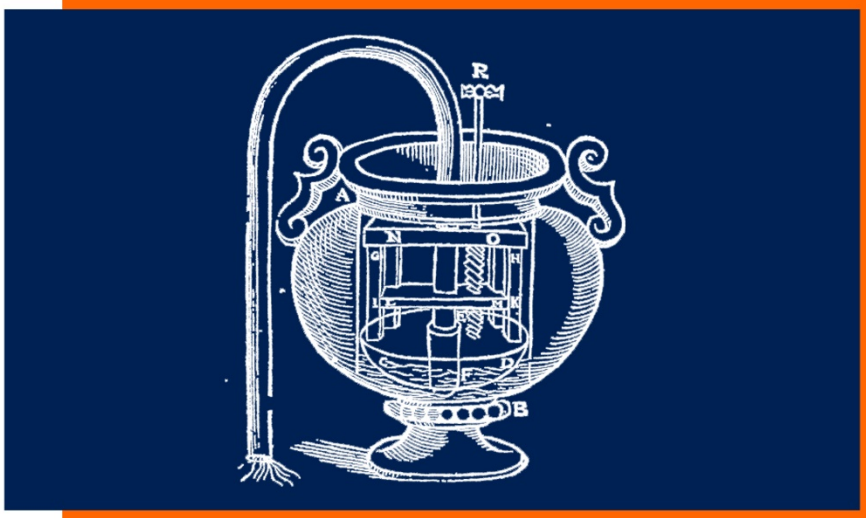
CNR-IRCrES Working Paper

An online survey on the effects of agile working in Italian Public Research Organisations



2/2021

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ISSN (online) 2421-7158

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CNR-IRCrES Working Paper 2/2021

aprile 2021 by CNR-IRCrES

An online survey on the effects of agile working in Italian Public Research Organisations

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ABSTRACT

This contribution summarizes the reference framework and main features of the online survey launched by CNR-IRCrES as part of the project *Agile working in research institutions: organisational factors and individual behaviors in the production of knowledge*. The survey aims to explore the individuals' effects of the massive activation of agile working, due to the spread of COVID-19 pandemic, within selected Italian Public Research Organisations (PROs). These organisations belong to a peculiar work sector, mainly characterized by intellectual and creative work performances, which include highly innovative activities. Considering the extensive implementation of this work mode in emergency circumstances, the investigation deals with specific dimensions of the individual's scientific work, such as productivity, collaborations, and other research routines. The survey has a specific interest in the value of the organisational autonomy of the research workers and considers side aspects connected to personal and social well-being as well. An overview on the literature on agile working and on the Italian legislation will introduce the main analytical dimensions treated. The survey design is outlined retracing the stages of the research implementation, like the definition of the target population (researchers and technologists from the PROs) and the strategy for contacting the respondents. As regard both to the public and the private sector, the investigations on the effects of the implementation of agile working are at the early stages. Thus, the strategy presented configures as a methodological proposal to be applied for studying the adaptation processes and the eventual changes in intellectual or creative jobs.

KEYWORDS: agile working, public research organisations, research work, survey, online interviews.

DOI: 10.23760/2421-7158.2021.002

HOW TO CITE THIS ARTICLE

Fabrizio, S., Lamonica, V., Spinello, A.O. (2021). *An online survey on the effects of agile working in Italian Public Research Organisations* (CNR-IRCrES Working Paper 2/2021). Istituto di Ricerca sulla Crescita Economica Sostenibile. Disponibile da http://dx.doi.org/10.23760/2421-7158.2021.002

INDICE

1. INTRODUCTION 3
2. GENERAL OVERVIEW ON THE LITERATURE ON AGILE WORKING AND ITALIAN REGULATION 4
3. MAIN ANALYTICAL DIMENSIONS 6
4. SURVEY DESIGN 7
4.1. Target population 8
4.2. Structure of the questionnaire 8
4.3. Contacting respondents 9
4.4. Pre-test phase 9
4.5. Implementation of the survey 9
4.6. Brief descriptive analysis of the sample 10
5. CONCLUSIONS 12
6. REFERENCES 13

1. INTRODUCTION

The COVID-19 pandemic has forced a radical experiment on individuals' lives, including a redefinition of workspaces and of the work routines. The restrictions adopted to contain the spread of the novel coronavirus – primarily focused on the respect of social distancing and on the minimization of the performance of activities in co-presence – imposed to increase the quota of work from remote (from now on, agile working, as defined both in literature, and in Italian legislation) both at private and public organisations, in many cases until to 100%. The massive introduction of agile working in emergency circumstances is deconstructing and challenging the traditional organisation of individual work, and the consequences on the future of work appear to be inevitable. It is very likely that the modes of working are on a path of change towards flexible organisational models capable of combining sustainability, productivity and well-being, drawing lessons from the experiences developed during the emergency period.

