Telework and job satisfaction in knowledge-intensive public organizations: a quali-quantitative analysis from an environmental protection agency in Italy

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Abstract
Purpose – The study aims to examine the relationship between telework conditions and employees’ job satisfaction (JS) within knowledge-intensive public organizations (KIPOs). Additionally, it aims to unfold the mediating role played by both organizational and job characteristics, namely supervisory support (SS) and job autonomy (JA).

Design/methodology/approach – The analysis adopts a simultaneous qualitative-quantitative design, starting with a preliminary inductive analysis of qualitative data, followed by a deductive quantitative analysis using structural equation modeling (SEM). The data were retrieved from a survey completed by some 700 employees of a regional environmental protection agency in Italy.

Findings – Findings show that the positive association between conditions for telework (CT) and JS is partially mediated by both SS and JA. Moreover, the results of the study suggest a sequential nature of such mediational patterns.

Originality/value – This research provides an empirical contribution to a relatively under-investigated area: the role of job characteristics in explaining the nexus between telework and JS. Furthermore, the study takes place within the context of a KIPO, adding particular significance to the emerging insights due to the distinct nature of the work conducted in such settings.

Keywords Telework, Job satisfaction, Job autonomy, Job characteristics model, Supervisory support, Knowledge-intensive public organizations

Paper type Research paper

Introduction
The COVID-19 pandemic sparked a significant shift in the way employees operate, impacting both the public and private sectors (Belzunegui-Eraso and Erro-Garcés, 2020). In order to ensure business continuity and prioritize employee safety, organizations rapidly embraced telework as...
a practical solution. This allowed individuals to work from home or remotely, mitigating the risk of virus transmission in traditional workplaces. Even as pandemic restrictions eased, this transformation in work patterns persisted, signifying a major turning point in the way people work (Eurofound, 2022).

However, transitioning to telework is no easy feat, as it demands substantial adjustments in the conventional work environment. Scholars have emphasized the necessity of implementing changes pertaining to employees’ human behavior, organizational processes and technology infrastructure (Elshaiekh et al., 2018) to ensure effective and sustainable telework, considering several crucial factors. Chief among them is providing employees with the necessary resources and tools. Employees require access to appropriate hardware, software and skills to perform their tasks efficiently and remain seamlessly connected to the organization. Embracing technology facilitates connectivity, enables collaborative efforts and ensures productivity despite physical distances. Furthermore, the success of telework hinges on establishing adequate organizational conditions. Employers must create clear policies, guidelines and protocols governing teleworking arrangements. Effective communication between supervisors and employees becomes increasingly critical in this context, with regular check-ins and virtual meetings playing a vital role in maintaining connectivity and combating feelings of isolation.

On the other hand, as telework schemes are becoming increasingly popular across all sectors, organizations are growing more concerned about maintaining workers’ well-being when they work remotely. The topic of the relationship between telework and job satisfaction (JS) is not new (DuBrin, 1991; Golden and Veiga, 2005), but it has gained prominent attention following the major transformation brought about by the pandemic (Brunelle and Fortin, 2021; Zöllner and Sulíková, 2021). One of the main areas that scholarship has focused on is how job characteristics affect JS in teleworking conditions (Golden, 2004). It is clear that jobs with different ways of interacting within their work environment (for example, jobs that rely more or less on collaboration with colleagues to complete one’s tasks) can have radically different effects on how individuals feel about their work.

This can depend on the level of knowledge intensity characterizing the organization. Indeed, knowledge-intensive organizational contexts (Makani and Marche, 2010) are associated with jobs that tend to be more characterized by decision-making discretion, which depends on the higher level of competence of workers compared to contexts where task execution follows more hierarchical logics. Knowledge-intensive organizations are recognized as workplaces where the highly qualified knowledge provided by the employees is the central asset for achieving the organization’s goals (Alvesson, 2004), with knowledge often becoming the foundation of their competitive strategy (Abell and Oxbrow, 2006). In the domain of public service, knowledge is closely linked to the rigor employed in accumulating, creating, or disseminating knowledge, particularly in sensitive or critical sectors, such as the environment (Grossi et al., 2020; Bracci et al., 2021), with organizations operating in such sectors being usually referred to as knowledge-intensive public organizations (KIPOs). The literature has noted that remote work was already widespread in knowledge-intensive organizational contexts even before the pandemic (Bülbul, 2022). Moreover, employees working in knowledge-intensive contexts were expected to respond more effectively to the new ways of working brought about by the pandemic compared to other organizations. This is because knowledge workers are typically more inclined to embrace flexible work methods and possess the autonomy to do so, thanks to the peculiar nature of their skills and expertise (Hoendervanger and Croce, 2022).

In this context, this study wants to contribute to the following question: what factors contribute to JS in teleworking conditions within KIPOs? In responding to the aforementioned inquiry, one of the largest national environmental protection agencies in Italy was investigated. The gathered evidence is positioned to guide the comprehensive national public environmental protection system in tackling evolving organizational challenges, placing emphasis not only on
the technical prerequisites of the services provided but also on personnel management. The article unfolds as follows: next section presents the theoretical foundations underlying the hypotheses of the study. Section 3 outlines the methods employed. Section 4 presents the findings that emerge from the analyses, followed by the discussion (Section 5). Concluding remarks, limitations and avenues for future research are highlighted in Section 6.

