ISTAT. (2022, 2 4). *Report Imprese Covid 2022.* Retrieved from https://www.istat.it/it/files/2022/02/REPORT-COVID-IMPRESE_2022.pdf

Kirk, J., & Belovics, R. (2006). Making E-Working Work. *Journal of Employment Counseling*, 43(1):39-46.

Klarner, P., & Raisch, S. (2013). Move to the beat - rhythms of change and firm performance. *Academy of Management Journal*, 56(1): 160-184.

Larsen, C., Rand, S., Schmid, A., & Dean, A. (2018). Developing Skills in a Changing World of Work.

Lin, L.-H., & Wang, K.-J. (2022). Talent Retention of New Generations for Sustainable Employment Relationships in Work 4.0 Era—Assessment by Fuzzy Delphi Method. *Sustainability*, 14(18), 11535.

Marco Cellini, L. P. (2021). Exploring Employee Perceptions towards Smart Working during the COVID-19 Pandemic: a Comparative Analysis of Two Italian Public Research Organizations. *Public Organiz Rev 21*, 815-833.

Marino, L., & Capone, V. (2021). Smart Working and Well-Being before and during the COVID-19 Pandemic: A Scoping Review. *European Journal of Investigation in Health, Psychology and Education*, 11(4):1516-1536.

Ministero del Lavoro e delle Politiche Sociali. (2017). *Lavoro Agile*. Retrieved from https://www.lavoro.gov.it/taxonomy/term/122

Ministero del Lavoro e delle Politiche Sociali. (2021, 12 7). Retrieved from https://www.lavoro.gov.it/notizie/Documents/PROTOCOLLO-NAZIONALE-LAVORO-AGILE-07122021-RV.pdf

Ministero del Lavoro e delle Politiche Sociali. (2023). Retrieved from https://www.lavoro.gov.it/strumenti-e-servizi/smart-working/Pagine/default

Ministero del Lavoro e delle Politiche Sociali. (2023). Retrieved from https://www.lavoro.gov.it/strumenti-e-servizi/smart-working/Pagine/default

Ministero dell'Istruzione e del Merito. (2017). Retrieved from https://miur.gov.it/lavoro-agile#:~:text=Il%20lavoro%20agile%20(o%20smart,il%20lavoratore%20a%20conciliare%20i

Ministero per la Pubblica Amministrazione. (2019, 12 30). *Indicatori comuni per le funzioni di supporto delle Amministrazioni Pubbliche - ciclo delle Performance 2020-2022.* Retrieved from https://performance.gov.it/system/files/Circolari/Circolare%2030-12-2019%20-%20Indicatori%20comuni%20per%20funzioni%20di%20supporto%20delle%20Amministrazioni%20Pubbliche%20Ciclo%20performance%202020-2022.pdf

Ministro per la Pubblica Amministrazione. (2021). *Piano organizzativo del lavoro agile (POLA)*. Retrieved from https://www.funzionepubblica.gov.it/piano-organizzativo-del-lavoro-agile-pola

Napierala, M. A. (2012). What is the Bonferroni correction? *AAOS Now*, 40.

Olivieri, L., & Spoto, F. (2021). Cybersecurity Impacts of the Covid-19 Pandemic in Italy. Verona.

Osservatori.net. (2023). *Osservatorio Smart Working*. Retrieved from https://www.osservatori.net/it/chi-siamo/conosciamoci/cosa-facciamo

Osservatorio Smart Working. (2018). Retrieved from https://blog.osservatori.net/it_it/smart-working-cos-e-come-funziona-in-italia

Osservatorio Smart Working. (2023). Retrieved from https://www.osservatori.net/en/research/active-observatories/smart-working

Peretz, H., Fried, Y., & Levi, A. (2017). Flexible work arrangements, national culture, organisational characteristics, and organisational outcomes: A study across 21 countries. *Human Resource Management Journal*, 28(1), 182–200.

Qualtrics. (2023). Retrieved from What Is ANOVA (Analysis of Variance) and what can I use for?: https://www.qualtrics.com/experience-management/research/anova/

Shagvaliyeva, S., & Yazdanifard, R. (2014). Impact of Flexible Working Hours on Work-Life Balance. *American Journal of Industrial and Business Management, Vol. 4 No. 1*, pp. 20-23.

