Chapter 8
Concluding remarks

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ABSTRACT
The COVID-19 pandemic has led to the introduction of a different way of working, whose effects show that existing rules at the PROs need a profound rethinking. However, according to the evidence presented in this volume, what we need is not only to maintain the possibility of smart working, but to acknowledge the importance of this disrupting innovation that is likely to emerge from the pandemic event. Agile working needs appropriate solutions to cope with the organizational transformations related to knowledge production.

KEYWORDS: agile working, COVID-19 pandemic, Public Research Organisations.

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This book is aimed at understanding the value of the autonomous organization of individual work with respect to the production of new scientific knowledge in Public Research Organizations. The focus was on the agile working modes introduced during the COVID-19 pandemic, and the processes of individual adaptation/reaction to the implementation of these assets which informed the autonomous behavior of the researcher, also with reference to the social containment measures. The emergency implementation of this relatively uneven working mode in public research organizations occurred in a context where only a few organizations had previously experimented with it (Reale et al., 2020), and it was found to be a necessary solution aimed at reconciling the public health interests with the continuity of public administration action. During the health emergency agile working became the ordinary mode of working and, at the early stages of the pandemic, it was characterized by the confinement of work activities within the home, rather than assuming the configuration of a hybrid mode, with an alternation of remote and in-presence work.

The investigation was conducted through a web-based survey that was launched one year after the beginning of the emergency implementation of agile working and was targeted to the researchers and technologists of two public research organizations in Italy, namely the National Research Council (CNR) and the National Institute of Astrophysics (INAF). The survey reported the answers of 2,921 respondents, with a good balance by gender, age, and disciplinary field (see Chapter 2).

The analysis was developed around four main items and their related research questions linked to the implementation of smart working during the emergency caused by the COVID-19 pandemic, namely:

- positive and negative effects on the organization of scientific work (autonomy, productivity, research collaborations, mobility);
- effects on the personal and social well-being of research personnel, distinguishing where possible between the ordinary application phase of agile working and the phase related to the COVID-19 emergency;
- effects linked to environmental and work organization advantages;
- enabling conditions for agile working, with reference to the use of ICTs in research work.

There are some important reasons for deepening the effects of smart working on researchers and technologists working in the PROs.

First, PROs play a significant role in the Italian research system, as the R&D expenditures of universities and public research institutions in some OECD countries demonstrate (Consiglio Nazionale delle Ricerche, 2021). Italy, with Germany, France, and Spain, are the European countries where the PROs are very important actors in the public sector of research.

Secondly, despite their importance, the researchers and technologists of the PROs have different work regulations with respect to the academics, with some contractual constraints as to where they can perform the research activities. The mentioned constraints foresee that the time spent on research activities carried out at home could not be computed as working hours, because the research can be done either at the office or in other places outside the office, but not at home.

Third, the research profession is characterized by high levels of creativity, flexibility, and directionality towards achieving the planned results; researchers generally need wide spaces of autonomy to decide when, how, and where performing their activities. It means that we can expect a high capability of individuals to adapt to the new regime imposed by the pandemic event and the constraint to perform either all the activities at home or mainly at home.

We can now try to sum up the most important results emerging from the analysis.

Autonomy and productivity

The obvious granting of more flexibility and freedom to workers to decide when and where to work has been largely acknowledged in the European surveys on working conditions (Eurofound

& the International Labour Office, 2017) and largely documented by the literature on work flexibility (Angelici & Profeta, 2020), which also find positive effects of smart working on productivity, work-life balance, and well-being (Choudhury et al., 2021). Our investigation demonstrated that working at home was already in the habits of researchers and technologists of the PROs, notwithstanding the limitations imposed by the regulation. The COVID-19 emergency pushed toward the transfer of all the activities at home (especially at a first stage of the pandemic), and this event found people ready to operate at home despite the need to adapt to several changes in the work organization. Researchers and technologists have enjoyed the advantages of using a wider space of autonomy, which has relaxed the application of regulations that are not adapt to highly creative professions. Scholars often increased or at least maintained stable the productivity, but at the same time remained conscious of the limitations linked to the lack of personal contacts with the other colleagues. Surprisingly, the mentioned characteristics are visible in all the scientific fields, in people involved in both experimental and non-experimental activities, although with different rate and pace.

The value of personal contacts

It is a clear outcome of our investigation, that the possibilities for the digital scholarship have been substantially improved as a consequence of the new platforms, services and tools that had been widely used in the period of the COVID-19 pandemic. It means that we are facing a deeper transformation concerning how academics work and collaborate together. However, it is important to recall that the research profession cannot exist in isolation. Social and professional isolation is a threat deriving from smart working (Canal et al., 2022), which was highlighted very clearly in our survey. The number of free textual comments collected thanks to the questionnaire was impressive, and several statements pointed out the problem. Saying differently, the respondents, both male and female, claimed the need to balance working at home with working in presence, because research outcomes and research collaborations increase and improve only through physical contacts and social interactions, which are unavoidable in science work.

Is there a gender issue?

Several papers demonstrate a decrease in women's paper production, the first-authorship on preprints (Andersen et al., 2020; Vincent-Lamarre et al., 2021; Squazzoni et al., 2021), and a lower participation in academic citizenship activities (Minello et al., 2021) compared to men during the COVID-19 lockdown, mainly because the special condition exacerbates the existing gender disparities in science work by increasing family responsibilities such as caring children and older relatives. (Myers et al., 2020; Utoft, 2020; Reardon, 2022). Our survey does not present strong differences between attitudes and perceptions of men and women in terms of productivity and well-being. However, the deepening of the data has allowed us to figure out that negative attitudes towards smart working are generally associated with women, with problems related to the disconnection from work and the maintenance of the boundaries between working and family duties. Finally, the presence of a high share of respondents with stable productivity and minor children at home in the age cohort 30-44 years old, suggest the reason for negative perceptions which often characterized the answers of young women.

Was smart working during the emergency improving the researchers' well-being?

Researchers and technologists have been largely positive towards the benefits of smart working as to its capability to improve the family and the work life, as well as in the balance between the two. However, smart working is not without negative effects, such as difficulties in the planning of activities, the stress, and the fragmentation of working time. The mentioned negative perceptions are distributed between the respondents without significant differences for disciplinary fields or career attainments, but as mentioned, with differences linked to the age of the respondents, with a worse situation of young scholars with respect to the elderly.

Can we foresee a positive impact on the environment from the adoption of smart working in research?

The simulation carried out using the survey results demonstrate the positive effects of smart working, as to the decreasing impact on transport emissions, with the possibility of future changes in the habits of the respondents, which are likely to use more ecologic transportations. However, a complete answer to this question needs to consider other types of changes that should go with the reduction of CO2 emissions to have positive effects on the environment. These types of effects, in fact, are related to the introduction of solutions to reduce the energy consumption at home and at work, and more in general to new assets of social life following the transformations brought by the introduction of a new organization of work.

In sum, The COVID-19 pandemic has led to the introduction of a different way of working, whose effects show that existing rules at the PROs need a profound rethinking. However, according to the evidence presented in this volume, what we need is not only to maintain the possibility of smart working, but to acknowledge the importance of this disrupting innovation that is likely to emerge from the pandemic event. Agile working needs appropriate solutions to cope with the organizational transformations related to knowledge production.

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