The Italian legislative framework of agile working in the Public Administration (PA henceforth) dates to 2017, but it has had a slow implementation process, and in many cases the new work regime has not been implemented at all (Tiraboschi, 2017). Nonetheless, since the first months of 2020, even those organisations that had never experienced agile working had to activate it as an ordinary work mode to comply with the government decrees aimed at contrasting the pandemic spread.

Among the PAs that have experienced this new working mode for the very first time, or at best that have experimented it for just a few months, there are the Public Research Organisations (PROs henceforth). These organisations belong to a *sui generis* work sector, mainly characterized by intellectual and creative work performances, which include highly innovative activities from a scientific and technological point of view. These features would suggest both an intrinsic predisposition of research workers (researchers) to be equipped with the 'smart attitude' necessary for an efficient work practice, and a high degree of organisational maturity of the PRO, that is necessary to implement agile working (Lake, 2013). Therefore, we could argue that this type of workers could adapt to such a work mode, even in extraordinary circumstances, with minor effects on their activity. However, such a predisposition is at the moment more supposed than real and the effects of agile working on the scientific work routine and on the well-being of the research personnel need to be investigated through specific studies.

Given these premises, CNR-IRCrES have launched a research project called *Agile working in research institutions: organisational factors and individual behaviours in the production of knowledge*. The study is mainly aimed at investigating the effects of agile working in the period of COVID-19 emergency on the activities of the research personnel from selected Italian PROs. Rather than understanding whether agile working is more or less suitable for the research activities, the ultimate goal is to explore what actually happened to the scientific community engaged in the production of new knowledge, considering peculiar dimensions related to the scientific work, with a specific interest in the value of the organisational autonomy.

The first research output of the project showed the differences among the agile working models in selected Italian PROs which approved a regulation before the emergency period, and the redefinitions, or the new regulations, applied in consequence of the containment measures due to the COVID-19 pandemic (Reale et al., 2020). Starting from this state of art, the CNR-IRCrES research team developed a survey aimed to researchers and technologists from the PROs in order to investigate positive and negative effects of agile working in the emergency period on specific dimensions of the individual's scientific work, such as productivity, collaborations and other research routines, considering the extensive and sudden implementation of this work mode[1]. Also, the survey intended to explore the personal and social well-being of the research staff,

[1] A specific characteristic of agile working in the pandemic period is linked to the contagion containment measures – agile working was mostly carried out at home and not in a place chosen freely by the individual as the legislation would allow.

distinguishing, where possible, between the phase of ordinary application of agile working and the phase linked to the COVID-19 emergency.

The survey was designed on the CAWI[2] method and foresaw the administration of a structured online questionnaire to the complete population of researchers and technologists (including institute directors) from 3 selected PROs, under the supervision of the Ministry of University and Research (MUR): CNR (National Research Council of Italy), INAF (National Institute for Astrophysics) and INFN (National Institute for Nuclear Physics).

This paper aims to present the methodological features of the survey and to illustrate the different dimensions explored, related to the agile working conducted in the PROs. The second paragraph provides for a general overview on the agile working literature, focusing also on the Italian regulation; the third paragraph presents the main analytical dimensions, explored through a presentation of the literature on the subject; the fourth one outlines the questionnaire structure and its online implementation. The last paragraph is dedicated to the final considerations on the implementation of the survey and its value as a methodological proposal for studying the effects of agile working on individuals.

2. General overview on the literature on agile working and Italian regulation

Agile working in literature (Jeyasingham, 2020; 2014) is considered as a new way of achieving a work performance characterized by "flexibility about where and when practitioners do their work" (Jeyasingham, 2020) which, as a form of smart working, can favour worker productivity and contribute to the improvement of individual and organisational performance (Golden, 2012). The academic reflection around the implications of these new working practices arose in the '90s in USA, and it is basically related to the diffusion of teleworking; the main contribution on this theme explores three main aspects of balance complexity: between autonomy and control (Gajendran & Harrison, 2007); between private life and work (Kreiner et al., 2009) between social and professional solitude (Wright et al., 2006).

A crucial role in the diffusion of new at-distance working practices (smart working, e-working, mobile working, teleworking, etc.) was played by the strong push towards digitalization and the redefinition of relationships and practices determined by the new ICTs.

Thanks to the new 'smart' tools, the distances between people and therefore between workers and private and public organisations have been progressively narrowed. Considering the organisational perspective to ensure a balance between workers well-being and the work objectives, Russell et al. (2020) underline four activities which must be undertaken:

> i. Promoting temporal and spatial flexibility
> ii. Integrating resources (people, knowledge, skills, facilities, infrastructure)
> iii. Engaging in innovative activities
> iv. Using new communication and digital technologies
>
> to respond dynamically to evolving work, service and market priorities and to produce outputs that espouse core work and personal values towards achieving core work and organisational goals. (Russell et al., 2020, p. 6).