Theoretical framework

Conditions for teleworking and job satisfaction

The rising adoption of flexible working models traces its origins back decades, primarily driven by efficiency concerns. As early as the Seventies, the futurist Alvin Toffler emphasized that “the single most anti-productive thing we can do is ship millions of workers back and forth across the landscape every morning and evening” (Toffler, 1970). However, a significant diffusion of these alternatives has been massively accelerated during the COVID-19 pandemic (Bülbül, 2022; Phillips, 2020). The pandemic has compelled both public and private organizations to redefine their work modalities, embracing remote working, teleworking, or hybrid models. These modalities vary in the degree of granted flexibility they offer (Elshaiekh et al., 2018; Bal and De Lange, 2014; Casper and Harris, 2008). The telework or remote working modalities provide for the possibility of working from a place other than the traditional one, generally from home, with the same time limits, responsibilities and expected outputs. Hybrid models include the possibility to spend part of the working time in the office and part in a remote location. Regardless of the variations among flexible work arrangements, certain conditions must be ensured to enable employees to deliver the expected contributions and allowing organizations to achieve their intended outcomes (Bérastegui, 2021). Scholars have categorized such conditions into four distinct dimensions: job, organizational, home and family and individual levels (Bérastegui, 2021). Workers should be provided with adequate information communication technology (ICT) equipment and infrastructures (Nasi et al., 2015), the managerial style should shift toward a result-oriented model (Galea et al., 2014), the alternative workplaces should ensure adequate conditions for working without excessive distractions (Bülbül, 2022) and proper training (e.g. ICT) should be provided to enable effective individual behaviors (Nasi et al., 2015). Ensuring specific conditions for a successful transition to a new working modality has shown potentially positive impacts for both workers and the organization. The literature emphasizes cost reductions in office space and employee travel, improved work-life balance (Nickson and Siddons, 2012), enhanced performance (De Menezes and Kelliher, 2011) and increased organizational commitment and JS (Felstead and Henseke, 2017).

In management scholarship, JS holds a pivotal role and denotes the cultivation of positive emotions towards one’s work experiences (Spector, 1997) and has been described as “how an individual feels about his or her job and various aspects of it usually in the sense of how favorable - how positive or negative - those feelings are” (Rainey, 2009, p. 298). Converging evidence from diverse academic disciplines suggests that JS is a complex and multi-dimensional construct encompassing various aspects related to fulfilling individual needs (Battaglio et al., 2022). In the public domain, JS is an important outcome to examine because it has been shown to strongly correlate with a variety of variables of interest to both employees and organizations, such as retention, organizational commitment and performance (Cantarelli et al., 2016). This is particularly true for knowledge-intensive organizations where “personnel is the most significant – sometimes the only significant – ‘resource’ of the company” (Alvesson, 2000, p. 1103).

Research on evaluating JS in telework conditions indicates that organizational factors (such as training, relationships with the supervisor and workplace environmental conditions) as well as job factors (such as job autonomy (JA)), significantly influence JS (Ordóñez Parada, 2018; Kim, 2023). This is particularly noteworthy in the context of knowledge-intensive
organizations, where employees have embraced flexible working modalities at a considerably higher rate compared to other industries (Milasi et al., 2021), with this trend being further accelerate by the progressive adoption of ICT innovations (Van Yperen et al., 2014). This adaptability stems from the peculiar nature of their expertise and competencies, allowing them to flexibly reorganize their working styles (Hoendervanger and Croce, 2022).

These lines of reasoning find further validation in the results of a recent systematic review on telework in the public sector (Mele et al., 2023), which delineates the main antecedents and outcomes of telework. In terms of antecedents, the adoption of telework within the public sphere is shaped by three pivotal categories of factors: contextual inputs (e.g. legislative reforms, responses to natural disasters), individual attributes (e.g. considerations for familial requirements) and professional and organizational characteristics (e.g. JA, supportive leadership). Turning to outcomes, telework in the public domain is poised to correlate positively with heightened JS, albeit accompanied by a potential risk of professional isolation, particularly accentuated in more immersive remote work settings, as exemplified by the case of so called COVID-work (Todisco et al., 2023). Drawing upon this evidence, we focus on organizational teleworking conditions and posit a positive correlation between such conditions, specifically hardware availability, software availability and training adequacy and JS within the context of a KIPO.

**Supervisory support and job satisfaction**

Research examining the relationship between leader behavior and employee attitudes has yielded, over time, quite compelling results: across various contexts and industries (Yukl, 1989; Rowold et al., 2014), the level of support exhibited by supervisors has been found to significantly correlate with positive outcomes for employees, such as increased organizational commitment and JS (e.g. Alegre et al., 2016), as well as abusive behavior has been shown to predict negative outcomes, such as turnover intentions and psychological distress (Tepper, 2000). Scholars emphasize that the employee-supervisor relationship plays a pivotal role in shaping individuals’ experiences at work and influencing their JS (Alegre et al., 2016). Factors such as the degree of delegation and autonomy granted by supervisors have a profound impact on employees’ attitudes towards their work (Fila et al., 2014). This relationship has been explored through different theoretical lenses, which explain the positive effect of supportive leaders on employee work attitudes in terms of cognitive focus (Latham and Yukl, 1976), dynamics of obligation and reciprocation (Blau, 1964; Hackman and Oldham, 1975; Deci and Ryan, 1985), or affection (Cropanzano et al., 2017). In a nutshell, supervisory support (SS) can be defined as “the extent to which supervisors provide encouragement and support to employees” (Griffin et al., 2001, p. 537).