Shockley, K., & Allen, T. (2007). Flexibility Helps: Another Look at the Availability of Flexible Work Arrangements and Work-Family Conflict. *Journal of Vocational Behavior*, 71(3):479-493.

Smart Working Observatory of Politecnico di Milano. (2023, 11 23). Retrieved from Osservatori.net: https://www.osservatori.net/en/research/active-observatories/smart-working

STATA Corp. (2023). *Do-files manual*. Retrieved from https://www.stata.com/manuals13/u16.pdf

STATA Corp. (2023). *Why STATA*. Retrieved from https://www.stata.com/why-use-stata/

The Smart Working Handbook. (2015). Retrieved from https://flexibility.co.uk/product/the-smart-working-handbook-new-edition/

The Smart Working Handbook, p.3. (2015). Retrieved from https://flexibility.co.uk/product/the-smart-working-handbook-new-edition/

Todisco, L., Mangia, G., Canonico, P., & Tomo, A. (2022). Effects of Covid-19 on Public Administration: Smart Working as an Organizational Revolution.

Veglianti, E. (2023). Digital Transformation and Working Setting in (Smart) Public Organizations. *Working Environment and Digital Transformation*.

Wheatley, D. (2012). Good to be home? Time-use and satisfaction levels among home- based teleworkers. *New Technology, Work and Employment*, 27(3):224-241.

Appendix

A.1. Analysis performed on the first survey

Categorizzazione: macrocategoria	Media numero dipendenti
Altre PA	203
Altre PA locali	127
Aziende del SSN	2944
Comune	299
PA centrale	10014
Ricerca e Università	1052
Scuola di ogni ordine e grado	150
Regione	2592

Categorizzazione: macrocategoria	Totale numero dipendenti
Altre PA	7107
Altre PA locali	5606
Aziende del SSN	23553
Comune	71786
PA centrale	70101
Ricerca e Università	21032
Scuola di ogni ordine e grado	5714
Regione	20736

Categorizzazione: macrocategoria	% media di lavoratori da remoto per chi fa Smart Working
Altre PA	49%
Altre PA locali	28%
Aziende del SSN	5%
Comune	10%
PA centrale	68%
Ricerca e Università	56%
Scuola di ogni ordine e grado	1%
Regione	44%

Categorizzazione: dimensione	% media di lavoratori da remoto per chi fa Smart Working
Da 10 a 99	15%
100 e più	25%

Categorizzazione: macrocategoria + dimensione	% media di lavoratori da remoto per chi fa Smart Working
Altre PA Big	43%
Altre PA locali Big	29%
Aziende del SSN Big	4%
Comune Big	20%
PA centrale Big	63%
Ricerca e Università Big	59%
Scuola di ogni ordine e grado Big	1%
Altre PA Small	54%
Altre PA locali Small	28%
Aziende del SSN Small	10%
Comune Small	8%
PA centrale Small	100%
Ricerca e Università Small	50%
Scuola di ogni ordine e grado Small	6%
Regione Big	44%

Categorizzazione: macrocategoria	**Occorrenze SW**			
	Sì, con iniziative strutturate (es. sono stati sottoscritti gli accordi individuali, sono state definite delle linee guida)	Sì, ma viene gestito in modo informale (es. organizzandosi con il proprio responsabile o con team di lavoro)	No, ma è in fase di introduzione	No
Altre PA	26	2	0	7
Altre PA locali	32	3	3	6
Aziende del SSN	6	0	2	0
Comune	105	33	13	88
PA centrale	6	0	0	0
Ricerca e Università	16	2	0	2
Scuola di ogni ordine e grado	7	3	0	28
Regione	7	0	0	1
TOT	191	40	18	103

Categorizzazione: macrocategoria	**Percentuale SW**			
	Sì, con iniziative strutturate (es. sono stati sottoscritti gli accordi individuali, sono state definite delle linee guida)	Sì, ma viene gestito in modo informale (es. organizzandosi con il proprio responsabile o con team di lavoro)	No, ma è in fase di introduzione	No
Altre PA	74%	6%	0%	20%
Altre PA locali	73%	7%	7%	14%
Aziende del SSN	75%	0%	25%	0%
Comune	44%	14%	5%	37%
PA centrale	100%	0%	0%	0%
Ricerca e Università	80%	10%	0%	10%
Scuola di ogni ordine e grado	18%	8%	0%	74%
Regione	88%	0%	0%	13%
Altre PA	74%	6%	0%	20%