In Italy, as in Europe, new forms of employment contracts increasingly widespread over the last years have strongly contributed to the push towards greater autonomy and flexibility in working practices mostly in the private sector (Albano et al., 2019, p. 61-62).

In its first *Report* (2012), the Observatory of Milan Polytechnic defines the *smart workers* as subjects with the capacity to work distantly defining spaces, working times, and tools (perhaps digitals) autonomously. The Observatory estimates that they were just under 500,000 (up 60% from 2013, starting point of the monitoring) in Italy in 2018[3].

[2] Computer Assisted Web Interviewing.
[3] https://www.osservatori.net/it/ricerche/osservatori-attivi/smart-working.

The regulatory context on agile working in the PA, introduced with Law 124/2015 and completed by the provisions of Law 81/2017, suggests experimentation and adoption of fluid organisational models of work regarding the spatial-temporal dislocation of the service. The objectives are manifold: better reconciliation between working and family life, greater individual and organisational productivity, containment of the costs of public structures, less environmental impact, greater inclusion, and equity.

With 'teleworking' the activities are decentralized, necessarily from home, and the work continues to be regulated with the same characteristics of on-site work in terms of the required result, time, and the means for carrying out the service. On the contrary, with agile working the modes of performance are regulated by a specific agreement between the employee and the administration. Such an optional, voluntary work mode is based on phases, cycles, and objectives, without precise constraints of time or place of work and with a large use of technological tools.

According to some authors (Tinti, 2020; Tiraboschi, 2017; Manzella & Nespoli, 2016) in Italy the Legislator intended to use the term agile working instead of smart working, which technically describes the work carried out through a 'smart' device with the intention of shifting the focus on the subject who practices it and not on the modality (Tinti, 2020). The notion of 'agile' refers directly to the *work-life balance*, compared to the notion of 'smart', which is more strictly attributable to the technical characteristics of the activity (Manzella & Nespoli, 2016). Therefore, according to the authors, 'agile workers' will be able to autonomously and flexibly 'adapt' spaces, times and methods of achieving objectives using ICT and digital skills. The change brought about by this new way of working imposes a redefinition of the relationship between worker and employer as the latter must deal with the loss of control over the worker and the performance, which requires a reorganisation of the control and performance evaluation systems. At the same time, the worker must protect him/herself against the risks of uncontrolled exploitation and loss of rights, through the support of the unions.

The distances and conflicts underlying the negotiation between employer and workers' unions have greatly slowed the application of the legislation, especially in the public sector and in the Public Research Organisations (PROs), where the first Regulations arrived in mid-2019, through a complex preparatory work.

Since the end of February 2020, due to the COVID-19 emergency, following the general government decrees (DPCM), all PROs have activated simplified procedures for agile working, even in the absence of individual agreements, in order to reduce the presence of employees at the offices and limit their movements (Reale et al., 2020). In some cases, they allowed facilitated and massive access to this working practice, derogating in different ways from the regulations of testing phase. In case there were no pre-existing specifications, including in the CNR case, a transitory discipline was suddenly established (Reale et al., 2020).

In general, before its implementation in the emergency phase, the introduction of agile working in Italian organisations collided very soon with cultural barriers and historical resistances both from employers, who feared the loss of control over workers and performance, and from the trade unions, which assumed an uncontrolled exploitation of workers, and the loss of rights and prerogatives acquired through collective labour agreement.

In the context of the PA, PROs are a *sui generis* sector, mainly characterized by highly innovative work performance, from a scientific and technological point of view. This would suggest both an intrinsic predisposition of the research personnel to be equipped with the smart attitude necessary for agile working to be an effective and efficient practice, and a high degree of organisational maturity of the PROs, a *sine qua non* for the adoption of models' organisations of agile working (Lake, 2013).

The application of new forms of flexibility and deconstruction of the work performance to intellectual and creative works is likely to produce innovative results (Dagnino, 2016; Chiaro et al., 2015), considering that PROs are exclusively dedicated to the production and dissemination of new knowledge, where creativity and innovation are intrinsic characteristics of the results produced.

In general, the researchers' work is inspired by the European Charter for Researchers, which establishes the freedom of research. In particular Italian PROs are characterized by a specific

collective contractual regulation of working hours, which ensures researchers and technologists "the autonomous determination of working time". This circumstance is one of the reasons for a possible conflict between collective bargaining and the rules of agile working. Indeed, the implementation of agile working could clash with the difficult harmonization between the legislation framework and the autonomy of research in terms of objectives of productivity and autonomy of research personnel as regards the determination of the times and places of work. On one side, the general legislation ensures researchers and technologists the autonomous determination of working time; on the other side, the agile working regulation requires the achievement of specific, measurable, consistent, and compatible performance objectives within the organisational context.