Hackman and Oldham (1975), in their Job Characteristics Model, define feedback as the degree to which carrying out the work activities required by the job results in the employee obtaining information about the effectiveness of his or her performance. Scholars have identified several behaviors that can be traced back to those of a supportive supervisor, which can eventually be summarized into at least three main categories (Kadushin and Harkness, 2002): direction (organizational agency), feedback (professional development) and motivation (expressive-supportive leadership). In the first place, employees need to have clear goals to achieve and understand how their work contributes to organizational goals. Then, they need to understand to what extent their work is in line with expectations and, if not, to see how to enhance their performance. Moreover, they need to be supported and motivated to give their best at work. This bears notable significance in public contexts, where formalization tends to be heightened compared to private settings. In situations where the strength of organizational routines and procedures is particularly pronounced, the positive outcomes in individual job experiences may ultimately rely on leadership behaviors that prioritize relationships and effective communication (Dahlstrom, 2013). This holds true for personnel working in knowledge-intensive organizations as well. Indeed, SS behaviors are not alternative to JA (which, in fact, stands in contrast to
control). Instead, they complement each other to create a work environment that is conducive to positive individual outcomes.

During the COVID-19 pandemic, the abrupt shift to remote working modalities resulted in a significant demand for guidance and support among teleworkers. Despite variations in the intensity of this phenomenon, we assume that the structural need for remote workers to receive support from their supervisors could imply a positive relationship of the latter with JS. Based on this, we posit that the relationship between conditions for teleworking and JS could be partially explained by the level of SS granted to the employees of a KIPO.

**Job autonomy and job satisfaction**

JA refers to the “degree to which the job provides substantial freedom, independence, and discretion to the employee in scheduling the work and in determining the procedures to be used in carrying it out” (Hackman and Oldham, 1975, p. 162). Autonomy is a central concept in several theoretical models that seek to explain JS, with most of these models drawing on the role of autonomy as a driver of JS (e.g. Hackman and Oldham, 1975; Deci and Ryan, 1985). Whereas autonomy has consistently been linked to employee satisfaction as a positive factor (Spector, 1986; Chang and Cheng, 2014), this association has been notably emphasized in the case of knowledge workers (Drucker, 1999): in complex jobs, with unstructured tasks that require discretionary behaviors (Chung-Yan, 2010), knowledge workers tend to feel more empowered and require less direction and control from their managers compared to other types of workers (Śajeva, 2007). Being “the vertical expansion of responsibility” (Ali et al., 2014, p. 47), autonomy uniquely creates the opportunity for the application of knowledge and skill. When a job provides employees with the freedom to make choices concerning the timing or methods of performing their tasks, it also enables them to leverage a wider range of their knowledge in decision-making (Morrison et al., 2005). This mechanism can be elucidated as follows: when employees have the opportunity to shape and redefine their jobs, they can fulfill their personal needs and unmet expectations, leading to positive work experiences (Berg et al., 2010; Zhao et al., 2022). Conversely, jobs with limited opportunities for task control may also restrict the use of an individual’s full range of expertise, hindering the enhancement and development of new work practices. In this vein, knowledge-intensive organizations should provide knowledge workers with goals, but it is the knowledge workers’ responsibility to achieve them and decide how to do it (Drucker, 1999).

The significance of autonomy as a work motivator is also extensively discussed in the context of public services, where it has been shown to exhibit a strong correlation with employees’ JS (Steijn, 2004; Cantarelli et al., 2016; Fernandez and Moldogaziev, 2015). The investigation of JA and its association with JS in the public sector, however, is by no means trivial: while convergingly considered a desirable aspect of the working environment, autonomy may be limited in the public sector domain due to the inherent institutional constraints that tend to lead to predetermined and standardized organizational operations (Farnham and Horton, 1996). On this very point, Mele et al. (2021) highlighted “ontological concerns” (Mele et al., 2021, p. 792) related to the interplay between autonomy/control and teleworking in public bureaucracies. In this vein, public administration scholarship has been delving into the relationship between autonomy and JS with particular attention to knowledge-intensive contexts, such as public health (Curtis and Glacken, 2014), where professionalism is intertwined with high levels of knowledge intensity. Recent evidence has reaffirmed the causal nature of the relationship between autonomy and JS among professionals working in KIPOs (Battaglio et al., 2022).

During the Covid-19 crisis, just like regular telework in ordinary circumstances, it has been observed that employees who rely more on factors other than self-management to accomplish their tasks (e.g. co-workers) encountered challenges while working remotely (Petcu et al., 2021).
Based on this evidence, we posit that the relationship between conditions for teleworking and JS could be partially explained by the level of JA granted to the employees of a KIPO.

Methods
To investigate the research questions mentioned earlier, we conducted simultaneous quali-quantitative analyses (Mele and Belardinelli, 2019) based on data gathered through a computer-assisted web interviewing (CAWI) questionnaire. The survey comprised multiple items presented in a Likert-like format, prompting respondents to express their level of agreement, along with open-ended questions designed to gather insights on perceived strengths and weaknesses in their workplace. The comprehensive exploratory approach comprised two phases (Table 1): (1) content analysis of qualitative responses and (2) statistical analysis of quantitative data, followed by a theory-driven interpretation of the emerging evidence. The logical and chronological sequencing aimed to provide quantitative augmentation (phase 2) to the emerging themes (phase 1), while coherently connecting them to pertinent theoretical frameworks. The devised hybrid research design (Schoonenboom and Johnson, 2017) empowers to discern novel contributions to the study by synergistically integrating insights from both qualitative and quantitative methodologies.

The regional [1] environmental protection agencies – hereafter referred to as REPAs (ARPA, in the Italian acronym for Agenzie Regionali per la Protezione Ambientale) – in which the survey was administered counted, at the time of data collection (i.e. January 2023), about 1,200 employees and 90 senior managers, constituting approximately 11% of the workforce within the entire national environmental protection system (NEPS) system. The response rate to the survey was approximately 69%, with 850 valid responses, which is considerably high compared to the usual rates in surveys related to organizational climate. After listwise deletion, 695 complete responses were included in the analysis. The characteristics of the sample are reported in the Appendix.

