

Review

Participatory Action Research Challenges Amidst the COVID-19 Pandemic: A Review and Comparison across Two European Projects

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Abstract: The Coronavirus Disease 2019 (COVID-19) pandemic that spread through the world in 2020 had a major effect on academia. Research projects relying on participatory methods and action research approaches were especially harmed by the restrictions and changes the situation imposed. This study performs a rapid literature review to identify common themes in the narratives of published studies concerning the difficulties of carrying-out participatory research during the COVID-19 pandemic. Perceptions and experiences of the authors of these studies are compiled and summarized. Additionally, insights and lessons learned from two projects in which the authors of this study participated are discussed and used to establish a comparison with the common challenges found in the literature. Over 90% of authors experienced challenges related to digitalization and methodological changes, 70% encountered difficulties with organizational and operational aspects of research, and over 30% felt that personal challenges, as well as issues with participatory aspects of research, were significant. On a positive note, almost 40% of authors from our sample recognize that the pandemic also brought unexpected benefits, such as a reduction in logistical expenses, and the creation of new opportunities for participation. This study adds to the growing body of literature regarding the effects of the COVID-19 pandemic on the research community. Additionally, it comments on the adaptation of participatory action research methods for added sustainability and social inclusion in the face of global crises.

Keywords: participatory action research; COVID-19; digital transition; community-based research



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1. Introduction

Action research (AR) is an iterative, reflective and cyclical scientific methodology, which has been widely employed in the fields of qualitative research [1,2], and has spawned a number of derivative terminologies for related approaches as more academics and practitioners adapted the concept to fit their circumstances. Participatory action research (PAR) is one such approach, and can be described as a sequence of iterative stages of research and action-engagement, involving stakeholders of diverse sectors of interest, allowing for a holistic and integrated assessment of any topic, through collective discussion and analysis, in a way that considers multiple factors [3–5]. This process allows both researchers and participants to systematically monitor and evaluate their work in mutual collaboration [6], while potentiating the transformative nature of research to produce change as opposed to simply generating data to inform future decisions [7,8]. Often, PAR is used as an umbrella term for research approaches involving participants in an inclusive and empowering manner [9]. Another emergent approach is that of ‘Online Action Research’ (OAR), consisting

of the application of PAR methods using online tools [10], and which some authors believe to have spread during the Coronavirus Disease 2019 (COVID-19) pandemic [11].

In 2020, the world was struck by COVID-19 (Available at: <https://www.who.int/emergencies/diseases/novel-coronavirus-2019>, accessed on 8 December 2022), having been announced as an international public health emergency by the World Health Organization (WHO) in January 2020, and then upgraded to a pandemic status in March of the same year, making it the most significant health concern since the 1918 Influenza pandemic [12]. More than once, in the years following the start of the pandemic, many countries implemented strict measures to combat the spread of the disease, including quarantines, lockdown measures, and social distancing [13].

During the COVID-19 pandemic, many sectors of society suffered negative impacts—both as a result of the disease as well as the measures implemented to stop it. Research activities have been negatively affected by the pandemic [14,15], and of note are social researchers and academics conducting PAR studies, who were particularly impacted [16–18]. Indeed, researchers employing methods that were supported by a strong interface and social engagement between people faced a number of challenges during the pandemic, such as travel and fieldwork restrictions, socially distant communities, cancelled activities and delays [16,18,19]. Those conditions forced many impacted academics and practitioners to adapt by exploring digital tools and ways to apply their methodologies in online or hybrid formats [19], while others halted their studies entirely.

With practical experience of the difficulties imposed by the COVID-19 pandemic on participatory processes, this study describes the perceptions of the Integrated Adaptation to Climate Change for Resilient Communities (INCCA) and Urban Nature Labs (UNaLab) project teams regarding how the respective PAR events and methodologies were affected in this period. Based on a rapid literature review, these experiences are compared with those reported by other authors in published works relating to PAR during COVID-19 times. Insights will be provided regarding lessons learned from the collective experiences in the literature as well as our own, and recommendations will be provided for future reference. Positive aspects of the digital transition and adaptation of these projects are also discussed, as well as their importance in the context of sustainable development in academia.