These conditions allow to evaluate and enhance the work performance in terms of results achieved, which is difficult to fit to the research work, while productivity is connected to the creation of new knowledge, not measurable in terms of quality or quantity of time spent on its production (Reale, 2020).

Considering this normative and organisational scenario, and the lack of studies on the effects of agile working on scientific productivity, both in the public and in the private sphere, PROs qualify as an ideal case study for testing agile working models and effects on this context. However, it is necessary not to consider the adoption of agile working as an organisational innovation desirable *tout court*, but rather to critically outline its lights and shadows within the different application contexts in its actual implementation (Neri, 2017).

3. Main analytical dimensions

The COVID-19 pandemic has changed daily life activities and work formats. In fact, many employees were suddenly required to work from their home, in a complicated balance between work and family demands. In a short time, workers began to experience changes in working time, in their ways to collaborate with colleagues and eventually in variations of motivation and productivity.

Through the survey implemented, the research team focuses on several dimensions of working remotely during the pandemic, and their possibly effects on the research agenda of PROs' researchers and technologists: new working spaces, family structure, type of employment contract, remote working experience, productivity, access to ICT. In addition, we are going to deepen the issue of working well-being during the pandemic (balance between free and working time) and to study the effects of remote working on environmental impact. Rather than understanding whether agile working is suitable for the research activities, the aim is to deepen what actually happened to the PROs personnel engaged in the production of new knowledge.

A critical reflection on the effects of agile working on specific categories of employees invites to focus on the development of these professional identities in their personal, social and collective dimensions, beside the processes of secondary socialization. One of the most discussed nodes of these new forms of 'virtual' work is represented by the risk of isolation (Eurofound – ILO, 2017; Bartel et al., 2012), of the erosion of social support, and of inadequate satisfaction of the need for affiliation (Wiesenfeld et al. 2001). As described by Albano et al., (2019), the remote worker is more exposed to social and working loneliness and to burnout risks. Beyond that, the impoverishment of contacts with colleagues, caused by the lack of face-to-face contact, could also negatively affect the productivity. In fact, informal activities with colleagues (e.g. coffee break, lunch) can provide learning opportunities and new collaborations. As described by Mulki and Jaramillo (2011), working from home can cause concern that one's performance is not visible, but visibility has a crucial role in both performance and job satisfaction. Considering the research field, and the need of autonomy and flexibility which has driven a change in the management of PROs over the last twenty years (Potì & Reale, 2000), there are some aspects that could have significant and different effects on the worker's perception in terms of inclusion or exclusion in research team dynamics and of type and level of collaborations and digital skills.

With regards to workers' well-being, the literature coined the term *workhoalism* to describe the colonisation of private life by work. There is some evidence that working time tend to lead on leisure time more for agile workers than for traditional ones (Kreiner et al., 2009). The possibility of working at any time, in fact, makes the transition between work and spare time fluid, especially during the COVID-19 pandemic, when most of the daily activities are carried out in the same space. There are many dimensions that impact on the reconciliation of family and working time. Family composition certainly plays a decisive role in time management; for instance, the presence of children in primary or lower secondary education paths, engaged in distance learning, requires the readjustment of parents' working hours. In particular, working mothers are more exposed to job fragmentation and stress because of day-care and school closures (McLaren et al., 2020). The economic status can also affect the way of working at home. Workers who do not have dedicated home offices are forced to improvise desk stations: dining tables become desks, family rooms become shared workspaces, at the expense of concentration (Toniolo-Barrios & Pitt, 2020).

Beyond that, literature points out the possible implication of inability to disconnection from work and technological devices on psychological well-being. In fact, the right to disconnect is difficult to implement when there are no physical and time boundaries within which work activities are carried out. The possibility to work remotely anywhere and at any time can generate, in colleagues and employers, the expectation that the worker is always reachable. The expectation of immediate availability allowed by ICT can deeply undermines one of the most emphasized advantages of smart working: the possibility of reconciling work and private life (Eurofound – ILO, 2017). Nevertheless, the use of ICT is strongly connected to workers' autonomy because the technological tools allow to carry out the remote work efficiently. For this very reason, it is interesting to analyse the technology available in each organisation during agile working in pandemic, beside the facilities in terms of support and training for workers. Not all workers, in fact, have experienced remote work with the necessary IT knowledge. This lack could have an impact on productivity, well-being and the sense of belonging among employees.

Concerning the research productivity and collaborations, through agile working during the pandemic, the role of ICT and digital tools has become central in redefining the 'traditional places' of exchange of knowledge, but also of innovation in the production of knowledge. In fact, researchers has had the opportunity to experiment with new forms of exchange and collaboration (online conferences, seminars, lessons, meetings) that could have positively or negatively affected cooperation between colleagues.