Study setting: the environmental protection system in Italy
Environmental protection stands as a paramount priority within the realm of sustainability and the 2030 Agenda identifies four specific goals aimed at addressing this critical issue.

<table>
<thead>
<tr>
<th>Phase</th>
<th>Type of analysis</th>
<th>Method of analysis</th>
<th>Approach</th>
<th>Purpose</th>
<th>Software</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1. Qualitative analysis</td>
<td>Content analysis</td>
<td>Inductive</td>
<td>Exploring emerging themes and recurrent semantic associations from raw qualitative data, without giving prior interpretations</td>
<td>NVivo</td>
</tr>
<tr>
<td></td>
<td>2. Quantitative analysis</td>
<td>Observational analysis</td>
<td>Deductive</td>
<td>Testing associations and patterns of relationship among variables, to complement the insights suggested by phase 1</td>
<td>SPSS 28, Amos 28</td>
</tr>
</tbody>
</table>

Table 1. Features of the methodological design

**Source(s):** Authors' own elaboration
In the Italian context, at the local level, environmental protection is upheld by 21 REPAs. REPAs are independent public bodies entitled of preserving the environment through forecasting and preventing actions, technical environmental analysis and release or denial of authorizations relating to activities that have a potential damage for the environment. Formally introduced by the national legislation in 1993 (legislative decree 496/1993), REPAs were then gradually established as independent bodies in each Italian Region. At the regional level, REPAs are chaired by a President appointed by the Executive Committee of the regional government, so as to ensure coherence with the policies issued by the regional authority. At the national level, each agency operates under the coordination of the NEPS. The NEPS plays a crucial role in ensuring alignment in local operational strategies, uniformity in the execution of tasks and the effectiveness of environmental action to support sustainability and public health protection policies. To this aim, NEPS establishes a three-year development and coordination plan involving all the Italian REPAs. The entire national system employs over 10,500 individuals.

The mission of REPAs requires a team of highly specialized professionals who ensure methodological rigor in data collection, analysis, interpretation and the coherence of information to be communicated to stakeholders (e.g. regional authorities, other public administrations and citizens). The agencies’ capacity to deliver top-notch work can be attributed to the presence of such highly skilled personnel with specific and technical competencies related, in several ways, to environmental protection (e.g. chemists, biologists, engineers, agronomists, etc.), which categorizes REPAs as KIPOs.

REPAs hold a vital and essential role in Italy’s environmental protection domain, carrying out monitoring activities to assess various aspects such as water quality (sustainable development goal – SDG 6 and SDG 14), air quality, daily emissions (SDG 11 and 13) and land conditions (SDG 15). However, it would be limiting to solely perceive REPAs as knowledge providers: as significant employers, these agencies provide intriguing contexts to study employees’ workplace experiences within the knowledge-intensive category. Furthermore, considering the 2030 Agenda’s objectives, REPAs offer an opportunity to identify conditions that foster decent work (SDG 8).

Qualitative inquiry
The qualitative analysis was conducted using Nvivo software to identify emerging themes directly from the raw data, without any preconceived interpretations (Jackson and Bazeley, 2019). The positive and negative aspects highlighted by the respondents were imported into Nvivo and independently analyzed using a “word frequency” query. The first 1,000 most frequently occurring words were considered to extract central themes. Subsequently, a second word frequency query was performed independently on two subgroups: on the one hand, the positive aspects mentioned by the most satisfied respondents were considered, and on the other hand, the negative aspects expressed by the least satisfied respondents were considered. This second query aimed to validate the consistency of the emerged themes and, possibly, identify additional factors that could be conducive of different levels of JS. Emerging topics were then observed within their specific semantic context to gain a comprehensive understanding of employees’ perspectives and the messages they wanted to convey. The analysis followed a flat approach, without classifying or distinguishing respondents based on their job positions, background or demographics.

Quantitative inquiry
All measures used in the quantitative analysis were assessed using responses to a 5-point Likert scale ranging from 1 (total disagreement) to 5 (total agreement). Conditions for telework (CT) were assessed using a three-item scale considering enablers of telework, such
as hardware provisions, software availability and digital skills acquired through training. SS was measured with a four-item scale encompassing different dimensions highlighted as relevant in the literature (Kadushin and Harkness, 2002), namely goal communication, positive reinforcement, feedback and motivating leadership. JA was evaluated using a three-item scale adapted from Breaugh (1998). JS was gauged using a three-item scale, which included assessing interest in one’s job, overall JS and propensity of recommending one’s job. All the items used to measure the variables in the model are reported in the Appendix.

We used SPSS and AMOS software to model our data adopting a structural equation modeling (SEM) approach. To test the hypotheses, a maximum likelihood (ML) full SEM analysis was conducted, consisting of two parts: a measurement model, in which the factors’ structure is examined and a structural model, which allows for testing the hypothesized structural relationships between latent variables. To test our mediation hypotheses, we used an analytical approach aimed at testing the indirect effect between the independent and the dependent variables through the mediator via a bootstrapping procedure (Preacher and Hayes, 2008). This technique estimates the mediation effect and overcomes the limitations of other procedures (such as the choice to free or constrain residual covariance).

**Results**

**Qualitative inquiry**

The qualitative analysis served as a guiding tool for researchers to uncover emerging topics that hold significance for employees, whether positive or negative in nature. In the first query, we selected from the first 1,000 most frequently mentioned words those that were cited by at least 50 respondents (about 7%), considering them noteworthy for further analysis. A total of 19 words (8 pertaining to positive aspects and 9 related to negative aspects) were identified and deemed relevant to the scope of the study (Table 2).