Categorizzazione: dimensione	**Occorrenze SW**			
	Sì, con iniziative strutturate (es. sono stati sottoscritti gli accordi individuali, sono state definite delle linee guida)	Sì, ma viene gestito in modo informale (es. organizzandosi con il proprio responsabile o con team di lavoro)	No, ma è in fase di introduzione	No
Da 10 a 99	112	36	15	96
100 e più	93	7	3	36

Categorizzazione: macrocategoria + dimensione	**Occorrenze SW**			
	Sì, con iniziative strutturate (es. sono stati sottoscritti gli accordi individuali, sono state definite delle linee guida)	Sì, ma viene gestito in modo informale (es. organizzandosi con il proprio responsabile o con team di lavoro)	No, ma è in fase di introduzione	No
Altre PA Big	10	0	0	4
Altre PA locali Big	13	0	1	1
Aziende del SSN Big	5	0	1	0
Comune Big	35	5	1	4
PA centrale Big	5	0	0	0
Ricerca e Università Big	13	0	0	0
Scuola di ogni ordine e grado Big	5	2	0	26
Altre PA Small	16	2	0	3
Altre PA locali Small	19	3	2	5
Aziende del SSN Small	1	0	1	0
Comune Small	70	28	12	84
PA centrale Small	1	0	0	0
Ricerca e Università Small	3	2	0	2

Scuola di ogni ordine e grado Small	2	1	0	2
Regione Big	7	0	0	1

Categorizzazione: macrocategoria	**Occorrenze diffusione futura**			
	Sì, sarà un'iniziativa strutturata (es. con accordi individuali, linee guida che definiscono il progetto, …)	Sì, ma lo gestiremo in modo informale	No	Non so
Altre PA	24	2	6	1
Altre PA locali	33	1	4	6
Aziende del SSN	8	0	0	0
Comune	110	22	58	49
PA centrale	7	0	0	0
Ricerca e Università	16	0	0	4
Scuola di ogni ordine e grado	9	3	13	13
Regione	7	0	0	1

Categorizzazione: dimensione	**Occorrenze diffusione futura**			
	Sì, sarà un'iniziativa strutturata (es. con accordi individuali, linee guida che definiscono il progetto, …)	Sì, ma lo gestiremo in modo informale	No	Non so
Da 10 a 99	112	36	15	96

100 e più	93	7	3	36

Categorizzazione: macrocategoria	**Percentuale diffusione futura**			
	Sì, sarà un'iniziativa strutturata (es. con accordi individuali, linee guida che definiscono il progetto, …)	Sì, ma lo gestiremo in modo informale	No	Non so
Altre PA	73%	6%	18%	3%
Altre PA locali	75%	2%	9%	14%
Aziende del SSN	100%	0%	0%	0%
Comune	46%	9%	24%	21%
PA centrale	100%	0%	0%	0%
Ricerca e Università	80%	0%	0%	20%
Scuola di ogni ordine e grado	24%	8%	34%	34%
Regione	88%	0%	0%	13%

Categorizzazione: macrocategoria + dimensione	**Occorrenze diffusione futura**			
	Sì, sarà un'iniziativa strutturata (es. con accordi individuali, linee guida che definiscono il progetto, …)	Sì, ma lo gestiremo in modo informale	No	Non so
Altre PA Big	10	0	4	0
Altre PA locali Big	13	0	0	2
Aziende del SSN Big	6	0	0	0
Comune Big	34	5	3	4
PA centrale Big	6	0	0	0
Ricerca e Università Big	13	0	0	0
Scuola di ogni ordine e grado Big	6	2	13	12
Altre PA Small	14	2	2	1
Altre PA locali Small	20	1	4	4
Aziende del SSN Small	2	0	0	0
Comune Small	76	17	55	45
PA centrale Small	1	0	0	0
Ricerca e Università Small	3	0	0	4
Scuola di ogni ordine e grado Small	3	1	0	1
Regione Big	7	0	0	1

Categorizzazione: macrocategoria	Media giornate lavoro da remoto
Altre PA	1,59
Altre PA locali	1,21
Aziende del SSN	1,00
Comune	0,82
PA centrale	2,18
Ricerca e Università	1,39
Scuola di ogni ordine e grado	0,63
Regione	1,31