The last dimension taken into consideration by our study concerns the environmental impact of agile working (Cerqueira et al., 2020). The reduced mobility of workers in the commute home-work-home has resulted in a net saving in polluting emissions and greenhouse gases (Penna et al., 2020). With respect to the energy issue, the main cognitive objectives of this study are two: using the measurement of the carbon footprint to estimate the environmental benefits achieved thanks to agile working (Bottero, 2016); estimating the energy-intensive activities saved in the workplace by the staff. Data from the survey will allow the analyses of the different means of transport used to reach the headquarters, and of the possible changes in post-pandemic mobility and consumption habits.

4. SURVEY DESIGN

The different analytical dimensions related to the effects of the emergency implementation of agile working in the PROs have been investigated through a web-based self-administered interviews. This methodological solution has proved to be preferable on one side for its efficacy, since the research items are supposed to be well operationalized in closed-ended questions with easy and immediate understanding, and on the other side for its effectivity in meeting the requirement of the full reachability via-email of the target to be intercepted.

The management of the online survey, which included implementing the questionnaire, contacting the respondents, sending invitations to institutional e-mail addresses, and hosting the

data, was carried out using the statistical survey web app LimeSurvey, integrated on the survey platform of the CNR (https://survey.cnr.it).

4.1. Target population

The target population has included researchers, technologists, and unit directors – from the three selected PROs – CNR, INAF and INFN.

As reported in Reale et al. (2020), CNR had never experienced agile working before the COVID-19 emergency, thus it activated an ad hoc regulation; for their part, INAF and INFN had approved an agile working regulation in 2019, so during the emergency they reproposed the same rules renouncing to the temporal limits. Nevertheless, the latter organisation confirmed the possibility of activating agile working only for technical-administrative staff, while researchers and technologists have been encouraged to work off-site, self-certifying with the motivation 'work done off-site for coronavirus emergency'. Assumed this peculiar configuration of the work from remote in INFN, which is not adherent to agile working as experienced in the other two PROs, its inclusion in the analysis will be considered at a later stage.

The personnel from the three PROs has been listed from the respective units' or institutes' websites. The final list consisted of 5,677 units for CNR, 783 for INAF and 1,981 for INFN. List errors have been taken into account due to the 'manual' collection of the respondents contact data from the websites – they could include incompleteness (or under-coverage) of the list or the inclusion of non-existent/unrelated units (over-coverage), which might lead the eventual participation in the survey of units not belonging to the target population. Nevertheless, an estimation of the errors has been possible in advance and a strategy was implemented to fix them. For INFN, whose population amounts to 1108 units (64% researchers and 36% technologists)[4], the over-coverage was quite large but inevitable due to the circumstance that the institution's websites do not allow to easily distinguish the employee's professional role. For CNR (population of 5620 units, 87% researchers and 13% technologists[5]) and INAF, (766, 73%-27%[6]) the margin of error was very limited. The CNR-IRCrES research team has applied a strategy to fix the error by creating a filter question at the beginning of the questionnaire which asked about the professional role of the respondent. In this way, employees not belonging to the target have been excluded from the compilation.

4.2. Structure of the questionnaire

The questionnaire has been structured in 7 sections, 5 of which designed in order to analyse the main research dimensions (see par. 3), and 2 – respectively one at the start and the other at the end – aimed to collect the respondent's structural data and information on the future orientation about the application of agile working after the end of the pandemic. The questionnaire includes 55 questions in total, and the estimated time to complete the interview is about 10-12 minutes. The length of the interview has been studied taking into account the fact that the time taken for each question decreases as the number of questions increases, causing the possible presence of inaccurate answers[7].

Almost all the questions are closed-ended, and the respondent is asked to choose an answer from a structured list of options. Being aware that the inclusion of every possible option could have led to excessively long lists of answers, the chosen strategy foresaw to limit the number of

[4] Source: INFN - Piano Triennale Di Attività 2020 – 2022 - Aggiornamento 2020. The number of researchers include the number of unit directors.

[5] Source: CNR PTA 2020-2022 – Aggiornamento del Piano di Fabbisogno del Personale – Anni 2020 – 2022. The number on researchers include the number of unit directors.

[6] Source: INAF – Piano triennale delle attività 2019-2021. Data on researchers include the number of the role of 'astronomer (old system of role classification)' and unit directors.

[7] SurveyMonkey, a professional service for online surveys, reports that if an online survey exceeds 7-8 minutes, drop-out rates can go up to 20% (https://www.surveymonkey.com/curiosity/survey_completion_times/).

responses including an option 'other' accompanied by a 'please specify'. The choose of avoiding open questions has been taken due to the risk of incompleteness and to the potential loss of the respondent's motivation as the answers could have been difficult or lengthy to transcribe.

For the detection of attitudes towards an object or phenomenon scaling techniques have been adopted. The Likert scale in a 4-option variant has been chosen, omitting the neutral response option to force the interviewees in one way or another.