The emerging themes, both positive and negative, are interconnected, with one theme often being explained by others. In relation to positive aspects, around a quarter of the respondents emphasized favorable aspects related to the recurring term job. Some respondents attributed the positivity of their job to the agency’s mission, emphasizing its purpose and outcomes. Others associated the positivity with the increasing adoption of telework, which facilitated a better work-life balance. Work-life balance emerged as a crucial aspect related to the concept of flexibility and working hours. As one respondent pointed out, “flexible working hours are beneficial for achieving work-life balance.” Several respondents also emphasized the stability provided by the organization as an employer, noting competitive

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### Table 2.
Output of the word recurrence analysis

<table>
<thead>
<tr>
<th>Overall sample</th>
<th>Keywords cited for positive aspect of working at the regional agency (word count in parentheses)</th>
<th>Keywords cited for negative aspect of working at the regional agency (word count in parentheses)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Job (N = 212), flexibility (N = 138), working hours (N = 95), work environment (N = 81), stability (N = 65), autonomy (N = 64), colleagues (N = 64), expertise (N = 64), collaboration (N = 59)</td>
<td>Staff (N = 139), job (N = 107), training (N = 106), lack (N = 78), poor (N = 76), scarce (N = 67), communication (N = 66), enhancement (N = 51)</td>
</tr>
<tr>
<td>Sub-samples</td>
<td>(Sub-sample of high-satisfaction respondents) Job (N = 62), life (N = 23), stability (N = 21), working hours (N = 17), colleagues (N = 14), flexibility (N = 14), contents (N = 10), environment (N = 9), balance (N = 9)</td>
<td>(Sub-sample of low-satisfaction respondents) Job (N = 11), lack (N = 8)</td>
</tr>
</tbody>
</table>

**Source(s):** Authors’ own elaboration
salaries and favorable contractual conditions as key positive aspects. Autonomy was another significant positive aspect, perceived as the possibility to make independent decisions and organize one’s work, both in terms of the approach and timing while considering the assigned tasks. This aspect was closely connected to expertise, which respondents often mentioned in relation to personnel and their ability to maintain effective working relationships. Furthermore, positive working relationships and constant collaboration with colleagues and managers were identified as essential contributors to a pleasant working environment. This emphasizes the significance of supportive social interactions within the workplace.

The negative aspects of working in the considered REPA have often been identified by respondents using similar keywords, necessitating specific interpretations to understand their meaning in context. One of the major concerns expressed by respondents is the staff shortage due to the wave of retirements. The average age of employees in Italian REPAs is indeed close to 50 years, and the turnover rate has been insufficient to replace outgoing human resources. As a result, respondents often refer to senior personnel being overloaded with work that requires younger forces with updated skills. The terms lack, poor and scarce are mainly used in relation to the insufficient number of workers compared to the workload and expected results. Alternatively, these terms are connected to the inadequate amount of time allocated for training. Additionally, quotes referring to the personnel enhancement process convergently mention the performance appraisal system, which is often criticized for prioritizing seniority and responding to monetary incentives rather than supporting actual professional development and improving competencies.

The second query, performed on distinct subgroups to verify the consistency of the positive and negative aspects as explained earlier, not only confirmed the identified themes but also highlighted the importance of specific positive aspects that contribute to JS. Among these, the most satisfied respondents emphasized the significance of the purpose and content of their job, the flexibility and work-life balance it offers, positive relationships with colleagues and the stability of their job. These aspects were found to be particularly conducive to JS among the subgroup of the most satisfied respondents. Conversely, the negative aspects mentioned by the subgroup of the least satisfied respondents were also confirmed, primarily related to the excessive workload due to the shortage of personnel. However, in this phase the term lack also revealed a frequent association with the tendency to criticize the role of certain managers struggling to effectively communicate goals, provide feedback and motivate the personnel. It is worth noting that the overall higher frequency of words in the positive domain can be attributed to the higher level of satisfaction expressed by respondents on average. As a result, there were more blank responses regarding perceived factors of weakness compared to strengths in the working context. This suggests that respondents were generally more inclined to highlight positive aspects of their work experience, as will be further emphasized later on.

Results emerging by the two queries were interpreted in combination, with the themes emerging from the first query being considered the most prevalent perceived positive and negative factors in the workplace, whereas the themes emerging from the second query being viewed as a proxy of the main drivers of high versus low JS. The recurring focus on working flexibility and new ways of working, coupled with the unique phase experienced by public administrations in Italy following the Covid-19 pandemic, compelled us to explore the relationship between teleworking conditions and JS. Considering REPAs’ status as KIPOs, we also delved into the role of JA, which might significantly influence and explain JS patterns. Additionally, we recognized the significance of the supervisor-employee relationship as a prominent driver of JS.

By integrating these insights with the tenets of the Job Characteristics Model (Hackman and Oldham, 1975), which includes JA and feedback as two core job characteristics determining individual outcomes (such as high versus low JS), we derived a conceptual model to be tested through quantitative procedures (Figure 1).
Quantitative inquiry: measurement model assessment

The items considered in the quantitative model were first subjected to exploratory factor analysis (EFA) with varimax rotation, in order to test whether the items actually loaded on different factors corresponding to the variables in the hypothesized model. Scale reliability and validity were then tested, showing encouraging results (Table 3). As for reliability, Raykov’s reliability coefficient (RRC) was tested and was satisfactory for all measures, namely conditions for teleworking (0.811), SS (0.957), JA (0.907) and JS (0.839). Despite some long-discussed issues surrounding Cronbach’s alpha, this was also calculated based on its widespread adoption and the relatively inconsequential difference with composite reliability (Peterson and Kim, 2013). On the other hand, constructs’ validity can be stated when both discriminant and convergent validity are established: an average variance extracted (AVE) greater than 0.50 indicates convergent validity, whereas an AVE greater than the squared correlations between the latent variables suggests discriminant validity, as it shows that the factors share an amount of variance low enough to be considered distinct one from each other. Both criteria were met in the data, with AVE showing values over the conventional threshold of 0.5 for all latent variables (0.603, 0.847, 0.765 and 0.644 respectively) and consistently greater than the squared correlation between the latent variables.