2. Methodology

In order to better understand the extent of the impacts of the COVID-19 pandemic on participatory action research (PAR) and related approaches, and as a way of comparing perceptions from our project with those of other academics, a rapid literature review was conducted in a systemic manner. Rapid reviews can be carried out in a shorter time than traditional reviews without significantly impacting the conclusions drawn, with the one limitation being the reduced scope of the search [20]. The limitations imposed on this literature search, as a result of the project's limited timeframe, consist of the requirement for peer-reviewed journal articles, as well as the use of only two scholarly databases: Scopus and the Journal of Participatory Research Methods (JPRM). Figure 1 provides a detailed representation of the review process.

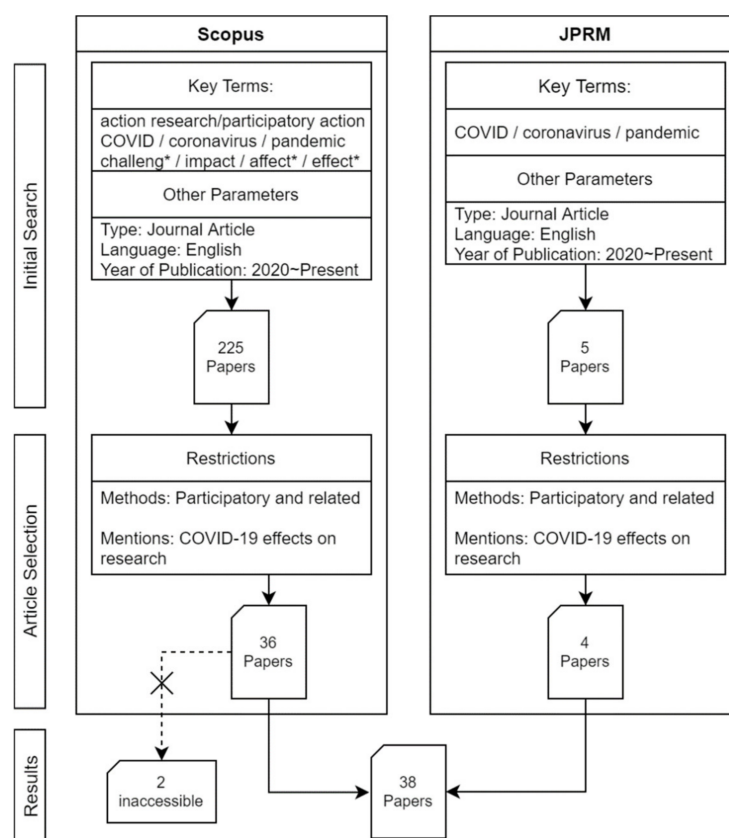


Figure 1. Diagram illustrating the literature review methodology, including the searches performed on Scopus and the Journal of Participatory Research Methods (JPRM).

2.1. Search Terms

The Scopus search engine was used to identify journal articles published in English from the year 2020 onwards and containing any combination of the following terms anywhere on the title, abstract, or keywords: “action research” or “participatory action”; “covid”, “coronavirus”, or “pandemic”; and “challeng*”, “impact”, “affect*”, or “effect*”. Note that search terms are not case-sensitive, and that the asterisk “*” next to a term signifies that derivative terms are also included in the search. For example, in the case of “challeng*”, the words “challenge”, “challenging”, or “challenged” would appear in the results. These keyword combinations were defined in order to find the largest amount of relevant content for the review, while minimizing false positives in the results.

In order to enrich the search results with additional materials, and due to the study’s focus on participatory research approaches, the authors also performed a ‘full-length article’ search on the database of the Journal of Participatory Research Methods using its simple search function. Because this journal is specific to the area of participatory research, and also due to the functional limitations of the search engine it provides, the search parameters were simplified to include only terms related to the COVID-19 pandemic, such as “covid”, “coronavirus”, or “pandemic”.

Both searches were performed on the 8 December 2022, yielding a combined 230 results (225 from Scopus, 5 from JPRM; see Figure 1).

2.2. Selection and Analysis

The titles, abstracts and keywords of all articles returned by the literature search were analysed to determine suitability for inclusion in this study. Papers considered suitable were those where a clear connection to participatory action research or related methods (e.g., action research (AR), youth participatory action research (YPAR), and community-based participatory research (CBPR)) could be established, and which also gave an indication of

the respective study being affected by the COVID-19 pandemic. This could include mentions of challenges, difficulties, negative effects, or implications regarding methodological or logistical decisions influenced by the pandemic. The first and second authors of this paper performed selected the suitable literature in order to minimize bias. The articles were randomly assigned to either of the two authors for analysis; then, each author performed a cross-check on 25% of the other author's papers.