4.3. Contacting respondents

A very recurrent problem associated to the interviews carried out with the CAWI method is the low response rates. Indeed, the propensity to respond to internet surveys is lower than other survey techniques. A study based on meta-analysis by Manfreda et al. (2008) reported that the average response rate to web surveys was around 11% lower compared to other interviewing modes. In a survey targeted to researchers who obtained PRIN funding in Italy – therefore a reference population very similar to that of this project – Zinilli (2016) reached 23% of the ivited respondents. However, the response rate to CAWI surveys appears highly variable and may depend on a variety of causes. The identity and reliability of the proponent of the interview can have an impact on the response rate as well as the wording used for the invitation and the sending of reminders (Alessi and Martin, 2010; Petrovcic et al., 2016).

The invitation to fill the questionnaire came from an institutional e-mail address showing the domain of the National Research Council: survey.lavoroagile@ircres.cnr.it. Furthermore, as suggested in the literature, the text of the e-mail included a brief description of the purpose of the research, and the identity and affiliations of the researchers was specified. The CNR-IRCrES research team foresaw three reminders for the non-respondents to the first invitations.

The researchers and technologists have been invited to follow a link for filling the questionnaire and referring to a document that illustrates the survey's Privacy Policy. The creation of a privacy policy document aimed to communicate to the respondents the guarantees on the security of information shared through the questionnaire and to ensure that the research team would adhere to the confidential principles set out.

4.4. Pre-test phase

A test phase was developed before the launching of the survey. It was necessary to control any issues related to the questions and it was planned to highlight difficulties and technical problems of the online procedure. Through a pilot survey, the questionnaire has been administered to a small sub-sample, including the members of the research team, fitting the same target of the survey.

Special attention has been paid to the clarity of any instructions and to the sequence of questions, respecting the branching logic. It also highlighted the potential presence of the errors presented by Andrews et al. (2003): requests for unnecessary structural data that can identify the respondent; ambiguous, piloting or curvilinear formulation of the questions; questions that most people answer in a neutral or unanswered way; questions highly related; response options that are not mutually exclusive or in some way superimposable. Moreover, for Likert scales: acquiescence, attraction effect, reaction to the object (Pavsic & Pitrone, 2005).

4.5. Implementation of the survey

Two waves have been launched: the first one at the end of February 2021 for INAF and INFN, and the second one for CNR at mid-March 2021. The respondents have been allowed a large time period – 14 days – to adhere to the compilation proposal, with the possibility of responding through multiple devices such as computers, mobile phones or tablets.

At the end of the two rounds of administration of the questionnaire, 3,068 answers have been obtained with a 40.9% total response rate, much higher from researchers (43.4%) than from

technologists (30.0%). The mass sending, which allowed reaching all the population, produced a very high response rate. Table 1 shows the number of respondents by PRO and research role.

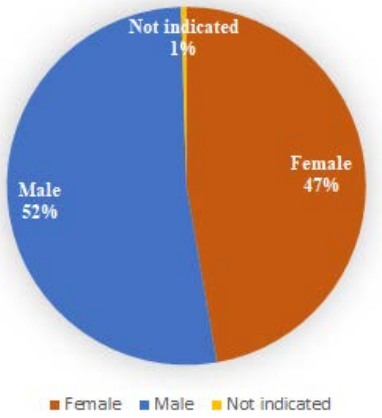
	CNR		INAF		INFN		Total by role	
	A.V	%	A.V	%	A.V	%	A.V	%
Researchers (including Directors)	2276	46.8	282	50.4	100	14.2	**2658**	**43.4**
Technologists	257	34.0	106	51.2	47	11.6	**410**	**30.0**
Total by PRO	**2533**	**45.1**	**388**	**50.7**	**147**	**13.3**	**3068**	**40.9**

Table 1. Respondents by PRO and role. Absolute value and percentage.

Different response rates emerged when comparing the three PROs under analysis. Particularly, around one researcher/technologist out of two from INAF filled the questionnaire and around 45% from CNR, with a higher response rate from researchers than technologists in the latter case; on the contrary, a low response rate emerged in INFN case (13.3%).

In the first two cases, the high response rate can be due to several reasons, such as: i) the contacted units perfectly identified their work situation in the survey topic; ii) the participation proposal came from the same organisation (in the case of CNR) or however from a similar and reliable organisation (INAF case); iii) a possible word of mouth among colleagues who received the questionnaire; iv) there was an actual different perception of the theme in historical period of compilation. In the case of INFN, the units did not recognize their work situation in the proposed topic, because in the facts there was not a real activation of agile working in that PRO: researchers and technologists had only been encouraged to work off-site, self-certifying with the motivation 'work done off-site for coronavirus emergency'. As anticipated, this circumstance could make INFN data excluded from the analyses or treated as a small case study.