Then, a confirmatory factor analysis (CFA) was performed. The model initially showed an acceptable fit with the data - although not good if considering the usually adopted thresholds (Fabrigar et al., 1999) - with $\chi^2$/df ratio of 3.585, root mean square error approximation (RMSEA) <0.08 (0.060), comparative fit index (CFI) and Tucker–Lewis index (TLI) >0.90 (0.956 and 0.947, respectively). When error covariances were allowed to correlate (as suggested by the modification index between items of the factors underlying JA and JS), the RMSEA decreased to 0.057, while both CFI and TLI increased to 0.967 and 0.958.

Quantitative inquiry: structural model

In the structural model analysis, we estimated all the path coefficients, simultaneously controlling for respondents’ age, sex, study background and role level. We tested for a three-

<table>
<thead>
<tr>
<th>Variable</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>AVE</th>
<th>RRC</th>
<th>α</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Conditions for telework (CT)</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td>0.603</td>
<td>0.811</td>
<td>0.812</td>
</tr>
<tr>
<td>2. Supervisory support (SS)</td>
<td>0.100</td>
<td>1.000</td>
<td></td>
<td></td>
<td>0.847</td>
<td>0.957</td>
<td>0.956</td>
</tr>
<tr>
<td>3. Job autonomy (JA)</td>
<td>0.113</td>
<td>0.256</td>
<td>1.000</td>
<td></td>
<td>0.765</td>
<td>0.907</td>
<td>0.906</td>
</tr>
<tr>
<td>4. Job satisfaction (JS)</td>
<td>0.150</td>
<td>0.345</td>
<td>0.408</td>
<td>1.000</td>
<td>0.664</td>
<td>0.839</td>
<td>0.827</td>
</tr>
</tbody>
</table>

Source(s): Authors’ own elaboration
path mediation effect and the structural model fitted the three-path mediation model reasonably well. Although the $\chi$ was significant ($354.29; p < 0.01$), this could be related to the sample size and, in the end, should not be considered as impediment (Barrett, 2007). Goodness-of-fit indices exhibited encouraging values, with CFI and TLI both higher than 0.95 (0.966 and 0.957, respectively), whereas the RMSEA value was borderline with the good-fit threshold of 0.05 (0.058). The value of the $\chi$/df ratio was also acceptable (3.314).

Results provide support for the suggested hypotheses (Table 4): CT are shown to have an indirect effect on JS ($B = 0.198$), with this being mediated by SS ($B = 0.082$) and JA ($B = 0.067$). This relationship is also sequentially mediated by the two mediator variables ($B = 0.050$), suggesting that better CT can predict a higher level of employees’ JS by means of SS and JA. Each lower and upper bound value for the 95% confidence intervals around each indirect effect failing to contain zero supports the mediation hypothesis. The results show, in other words, that the association between JS and flexible work arrangements can be explained by two factors. Firstly, it is influenced by the type of leadership expressed by the direct supervisor and his/her capacity to empower employees in organizing their work. Secondly, it is associated with the resulting level of autonomy employees have in determining how they carry out their job. Among the controlling variables, sex only shows to have a direct effect on JS, indicating that women exhibit significantly higher levels of satisfaction ($B = 0.215, p = 0.024$), which is a common finding in such studies (Clark, 1997). On the other hand, age, study background and job position do not show any significant effects.

**Discussion**

The combined results of exploratory qualitative analysis and the quantitative model show that conditions for flexible working, especially in the context of telework or remote work, contribute to determining JS levels among REPAs’ personnel. Starting from the qualitative analysis of factors associated with JS and dissatisfaction among the personnel of the considered REPA, the themes of autonomy and professional content have initially emerged as relevant antecedents of satisfaction. On the other hand, the theme of supportive leadership, in terms of guidance and motivation, has surfaced as an element whose absence seems to limit or compromise a positive working experience. Based on this, we derived a quantitative model

<table>
<thead>
<tr>
<th>Path coefficients</th>
<th>Indirect effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>To supervisory support (SS)</td>
<td>Bias-corrected bootstrap 95% C.I.</td>
</tr>
<tr>
<td>To job satisfaction (JS)</td>
<td></td>
</tr>
<tr>
<td>Conditions for telework (CT)</td>
<td>0.112***</td>
</tr>
<tr>
<td>Supervisory support (SS)</td>
<td>0.176**</td>
</tr>
<tr>
<td>Job autonomy (JA)</td>
<td>0.342**</td>
</tr>
<tr>
<td>Sex</td>
<td>0.215*</td>
</tr>
<tr>
<td>Age class</td>
<td>-0.045</td>
</tr>
<tr>
<td>Study background</td>
<td>-0.081</td>
</tr>
<tr>
<td>Job position</td>
<td>0.032</td>
</tr>
<tr>
<td>CT $\rightarrow$ SS $\rightarrow$ JS</td>
<td>0.198</td>
</tr>
<tr>
<td>CT $\rightarrow$ JA $\rightarrow$ JS</td>
<td>0.082</td>
</tr>
<tr>
<td>CT $\rightarrow$ SS $\rightarrow$ JA $\rightarrow$ JS</td>
<td>0.067</td>
</tr>
<tr>
<td>CT $\rightarrow$ JS</td>
<td>0.048</td>
</tr>
</tbody>
</table>