Due to the frequent occurrence of terms such as “challenging” and “effect” in the scientific literature, as well as the variety of publications about the COVID-19 pandemic itself over the past two years, a large portion of the search results did not meet our specifications. In the end, 40 papers were categorized as suitable, of which two were discarded as they were inaccessible (see Figure 1). The resulting 38 papers (see Table A1 in Appendix A) were perused in order to identify common and unique themes and experiences on the topic of the effects of the COVID-19 pandemic on PAR.

After careful analysis of the literature, we identified commonly recurring themes of challenges and difficulties encountered in the selected studies and categorized these into four different challenge groups—Methodological, Project, Participatory, and Personal Stability. Each of these is further detailed in Section 5 of this paper.

3. INCCA Project

The Integrated Adaptation to Climate Change for Resilient Communities (INCCA; available at: <http://incca.web.ua.pt/>, accessed on 8 December 2022) project is a national research project financed by the Portuguese Foundation for Science and Technology (FCT) focused on studying modern and sustainable solutions to combat the effects of coastal erosion on the northwestern shores of Portugal.

The region of Ovar (NW Portugal) hosts three urban areas, has significant value from both industrial and touristic activities, and has rich coastal ecosystems that provide several benefits to the environment and society. With the sediment deficit observed and documented on this stretch of coast [21], as well as emerging concerns related to climate-change-led sea level rises, this region has shown to be particularly vulnerable to coastal erosion. Additionally, the region presents very diverse conditions in the context of coastal adaptation and planning, including stretches protected by groynes and seawalls of varying morphologies, stretches of coast maintained by artificial beach nourishment, stretches protected by dunes, lagoons and other natural features, and completely exposed sections where sea advances are evident. This diversity can also be observed across the stakeholders in the region, who voice very different, sometimes antagonistic, opinions regarding the most beneficial strategies to deal with the issue of coastal erosion, making co-creation fundamental but also challenging.

The goal of the INCCA project is to develop a municipal strategy of mitigation and adaptation to coastal erosion and climate change effects for the municipality of Ovar. This entails an integrated and multidisciplinary approach involving all facets of participatory action research (PAR), including stakeholder engagement, scientific data models, economic assessment, and careful attention to environmental and social challenges.

The INCCA Approach and COVID-19

The methodology employed in the INCCA project consists of iterative workshops involving a wide range of stakeholders from multiple sectors, making full use of the participatory action research (PAR) approach. A comprehensive explanation of the methodology employed, as well as the detailed results of the events, is presented in Matos et al. [22].

Three in-person participatory workshops were planned for the first two years of the three-year project duration; however, this was not feasible due to the COVID-19 pandemic situation, so the methodology had to be revised. The INCCA team planned for the first workshop to be a face-to-face, ‘hands-on’ experience for the participants; however, the plan underwent several changes to adapt to the conditions imposed by the COVID-19 pandemic, especially the social gathering restrictions and stay-at-home directives. After several

months of delays, the team decided to split the first workshop into three separate, smaller events, and host them in a digital format using the Zoom (Available at: <https://zoom.us/>, accessed on 8 December 2022) platform. The stakeholders were contacted through diverse means, and 24 confirmed their attendance.

During the first event, the participants were divided into three breakout rooms, where they worked in groups, similar to how they would have been distributed across various tables in a physical workshop, and each was provided with a previously compiled list of coastal erosion mitigation and adaptation measures (MAM) in PDF format. The groups then analysed the list, criticized the existing MAM, added new ones, and discussed which 10 measures they would like to see implemented and prioritized in the region for different temporal horizons. Originally, this exercise was planned to be a physical one, with stakeholders highlighting options in the MAM list, writing them in post-its, and then arranging them on a board. The easiest way to emulate this digitally was to use the Miro (Available at: <https://miro.com/>, accessed on 8 December 2022) web application. Miro acts as an interactive, collaborative platform where several users can add information simultaneously and in different formats (text, tables, images, etc.) and see what others are doing in real time—making it a great tool for participatory brainstorming processes.