4.6. Brief descriptive analysis of the sample



The survey collected complete questionnaires from 1.589 men (51.8%) and 1,438 women (46.9%), while 41 units (1.3%) did not want to disclose their gender (Figure 1).

The characterization of respondents by gender will be useful for interpreting the data on the different dimensions covered by the questionnaire, highlighting eventual differences in the effects of agile working.

.

Figure 1. Respondents' proportion of between females and males

Another structural information on respondents regarded the age range. The distribution of the age groups – split into 'under 44', 'from 45 to 54' and 'over 55' –shows a slight prevalence of the median range (37.2%). Curiously, as regards to this age group, the same number of women and men responded, while in the younger and older groups the difference is evident in favor of men (Table 2).

	Women (A.V)	Men (A.V)	Total by range age (%)
Under 44 years	462	521	32.5
45-54 years	563	563	37.2
Over 55 years	413	505	30.4

Table 2. Respondents by age range and gender. Absolute value and percentage.

In the case of INAF and INFN there is the obvious prevalence of a specific disciplinary sector of the respondents (physical sciences), while in the case of the 2,533 respondents from CNR, there is a range of disciplinary specialization sectors, which represent the multifaceted research areas of the major public research organisation in Italy.

As Figure 2 shows, the so-called soft sciences are less represented, while the biological sector is prevailing, and physical, chemical and Earth sciences have a similar representation among the respondents.

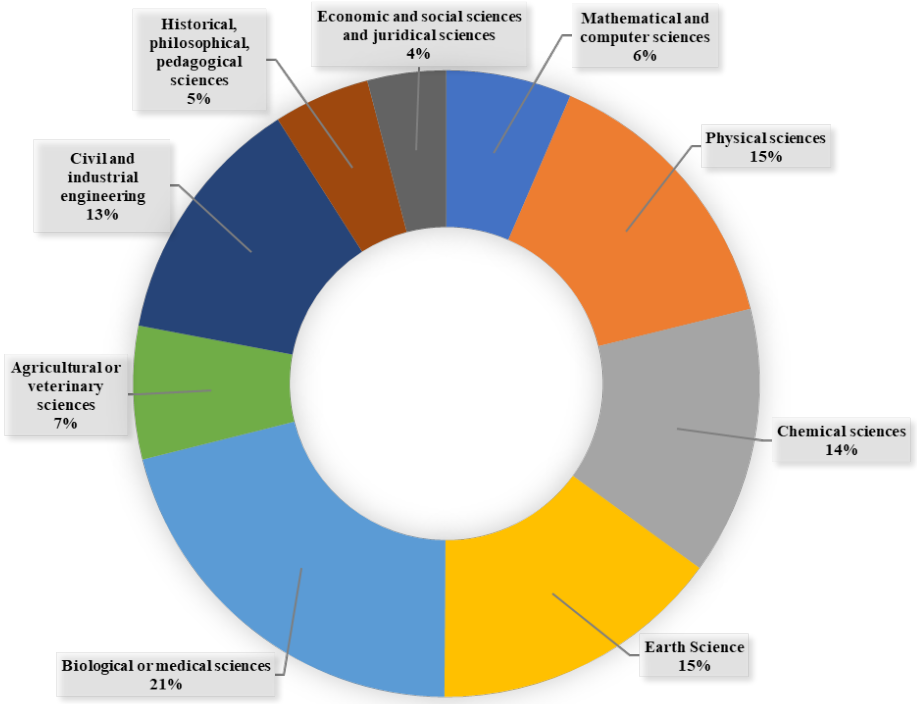


Figure 2. Respondents from the National Research Council (CNR) by disciplinary area.

The territorial distribution of the responses is quite varied and shows the prevalence of two regions of central Italy, Lazio (17.4%) and Tuscany (14.9%), which precede Lombardy (10.2%). A quite large number of responses came from Campania (9.3%) and Sicily (8.5%).

Figure 3 describes the frequency of responses by region, showing only the percentage of regions that obtained more than 2% of the responses. The geolocation of the answers could help the analyses to shed light on eventual territorial differences on the analysed dimensions.