Categorizzazione: dimensione	Media giornate lavoro da remoto
Da 10 a 99	1,91
100 e più	2,08

Categorizzazione: macrocategoria + dimensione	Media giornate lavoro da remoto
Altre PA Big	1,70
Altre PA locali Big	1,68
Aziende del SSN Big	0,92
Comune Big	1,42
PA centrale Big	2,21
Ricerca e Università Big	1,56
Scuola di ogni ordine e grado Big	0,64
Altre PA Small	1,51
Altre PA locali Small	0,97
Aziende del SSN Small	1,25
Comune Small	0,68
PA centrale Small	2,00
Ricerca e Università Small	1,07
Scuola di ogni ordine e grado Small	0,55
Regione Big	1,31

Categorizzazione: macrocategoria	Maturità media policy (1 per niente - 5 totale)
Altre PA	2,50
Altre PA locali	2,06
Aziende del SSN	1,50
Comune	1,57
PA centrale	2,83
Ricerca e Università	2,83
Scuola di ogni ordine e grado	1,70
Regione	2,57

Categorizzazione: dimensione	Maturità media policy (1 per niente - 5 totale)
Da 10 a 99	1,72
100 e più	2,15

Categorizzazione: macrocategoria + dimensione	Maturità media policy (1 per niente - 5 totale)
Altre PA Big	2,80
Altre PA locali Big	2,08
Aziende del SSN Big	1,20
Comune Big	1,80
PA centrale Big	2,60
Ricerca e Università Big	2,85
Scuola di ogni ordine e grado Big	2,00

Altre PA Small	2,33
Altre PA locali Small	2,05
Aziende del SSN Small	3,00
Comune Small	1,47
PA centrale Small	4,00
Ricerca e Università Small	2,80
Scuola di ogni ordine e grado Small	1,00
Regione Big	2,57

Categorizzazione: macrocategoria	**Maturità media spazi (1 per niente - 5 totale)**
Altre PA	1,68
Altre PA locali	1,66
Aziende del SSN	1,50
Comune	1,45
PA centrale	1,50
Ricerca e Università	2,06
Scuola di ogni ordine e grado	1,80
Regione	2,00

Categorizzazione: dimensione	**Maturità media spazi (1 per niente - 5 totale)**
Da 10 a 99	1,59
100 e più	1,57

Categorizzazione: macrocategoria + dimensione	Maturità media spazi (1 per niente - 5 totale)
Altre PA Big	1,80
Altre PA locali Big	1,69
Aziende del SSN Big	1,40
Comune Big	1,38
PA centrale Big	1,40
Ricerca e Università Big	1,69
Scuola di ogni ordine e grado Big	1,71
Altre PA Small	1,61
Altre PA locali Small	1,64
Aziende del SSN Small	2,00
Comune Small	1,48
PA centrale Small	2,00
Ricerca e Università Small	3,00
Scuola di ogni ordine e grado Small	2,00
Regione Big	2,00

Categorizzazione: macrocategoria	Maturità media comportamenti (1 per niente - 5 totale)
Altre PA	2,43
Altre PA locali	2,71
Aziende del SSN	2,17
Comune	2,26
PA centrale	2,50
Ricerca e Università	2,56
Scuola di ogni ordine e grado	2,40
Regione	2,29

Categorizzazione: dimensione	Maturità media comportamenti (1 per niente - 5 totale)
Da 10 a 99	2,34
100 e più	2,43

Categorizzazione: macrocategoria + dimensione	Maturità media comportamenti (1 per niente - 5 totale)
Altre PA Big	2,70
Altre PA locali Big	2,85
Aziende del SSN Big	2,20
Comune Big	2,20
PA centrale Big	2,60
Ricerca e Università Big	2,54
Scuola di ogni ordine e grado Big	2,57

Altre PA Small	2,28
Altre PA locali Small	2,64
Aziende del SSN Small	2,00
Comune Small	2,29
PA centrale Small	2,00
Ricerca e Università Small	2,60
Scuola di ogni ordine e grado Small	2,00
Regione Big	2,29