During the second and third events, the activities revolved around the assessment of the previously defined MAM using multi-criteria decision analyses (MCDA) and participatory cost-benefit analyses (PCBA) [23], respectively. Once more divided into breakout rooms, each group internally discussed their three most-voted measures from the previous event and conducted an MCDA for each, followed by a PCBA. Due to the digital format of the event, the idea of the participants writing on boards while consulting MAM information sheets was discarded. The activities were, once again, performed using the Miro application, under the guidance of a member of the project team acting as a session facilitator. All the groups then took turns presenting their conclusions in the final plenary session.

All these events were structured to allow the participants regular, brief intervals to eat and rest between activities, including also one, longer, lunch period.

The second and third workshops were held face-to-face, and employed the scenario workshop and adaptation pathways (SWAP) approach [24]. The participant work groups were presented with three narrative scenarios depicting possible realities for the long-term future of the municipality of Ovar, which they analysed and discussed. Finally, the groups were invited to assess one of three segments of the coast of Ovar; then, each could design an adaptation pathways map for their respective section. These events included a lunch period and several coffee-break moments, which allowed participants to replenish their energies, network, and share ideas.

4. UNaLab Project

Urban Nature Labs (UNaLab) (Available at: <https://unalab.eu/en>, accessed on 8 December 2022) is an international project funded by the European Union's Horizon 2020 research and innovation programme. The objective of UNaLab is to develop, via co-creation with stakeholders and the implementation of 'urban living lab' (ULL) demonstration areas, a robust evidence base and European framework of innovative, replicable, and locally attuned nature-based solutions (NBS) to enhance the climate- and water-resilience of cities [25].

Co-creation is at the core of UNaLab. Through three European front-runner cities (Eindhoven, Netherlands; Tampere, Finland; Genova, Italy), five European follower cities (Basaksehir, Turkey; Cannes, France; Castellón, Spain; Prague, Czech Republic; Stavanger, Norway) and two observer cities (Buenos Aires, Argentina; Hong Kong, China), UNaLab and the stakeholders co-create and co-implement integrated NBS, demonstrate the multiple benefits, co-benefits, cost-effectiveness and economic viability of NBS systems within an ULL framework, and develop and test innovative decision-making schemes for the implementation and replication of effective NBS systems based on solid business models and financing solutions.

The front-runner cities serve as pilot sites to experiment with and demonstrate the effects of NBS implementation to improve urban–environmental conditions and build resilience to climate change. The co-creation processes employed in UnaLab, as well as all the collaborative knowledge production, ensures the representation of diverse actors and communities across cultural settings and climate conditions. Hence, the findings guide the implementation and development of NBS in cities across Europe and the rest of the world.

The UNaLab Approach and COVID-19

The UnaLab project, more specifically the monitoring and impact assessment work package team, aimed to assess the expected performance and impact of NBS scenarios in the three front-runner cities. To identify city problems and co-create corresponding NBS scenarios, three workshops (Scenario Workshops, hereafter) were planned, including relevant stakeholders in the process. The workshops were initially intended to be held in person to foster discussion and map creation, providing a “hands-on” experience.

The workshop structure was planned in two phases, with the final objective being the co-creation of case-specific NBS scenarios to tackle identified urban problems. Urban planners from the municipality represented different stakeholders relevant to NBS co-creation, including planning, demography, hydrology and green space experts. The first part of the workshop involved a discussion and identification of the urban problems, followed by their mapping. The second part included a discussion about the several types and potential benefits of different NBSs. After this discussion, the NBS that seemed most beneficial was mapped and corresponding NBS scenarios were created. Finally, the participants were introduced to the Systemic Decision Support Tool—NBS Simulation Visualization Tool (SDST/NBS-SVT) (Available at: http://unalab.eng.it/nbssvt_v4/, accessed on 8 December 2022), which allows for an assess of the direct and indirect impacts of NBS on urban heat and air quality, flooding and water quality, and sprawl, gentrification and real-estate valuation, and had the opportunity to explore the prototype version of the application. The workshop methodology and SDST/NBS-SVT structure are explained in more detail in the work of Matos et al. [26].