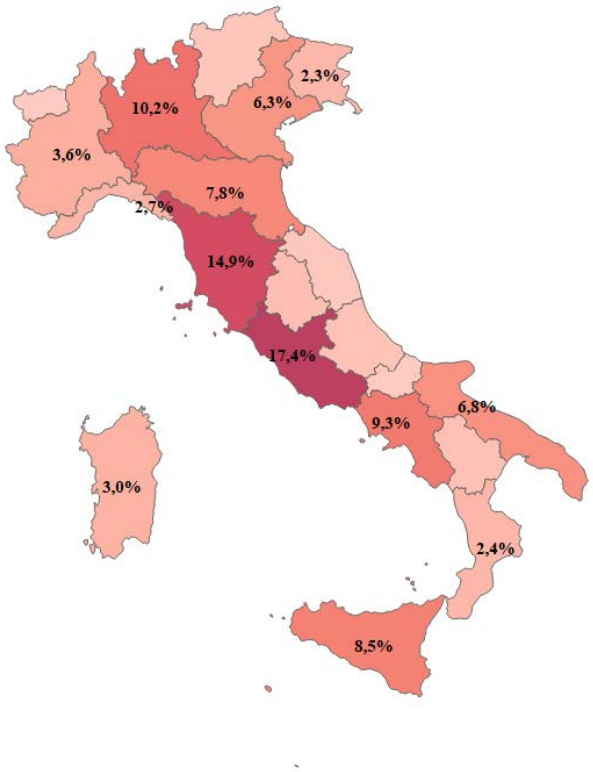


Figure 3. Territorial distribution of the survey's responses (values for regions under 2% have been obscured). Darker color corresponds to higher number of responses from the region.

5. CONCLUSIONS

The project *Agile working in research institutions: organizational factors and individual behaviours in the production of knowledge*, promoted by CNR-IRCrES, aims at exploring the implementation of agile working in that particular sector of the Italian PA, which produces knowledge, where creativity and innovation are intrinsic characteristics of the work performance and of its results. The project investigates the positive and negative effects of the massive activation of agile working, due to the restrictions connected to the COVID-19 pandemic, on the work of the research personnel in some selected Italian PROs.

After a first research output, which showed the differences among the agile working models implemented in some selected Italian PROs (Reale et al., 2020), an online survey has been administered in order to understand the changes produced by agile working onto the individuals' scientific work, in terms of production of new scientific knowledge, collaborations and other research routines. Beyond that, the survey investigates the personal and social well-being of the research workers during the COVID-19 pandemic, their access to ICT tools, and the effects of agile working on environmental impact.

A peculiar aspect that characterizes this study concerns the specific temporal context of application of this mode of work, due to the COVID-19 pandemic emergency, which certainly implies limitations to the potential of agile working regulation (e.g. possibility of working from anywhere, accessibility in managing work in presence and remotely etc.). In Italy there is a lack of studies on agile working in public research organisations. This can be determined by the recent introduction of a regulatory framework, which allows and regulates its use, and by an embryonic adoption by the sector institutions (Reale et al., 2020). These aspects stimulate both theoretical reflection and empirical observation.

This working paper describes the methodological approach for the creation of the survey, highlighting the analytical dimension under investigation and the characteristics of the study design, from the creation of the population list to the implementation phase. The descriptive analysis of the sample confirms that the survey, launched between February and March 2021, had

a very good response rate. One can observe a high participation from INAF research staff (50.7%) and CNR (45.1%). The low participation rate at INFN (13.3%) can be explained by its peculiar implementation of agile working, which this organisation has not extended to researchers and technologists, preferring the adoption of the 'work done off-site'. This fact will affect the future decisions on the execution of the overall analyses on the selected PROs. The survey collected 3,068 questionnaires: 51.8% came from male respondents and 46.8% from women. All the disciplinary areas of research are well represented, and the territorial distribution of the responses presents a prevalence of participation from Lazio, Tuscany and Lombardy.

The analysis of the data on the different dimensions treated by the survey will allow to deepen the topic of the effects of agile working from the point of view both of the work of knowledge production and of personal and social well-being. The strategy created for the implementation of the survey constitutes a possible methodological proposal for the study of agile working in the wider context of intellectual or creative jobs.

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ISSN (online) 2421-7158

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ABSTRACT

This contribution summarizes the reference framework and main features of the online survey launched by CNR-IRCrES as part of the project *Agile working in research institutions: organisational factors and individual behaviors in the production of knowledge*. The survey aims to explore the individuals' effects of the massive activation of agile working, due to the spread of COVID-19 pandemic, within selected Italian Public Research Organisations (PROs). These organisations belong to a peculiar work sector, mainly characterized by intellectual and creative work performances, which include highly innovative activities. Considering the extensive implementation of this work mode in emergency circumstances, the investigation deals with specific dimensions of the individual's scientific work, such as productivity, collaborations, and other research routines. The survey has a specific interest in the value of the organisational autonomy of the research workers and considers side aspects connected to personal and social well-being as well. An overview on the literature on agile working and on the Italian legislation will introduce the main analytical dimensions treated. The survey design is outlined retracing the stages of the research implementation, like the definition of the target population (researchers and technologists from the PROs) and the strategy for contacting the respondents. As regard both to the public and the private sector, the investigations on the effects of the implementation of agile working are at the early stages. Thus, the strategy presented configures as a methodological proposal to be applied for studying the adaptation processes and the eventual changes in intellectual or creative jobs.

CNR - Consiglio Nazionale delle Ricerche

IRCrES - Istituto di Ricerca sulla Crescita Economica Sostenibile