Categorizzazione: macrocategoria	**Maturità media tecnologie (1 per niente - 5 totale)**
Altre PA	2,75
Altre PA locali	2,43
Aziende del SSN	2,50
Comune	2,33
PA centrale	3,00
Ricerca e Università	2,72
Scuola di ogni ordine e grado	2,50
Regione	2,43

Categorizzazione: dimensione	**Maturità media tecnologie (1 per niente - 5 totale)**
Da 10 a 99	2,34
100 e più	2,62

Categorizzazione: macrocategoria + dimensione	Maturità media tecnologie (1 per niente - 5 totale)
Altre PA Big	3,00
Altre PA locali Big	2,54
Aziende del SSN Big	2,40
Comune Big	2,48
PA centrale Big	3,00
Ricerca e Università Big	2,85
Scuola di ogni ordine e grado Big	2,71
Altre PA Small	2,61
Altre PA locali Small	2,36
Aziende del SSN Small	3,00
Comune Small	2,28
PA centrale Small	3,00
Ricerca e Università Small	2,40
Scuola di ogni ordine e grado Small	2,00
Regione Big	2,43

Categorizzazione: macrocategoria	Maturità media	Maturità media %
Altre PA	2,34	49%
Altre PA locali	2,21	54%
Aziende del SSN	1,92	43%
Comune	1,90	45%
PA centrale	2,46	50%
Ricerca e Università	2,54	51%
Scuola di ogni ordine e grado	2,10	48%
Regione	2,32	46%

Categorizzazione: macrocategoria	Occorrenza PA mature	Occorrenza PA non mature
Altre PA	8	27
Altre PA locali	7	34
Aziende del SSN	1	7
Comune	11	221
PA centrale	2	4
Ricerca e Università	11	9
Scuola di ogni ordine e grado	3	33
Regione	3	5

Categorizzazione: dimensione	Occorrenza PA mature	Occorrenza PA non mature
Da 10 a 99	21	227
100 e più	25	113

Categorizzazione: macrocategoria + dimensione	Occorrenza PA mature	Occorrenza PA non mature
Altre PA Big	5	9
Altre PA locali Big	3	12
Aziende del SSN Big	0	6
Comune Big	2	43
PA centrale Big	1	4
Ricerca e Università Big	8	5
Scuola di ogni ordine e grado Big	3	29
Altre PA Small	3	18
Altre PA locali Small	4	22
Aziende del SSN Small	1	1
Comune Small	9	178
PA centrale Small	1	0
Ricerca e Università Small	3	4
Scuola di ogni ordine e grado Small	0	4
Regione Big	3	5

A.2. Analysis performed on the second survey

Use of STATA 14/SE: Do_file for analysis.

// autovalutazione delle performances, divisione per tipologia lavoratore

by TIPOLOGIA_LAVORATORE, sort : tabulate VALPERF_1

by TIPOLOGIA_LAVORATORE, sort : tabulate VALPERF_2

by TIPOLOGIA_LAVORATORE, sort : tabulate VALPERF_3

by TIPOLOGIA_LAVORATORE, sort : tabulate VALPERF_4

by TIPOLOGIA_LAVORATORE, sort : tabulate VALPERF_5

by TIPOLOGIA_LAVORATORE, sort : tabulate VALPERF_6

// test ANOVA per questi dati, rimosso il numero 6 (=non so)

oneway VALPERF_1 TIPOLOGIA_LAVORATORE if VALPERF_1!=6, bonferroni tabulate

oneway VALPERF_2 TIPOLOGIA_LAVORATORE if VALPERF_2!=6, bonferroni tabulate

oneway VALPERF_3 TIPOLOGIA_LAVORATORE if VALPERF_3!=6, bonferroni tabulate

oneway VALPERF_4 TIPOLOGIA_LAVORATORE if VALPERF_4!=6, bonferroni tabulate

oneway VALPERF_5 TIPOLOGIA_LAVORATORE if VALPERF_5!=6, bonferroni tabulate

oneway VALPERF_6 TIPOLOGIA_LAVORATORE if VALPERF_6!=6, bonferroni tabulate

// autovalutazione della situazione lavorativa attuale, divisione per tipologia lavoratore