**Note(s):** $* = p < 0.05, ** = p < 0.01, *** = p < 0.001$

**Source(s):** Authors’ own elaboration

Table 4.
Results of the three-path mediation analysis

Telework in public organizations
to test the nature and significance of these relationships in a remote work arrangement. Based on the data from this study, emerging results seem to strongly relate to the nature of this agency, which is a KIPO: the distinctive profile of individuals working there, in fact, aligns more with that of professionals than other employees. Since autonomy (rather than hierarchical control) is a defining characteristic of these workers, flexible forms of organizing their activity appear to correlate with higher levels of JS. Such a finding, beyond being relevant to the KIPO sector, suggest some generalizable insights. As a result of employees' working experiences during the pandemic, expectations regarding work arrangements seem to have conclusively changed. However, this does not mean that the solution lies in increasing per se teleworking or similar forms of work flexibility. In remote work contexts, greater autonomy tends to be accompanied by a reduced density of relational proximity with superiors, colleagues and subordinates. This may impact work continuity, particularly in terms of contextualizing one's work contributions within the broader organizational goals and potentially lead to feelings of isolation and lower performance. In essence, alongside the heightened JS derived from telework, the adverse aspect of professional isolation needs to be carefully considered as a potential outcome of especially intense remote work setups (Mele et al., 2023), as observed during the pandemic. Hence, simplistic categorical solutions advocating for more (or less) teleworking should be avoided. Instead, it is important to develop situational approaches that consider the specific characteristics and internal dynamics of each organization.

Besides, two factors of particular relevance were then separately and sequentially considered to explain the intermediate mechanisms linking teleworking conditions and JS: SS and JA. On one hand, supportive leadership emerges as a strong mediator in the relationship between teleworking conditions and JS: the link that associates the latter with the former is, at least partially, explained by the type of support exercised by supervisors towards their personnel. Direction, feedback and motivational stimuli are the components through which remote work can effectively translate into better individual outcomes for employees. On the other hand, individuals working in knowledge-intensive organizational contexts seek and demand space to exercise the decision-making discretion that accompanies their particular expertise. Therefore, JA provides a second piece in explaining the mechanism that constitutes the relationship between conditions for teleworking and JS.

From a theoretical perspective, the results offer insights to enrich the discourse on core job characteristics and the relationship between such characteristics and individual outcomes. Firstly, the study follows in the wake of scholars exploring the relationship between practices of organizing work, JS and the mediating role of job and organizational characteristics (Steijn, 2004; Yunus et al., 2023), particularly in flexible work arrangements (Palumbo et al., 2022). Secondly, to the authors' knowledge this is indeed the first empirical study proposing the combined and sequential nature of these two mediators, supervisor support and autonomy. The interpretation is as follows: remote work offers opportunities (autonomy) at the cost of certain challenges (the risk of isolation). In order to address these opposing tensions related to telework in KIPOs, a balanced approach requires (1) ensuring the presence of supportive measures from those individuals responsible for coordinating and overseeing work within the organization and (2) simultaneously preserving the scope for exercising discretion inherent in the specialized and professional nature of work in KIPOs. The logical order of the sequential mediation is deduced from practical considerations: if a positive relationship exists between teleworking conditions and JS, it necessitates conditions that allow for teleworking to be feasible, while still maintaining a clear direction and necessary adaptations. Subsequently, with these conditions in place, JA can further explain the pathway to JS. Conversely, the reverse mechanism appears to be practically less plausible.
Conclusion
The study presented here aims to offer theoretically grounded reflections that are practically valuable for managing KIPOs. In doing so, it discusses results that open up areas of debate on at least three practical fronts. Firstly, it explores the fundamental conditions, both material and immaterial, that allow employees in KIPOs to work remotely while still aligning with organizational goals and individual attitudes. Secondly, it examines the role or leadership in facilitating personnel's effective contribution to organizational action in KIPOs. Lastly, it investigates the spaces for exercising JA that can be emphasized to empower individuals working in KIPOs to perform at their best, considering the distinctive nature of their activities.

On the other hand, by employing cross-sectional data, the study cannot provide insights into the “how” of the investigated relationships. In other words, the results cannot be bent to interpreting the mechanisms underlying the observed associations among variables, beyond hints. Therefore, as with any observational study, extreme caution must be exercised when making causal claims about the analyzed relationships and their direction, as the very nature of the data does not allow for definitive conclusions in this regard. Prospective inquiries stand to benefit from incorporating experimental designs to unveil a nuanced comprehension of causal relationships. Simultaneously, the application of in-depth analyses could offer a valuable pathway for identifying the underlying factors contributing to satisfaction or dissatisfaction in the realm of teleworking. Further limitations of the research warrant consideration. While the considered agency represents one of the largest in terms of personnel, territorial coverage and budget in Italy, it is essential to use caution when interpreting the observed dynamics as an applicable proxy for the entire Italian system of environmental protection, or even broader domains. Future studies could expand this research design to employees from other REPAs to test the consistency of the emerging insights at the national level and inform management actions accordingly. In terms of external validity, it would be essential to validate the proposed design across various public organizations to observe the diverse balances and dynamics among the variables under consideration in different contexts. Another crucial issue revolves around the observed process and the timeframe under consideration. It is important to acknowledge that the rapid transition from traditional working modalities to a hybrid model in the aftermath of 2020 was primarily driven by the pandemic. Organizations had not proactively planned for this shift, leading to a lack of specific large-scale training, infrastructural support, or team arrangements beforehand. The pandemic forcefully and rapidly triggered internal and external dynamics of change, which were later either solidified or restructured. As a result, the study delves into a context heavily influenced by a “global accelerator” such as the pandemic. In this context, administering the survey over the years could establish the groundwork for a longitudinal analysis, which would involve observing the same variables under the influence of varying socio-economic conditions.