The first workshop was held in Eindhoven right before the COVID-19 pandemic was officially declared by the WHO, allowing for the workshop to be held in person. However, the following two workshops, in Tampere and Genova, respectively, were held online in order to comply with the pandemic restrictions and maintain the project deadlines. To adapt these latter workshops to online events, the Microsoft Teams online videoconference platform was used, allowing participants from academia and municipalities to be present individually (Genova) or in groups (Tampere), regardless of the evolution of the COVID-19 restrictions in the different countries. To maintain the workshop structure and expected outcomes, the uMap (Available at: <https://umap.openstreetmap.fr/en/>, accessed on 8 December 2022) software was used. uMap is an online map drawing application that enables users to draw georeferenced polygons that can assessed, edited and characterized (by adding attributes) by all participants simultaneously. As a result of transitioning to the online platform, the SDST/NBS-SVT exploration phase of the workshops had to be cut from the planned activities in the Genova and Tampere workshops.

Two other workshop sessions were organized in the scope of this work package, having taken place during the recurring UNaLab consortium meeting events. These workshops (Feedback Workshops, henceforth) aimed to present the updated versions of the SDST/NBS-SVT application to the consortium partners in order to gauge the effectiveness of the tool in providing and transmitting information, as well as to gather feedback on how to improve the tool. As the consortium meetings transitioned to the online format, the UNaLab team had to adapt the planned activities of the session. Participants were divided into groups in different breakout rooms, and each was asked to explore the NBS simulation results with the SDST/NBS-SVT to determine which NBS was most effective in dealing with urban issues by city (Eindhoven; Tampere; Genova) or by challenge group (air quality; flooding; socio-economic), depending on the event. The participants could explore the tool

individually, and then answer a set of questions about the results using the Mentimeter (Available at: <https://www.mentimeter.com/>, accessed on 8 December 2022) application. This app allows for users to fill out simple questionnaires created by the session organizers, and to see the results in a graphical manner in real time as other participants submit their answers. Finally, participants discussed the results and selected a spokesperson to present their findings in the plenary session, as well as provide feedback on the tool itself.

Another activity related to the UNaLab project was the use of the Adoption and Diffusion Outcome Prediction Tool (ADOPT) (Available at: <https://adopt.csiro.au/>, accessed on 8 December 2022) on multiple occasions to measure the level of adoption and time to peak adoption of green roofs in the City of Eindhoven [27]. Initially, the study was conducted in a participatory workshop setting in the City of Eindhoven, including stakeholders from academia and local government, to compare participants' responses. However, due to the COVID-19 pandemic, a second analysis, this time focusing directly on property owners in the City of Eindhoven, had to be adapted to the means of an online survey (ADOPT surveys, henceforth) using Microsoft Forms (Available at: <https://forms.office.com/>, accessed on 8 December 2022) and announced in the municipal newsletter with the help of the local government. The same online survey method was also applied to the city of Tampere, where the municipality publicized the form on their social media accounts.

5. How COVID-19 Challenged Participatory Research

The analysed literature expresses the thoughts of researchers and practitioners who experienced noticeable effects of the COVID-19 pandemic on the diverse aspects of participatory and action research projects. The most attention was given to challenges and problems arising from the pandemic situation, a mostly negative, yet justified perception of the topic. Despite the prevalence of negative perceptions on this matter, some authors also punctuated their experiences with positive notes.

This chapter provides an overview of the four identified challenge groups—Methodological, Project, Participatory, and Personal Stability—and explores the individual topics within each group.

5.1. Methodological Challenges

The COVID-19-related issues we identified in this challenge group are predominantly related to difficulties in the application of the planned methodology of a research project, as well as challenges regarding the adoption of digital tools. These appear to be the most widespread types of difficulties encountered by PAR researchers during the COVID-19 pandemic; the authors of 35 of the 38 analysed papers analysed, approximately 92%, claim to have experienced them to some degree. This section discusses the challenges that fall into the methodological category, including Digital Transition, Technological Accessibility, and Adaptation of Methodologies. In the case of both INCCA and UNaLab projects, these challenges were the most visibly impactful ones, according to the majority of the teams.