by TIPOLOGIA_LAVORATORE, sort : tabulate VALAV_1

by TIPOLOGIA_LAVORATORE, sort : tabulate VALAV_2

by TIPOLOGIA_LAVORATORE, sort : tabulate VALAV_3

by TIPOLOGIA_LAVORATORE, sort : tabulate VALAV_4

by TIPOLOGIA_LAVORATORE, sort : tabulate VALAV_5

by TIPOLOGIA_LAVORATORE, sort : tabulate VALAV_6

by TIPOLOGIA_LAVORATORE, sort : tabulate VALAV_7

by TIPOLOGIA_LAVORATORE, sort : tabulate VALAV_8

by TIPOLOGIA_LAVORATORE, sort : tabulate VALAV_9

```
// test ANOVA per questi dati
oneway VALAV_1 TIPOLOGIA_LAVORATORE, bonferroni tabulate
oneway VALAV_2 TIPOLOGIA_LAVORATORE, bonferroni tabulate
oneway VALAV_3 TIPOLOGIA_LAVORATORE, bonferroni tabulate
oneway VALAV_4 TIPOLOGIA_LAVORATORE, bonferroni tabulate
oneway VALAV_5 TIPOLOGIA_LAVORATORE, bonferroni tabulate
oneway VALAV_6 TIPOLOGIA_LAVORATORE, bonferroni tabulate
oneway VALAV_7 TIPOLOGIA_LAVORATORE, bonferroni tabulate
oneway VALAV_8 TIPOLOGIA_LAVORATORE, bonferroni tabulate
oneway VALAV_9 TIPOLOGIA_LAVORATORE, bonferroni tabulate

// autovalutazione delle performances, classificazione in base alla presenza del "Capo Smart"
by CAPO_SMART, sort : tabulate VALPERF_1
by CAPO_SMART, sort : tabulate VALPERF_2
by CAPO_SMART, sort : tabulate VALPERF_3
by CAPO_SMART, sort : tabulate VALPERF_4
by CAPO_SMART, sort : tabulate VALPERF_5
by CAPO_SMART, sort : tabulate VALPERF_6

// test ANOVA per questi dati, rimosso il numero 6 (=non so)
oneway VALPERF_1 CAPO_SMART if VALPERF_1!=6, bonferroni tabulate
oneway VALPERF_2 CAPO_SMART if VALPERF_2!=6, bonferroni tabulate
oneway VALPERF_3 CAPO_SMART if VALPERF_3!=6, bonferroni tabulate
oneway VALPERF_4 CAPO_SMART if VALPERF_4!=6, bonferroni tabulate
oneway VALPERF_5 CAPO_SMART if VALPERF_5!=6, bonferroni tabulate
oneway VALPERF_6 CAPO_SMART if VALPERF_6!=6, bonferroni tabulate
```

// autovalutazione della situazione lavorativa attuale, classificazione in base alla presenza del "Capo Smart"

by CAPO_SMART, sort : tabulate VALAV_1

by CAPO_SMART, sort : tabulate VALAV_2

by CAPO_SMART, sort : tabulate VALAV_3

by CAPO_SMART, sort : tabulate VALAV_4

by CAPO_SMART, sort : tabulate VALAV_5

by CAPO_SMART, sort : tabulate VALAV_6

by CAPO_SMART, sort : tabulate VALAV_7

by CAPO_SMART, sort : tabulate VALAV_8

by CAPO_SMART, sort : tabulate VALAV_9

//test ANOVA per questi dati

oneway VALAV_1 CAPO_SMART, bonferroni tabulate

oneway VALAV_2 CAPO_SMART, bonferroni tabulate

oneway VALAV_3 CAPO_SMART, bonferroni tabulate

oneway VALAV_4 CAPO_SMART, bonferroni tabulate

oneway VALAV_5 CAPO_SMART, bonferroni tabulate

oneway VALAV_6 CAPO_SMART, bonferroni tabulate

oneway VALAV_7 CAPO_SMART, bonferroni tabulate

oneway VALAV_8 CAPO_SMART, bonferroni tabulate

oneway VALAV_9 CAPO_SMART, bonferroni tabulate

// valutazione dal punto di vista del coordinatore, divisione in base alla tipologia di lavoratore