Several directions for future research also emerge. First, a finer-grained understanding of the impact of telework beyond JS is much needed and scholars should investigate its influence on other individual and organizational outcomes, such as employee productivity and organizational performance. Secondly, in the context of KIPOs JA is intricately intertwined with employee motivation and creativity through the lens of job crafting dynamics. A reflection on how to strike an optimal balance between granting autonomy and maintaining coordination to harness the full potential of the workforce would be much beneficial, from the side of both scholars and public managers. Fostering a culture of trust, collaboration and continuous learning is of paramount importance to support remote work arrangements and enhance employee well-being. Understanding the specific role of leadership in cultivating such a culture becomes essential for organizational success, particularly in the context of knowledge-intensive environments. However, while some
studies have explored aspects of this relationship, there is still much to be comprehended about how leadership practices can be tailored to suit the unique challenges and dynamics faced by knowledge-intensive organizations operating in a remote work setting. Furthermore, this study aligns with well-established scholarship that portrays knowledge-intensive organizations as operating under mechanisms notably distinct from traditional hierarchies. While hierarchy seems to exert less influence as a primary coordination mechanism, due to the distribution of specialized competencies among workers, the necessity for collaboration remains imperative. In instances of intense teleworking, a trade-off surfaces between the advantages of increased autonomy in self-organizing work and the drawbacks of reduced proximity to the social dynamics of the workplace. Although such a trade-off - recognized as a challenge in telework by other scholars (Mele et al., 2023) - was not evident in our study, the exploration of the relational dimension of work for professionals is recommended for future inquiries, drawing on the insights provided in this regard by recent scholarship (Battaglio et al., 2022). Further research in this domain could unveil valuable insights into effective leadership strategies and human resources management.

Note
1. Or provincial, as in the case of the two autonomous provinces within Trentino-South Tyrol area.

References


Appendix

<table>
<thead>
<tr>
<th>Variables</th>
<th>Categories</th>
<th>Frequency</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td>Female</td>
<td>421</td>
<td>60.6</td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>274</td>
<td>39.4</td>
</tr>
<tr>
<td>Age</td>
<td>&lt;35</td>
<td>59</td>
<td>8.5</td>
</tr>
<tr>
<td></td>
<td>35–44</td>
<td>110</td>
<td>15.8</td>
</tr>
<tr>
<td></td>
<td>45–54</td>
<td>285</td>
<td>41.0</td>
</tr>
<tr>
<td></td>
<td>&gt;54</td>
<td>241</td>
<td>34.7</td>
</tr>
<tr>
<td>Position</td>
<td>Employees, category B</td>
<td>19</td>
<td>2.7</td>
</tr>
<tr>
<td></td>
<td>Employees, category B/plus</td>
<td>11</td>
<td>1.6</td>
</tr>
<tr>
<td></td>
<td>Employees, category C</td>
<td>98</td>
<td>14.1</td>
</tr>
<tr>
<td></td>
<td>Employees, category D</td>
<td>454</td>
<td>65.3</td>
</tr>
<tr>
<td></td>
<td>Middle managers</td>
<td>71</td>
<td>10.2</td>
</tr>
<tr>
<td></td>
<td>Senior managers</td>
<td>42</td>
<td>6.0</td>
</tr>
<tr>
<td>Study background</td>
<td>Lower secondary school</td>
<td>9</td>
<td>1.3</td>
</tr>
<tr>
<td></td>
<td>Upper secondary school</td>
<td>192</td>
<td>27.6</td>
</tr>
<tr>
<td></td>
<td>Graduate (bachelor or M.Sc.)</td>
<td>336</td>
<td>48.3</td>
</tr>
<tr>
<td></td>
<td>Post-graduate (master’s degree or Ph.D.)</td>
<td>158</td>
<td>22.7</td>
</tr>
</tbody>
</table>

Table A1. Characteristics of the sample

Source(s): Authors’ own elaboration
### Variables in the quantitative model

<table>
<thead>
<tr>
<th>Variables</th>
<th>Items</th>
</tr>
</thead>
</table>
| **Conditions for telework (CT)** | - The technological tools provided contribute to increasing my efficiency in sharing information and connecting with others  
                                     - The software and applications available to teleworkers in the Agency are adequate  
                                     - The training provided by the Agency aimed at promoting teleworking capacity have contributed to increasing my digital skills |
| **Supervisory support (SS)**  | - My direct supervisor helps me understand how I can contribute to achieving the goals of the Agency  
                                     - My direct supervisor recognizes when I perform well  
                                     - My direct supervisor helps me understand how I can improve  
                                     - My direct supervisor motivates me to perform my work more efficiently and/or effectively |
| **Job autonomy (JA)**          | - I am free to choose how to carry out my work and the related tasks  
                                     - My job allows me to decide when to perform specific tasks  
                                     - I have some degree of control over what my direct supervisor assigns as the goal of my work |
| **Job satisfaction (JS)**      | - I think that my job is interesting  
                                     - Overall, I am satisfied with my job  
                                     - I would recommend my job as a good job |

*Source(s):* Authors’ own elaboration

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