by TIPOLOGIA_LAVORATORE, sort : tabulate VALCOORD_1

by TIPOLOGIA_LAVORATORE, sort : tabulate VALCOORD_2

by TIPOLOGIA_LAVORATORE, sort : tabulate VALCOORD_3

by TIPOLOGIA_LAVORATORE, sort : tabulate VALCOORD_4

by TIPOLOGIA_LAVORATORE, sort : tabulate VALCOORD_5

by TIPOLOGIA_LAVORATORE, sort : tabulate VALCOORD_6

// test ANOVA per questi dati, rimosso il numero 6 (=non so)

oneway VALCOORD_1 CAPO_SMART if VALCOORD_1!=6, bonferroni tabulate

oneway VALCOORD_2 CAPO_SMART if VALCOORD_2!=6, bonferroni tabulate

oneway VALCOORD_3 CAPO_SMART if VALCOORD_3!=6, bonferroni tabulate

oneway VALCOORD_4 CAPO_SMART if VALCOORD_4!=6, bonferroni tabulate

oneway VALCOORD_5 CAPO_SMART if VALCOORD_5!=6, bonferroni tabulate

oneway VALCOORD_6 CAPO_SMART if VALCOORD_6!=6, bonferroni tabulate

// Analisi punti di focus per il team, divisione per tipologia lavoratore. Calcolo percentuali sulla base dei 692 rispondenti

. total REMFOCUSCOORD_1-REMFOCUSCOORD_12, over(TIPOLOGIA_LAVORATORE)

// Analisi punti di focus per il team, divisione per tipologia lavoratore. Calcolo percentuali in base alla tipologia di lavoratore e specifico per coordinatori di prsone da remoto

total REMFOCUSCOORD_1-REMFOCUSCOORD_12 if REMCOORD_1==1 | REMCOORD_1==2, over(TIPOLOGIA_LAVORATORE)

// Numero lavoratori fully engaged, divisione per tipologia lavoratore

by TIPOLOGIA_LAVORATORE, sort : tabulate ENG_FREQ

// Numero lavoratori con benessere top, divisione per tipologia lavoratore

by TIPOLOGIA_LAVORATORE, sort : tabulate BEN_FREQ

// Numero lavoratori fully engaged, divisione per tipologia capo

by CAPO_SMART, sort : tabulate ENG_FREQ

// Numero lavoratori con benessere top, divisione per tipologia lavoratore

```
by CAPO_SMART, sort : tabulate BEN_FREQ_V2

// Calcolo Engagement medio, secondo tipologia lavoratore
 mean ENG_MEDIA, over(TIPOLOGIA_LAVORATORE)
 // Calcolo Engagement medio, secondo tipologia capo
 mean ENG_MEDIA, over(CAPO_SMART)

// Valutazione delle performances, classificazione in base al tipo di team
by REMCOORD_1, sort : tabulate VALCOORD_1
by REMCOORD_1, sort : tabulate VALCOORD_2
by REMCOORD_1, sort : tabulate VALCOORD_3
by REMCOORD_1, sort : tabulate VALCOORD_4
by REMCOORD_1, sort : tabulate VALCOORD_5
by REMCOORD_1, sort : tabulate VALCOORD_6

// test ANOVA per questi dati, rimosso il numero 6 (=non so)
oneway VALCOORD_1 REMCOORD_1 if VALCOORD_1!=6, bonferroni tabulate
oneway VALCOORD_2 REMCOORD_1 if VALCOORD_2!=6, bonferroni tabulate
oneway VALCOORD_3 REMCOORD_1 if VALCOORD_3!=6, bonferroni tabulate
oneway VALCOORD_4 REMCOORD_1 if VALCOORD_4!=6, bonferroni tabulate
oneway VALCOORD_5 REMCOORD_1 if VALCOORD_5!=6, bonferroni tabulate
oneway VALCOORD_6 REMCOORD_1 if VALCOORD_6!=6, bonferroni tabulate

// Analisi punti di focus per il team, divisione per tipologia di team. Calcolo percentuali
sulla base dei 692 rispondenti
. total REMFOCUSCOORD_1-REMFOCUSCOORD_12, over(REMCOORD_1)

// Percentuali di capi smart
 tabulate CAPO_SMART
```

// Opinione di inserimento SW in base al team

by REMCOORD_1, sort : tabulate OPIREM_1

A.3. ANOVA test results for second survey

A green cell means that p-value in that case is considered good to support statistical correlation.

CAPO_SMART					
VALPERF_1	0		VALAV_1	0	
1	0,100287		1	0,819981	
	0,009			0	
VALPERF_2	0		VALAV_2	0	
1	0,98981		1	0,648448	
	0,011			0	
VALPERF_3	0		VALAV_3	0	
1	0,104806		1	0,711207	
	0,009			0	
VALPERF_4	0		VALAV_4	0	
1	0,074174		1	0,850121	
	0,061			0	
VALPERF_5	0		VALAV_5	0	
1	0,222722		1	0,50097	
	0			0	
VALPERF_6	0		VALAV_6	0	
1	0,17203		1	0,584625	
	0			0	
ENG_MEDIA	0		VALAV_7	0	
1	1,24002		1	0,623915	
	0			0	
ENG_FREQ	0		VALAV_8	0	
1	0,213072		1	0,730316	
	0			0	
BEN_FREQ	0		VALAV_9	0	
1	0,213996		1	0,595052	
	0			0	

VALCOORD_1

VALPERF_1	1	2
2	0,09238	
	0,652	
3	0,186886	0,094507
	0,475	1

VALPERF_2	1	2
	0,115778	
	0,391	
3	0,253308	0,13753
	0,184	0,877

VALPERF_3	1	2
2	0,088803	
	0,775	
3	0,110732	0,021929
	1	1

VALPERF_4	1	2
2	0,091552	
	0,718	
3	0,158286	0,066733
	0,75	1

VALPERF_5	1	2
2	0,087081	
	0,812	
3	-0,12379	-0,09946
	1	1

VALPERF_6	1	2
2	0,125055	
	0,357	
3	0,093998	-0,03106
	1	1

COORD_1	1
2	0,033791
	0,207

COORD_2	
2	0,004129
	0,836

COORD_3	1
2	0,013465
	0,625

COORD_4	
2	0,002985
	0,877

COORD_5	1
2	0,018547
	0,546

COORD_6	1
2	0,065104
	0,049

COORD_7	1
2	0,01401
	0,588

COORD_8	1
2	-0,00222
	0,906

COORD_9	1
2	0,023946
	0,466

COORD_10	1
2	-0,01334
	0,662

COORD_11	1
2	-0,02839
	0,418

COORD_12	1
2	-0,0174
	0,652

TIPOLOGIA_LAVORATORE

VALPERF_1	0	1
1	-0,038167	
	1	
2	0,049248	0,087415
	1	0,44

VALAV_1	0	1
1	-0,00476	
	1	
2	0,164446	0,169206
	0,061	0,058

VALPERF_2	0	1
1	-0,063203	
	0,343	
2	0,041169	0,104372
	1	0,253

VALAV_2	0	1
1	0,095196	
	0,184	
2	0,590142	0,494946
	0	0

VALPERF_3	0	1
1	-0,075921	
	0,195	
2	0,063485	0,139406
	0,899	0,075

VALAV_3	0	1
1	0,07939	
	0,291	
2	0,314523	0,235133
	0	0,003

VALPERF_4	0	1
1	-0,06123	
	0,4	
2	0,04796	0,10919
	1	0,229

VALAV_4	0	1
1	0,07939	
	1	
2	0,284505	0,257315
	0	0,001

VALPERF_5	0	1
1	-0,038385	
	1	
2	0,08615	0,124535
	0,476	0,135

VALAV_5	0	1
1	0,093002	
	0,165	
2	0,300044	0,207042
	0	0,013

VALPERF_6	0	1
1	-0,031991	
	1	
2	0,11406	0,14605
	0,186	0,056

VALAV_6	0	1
1	0,138761	
	0,021	
2	0,259843	0,121082
	0,002	0,345

ENG_MEDIA	0	1
1	-0,295507	
	0	
2	-0,251806	0,043701
	0,083	1

VALAV_7	0	1
1	0,026027	
	1	
2	0,145237	0,11921
	0,159	0,36

ENG_FREQ	0	1
1	-0,02757	
	0,295	
2	-0,068829	-0,04126
	0,014	0,292

VALAV_8	0	1
1	-0,02722	
	1	
2	0,074483	0,1017
	0,917	0,512

BEN_FREQ	0	1
1	0,02591	
	0,534	
2	0,059301	0,033391
	0,105	0,734

VALAV_9	0	1
1	-0,00163	
	1	
2	0,140635	0,142268
	0,102	0,107

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