5.1.1. Digital Transition

The COVID-19 pandemic was declared in 2020, and prompted many countries to decree strict rules, at local and national levels, that restricted travel, social gatherings, and most forms of face-to-face contact. Under these circumstances, many researchers turned to videoconferencing technology in order to continue their research [28], as well as other digital media. This phenomenon could be demanding for researchers in a number of ways, for example, by creating the need to learn how to use this technology and adapt existing methodologies to support this use. For these reasons, we classified digital transition as a noticeable impact of COVID-19 on participatory research when authors commented on being forced to adopt virtual approaches or change their methodologies to make use of technology as a result of the COVID-19 situation.

The authors of 29 papers mention issues in the digital transition category; this is equivalent to 76% of all papers analysed in this study, making digital transition challenges

the most common ones in the literature. Indeed, authors frequently commented on how changing their projects to virtual environments was a necessary response to the conditions imposed by the COVID-19 pandemic, usually as a result of government-decreed stay-at-home orders and limitations on social gatherings [10,29–31].

The reason this particular challenge is considered so impactful goes beyond the forced adoption of a new way of conducting research: it is also due to the extensive ramifications of the process of transition and the necessary adjustments it entails. Much of this extra effort revolves around the need to make sure all components of the digital approach meet the participant's capacities [30]. One of these challenges is deciding which platform or application to adopt, as there are numerous options, and the time it takes to explore each platform and make a decision is considerable [30–32]. Videoconferencing platforms, in particular, have varying degrees of ease of use and various features, such as breakout rooms, varying call times, polls, emoticons and text chat options. As a result, it can be difficult to find an ideal platform that meets all the requirements [10].

Deciding which platform to use was a significant challenge for the INCCA project team. The INCCA workshops required the possibility of creating breakout rooms for certain exercises, so Microsoft Teams (Available at: <https://www.microsoft.com/en-us/microsoft-teams/group-chat-software>, accessed on 8 December 2022) and Zoom were the best alternatives, as they included this feature. The breakout room function of these applications allows the session moderators to divide the participants into groups, sending each to a separate call where team activities can take place. In the end, Zoom was adopted due to its simplicity and availability to the general public, as participants can use it for free without any registration requirements or even the need to install the software on their devices. It should be noted that several authors had similar frustrations with the choice of digital platform [10,31]. Other authors opted to use social messaging applications instead of videoconferencing platforms, such as WhatsApp (Available at: <https://www.whatsapp.com/>, accessed on 8 December 2022), due to their widespread popularity and ease of access [33,34]. These applications can be more practical for informal communication than videoconferencing apps, and they also allow users to share documents such as surveys and task lists.

Even after deciding which videoconferencing platform to use, additional functionalities were necessary to emulate the type of activities the participants were to perform, especially in the breakout sessions. The nature of participatory approaches including workshops and physical activities can be hard to translate to a digital environment, forcing researchers to seek ways to replicate the feel of physical interaction with a variety of resources. This feeling was also observed in several of the analysed papers: *"There were several packages tested, but there was no single tool/online platform on the market at the time that would tick all the boxes."* [32].

In the INCCA workshops, the idea was that the participants would consult and discuss the coastal erosion mitigation and adaptation measures (MAM) list provided, and then write down their preferred measures on post-its, and organize them on a large board. The post-it action could be emulated with some fidelity using the online collaboration platform Miro; however, the participants did not sufficiently interact with the other documents, such as the MAM list, as they would have in a physical environment where they could easily observe both the document and the exercise on a table. The virtual board exercise also proved to have certain setbacks. We noticed that the more adept participants quickly became distracted by the potential of the co-creation platform, and immediately began experimenting with several features—disrupting the otherwise controlled environment. In the end, the facilitators of the sessions had to alternate between allowing the participants to interact with the elements seen on the activity board and forcibly locking the board state from user interaction during the activity and discussion segments of the session, respectively. This placed an added layer of pressure on the facilitators, some of which were not sufficiently acquainted with the Miro platform—causing disturbances in the workflow of some breakout rooms.

For the UNaLab team, the most significant challenge related to digital transition revolved around the necessity of finding a free online tool that enabled users to draw maps in an intuitive and accessible manner, emulating the activity the participants were supposed to perform when using printed maps and colour markers in the Scenario Workshops. For the SDST/NBS-SVT Feedback Workshops, a learning process was also required to effectively manage the sessions using Microsoft Teams's breakout room functions, which, at the time, were relatively new, and with which the team members had no experience. Finally, for the ADOPT Surveys, which had to be performed online rather than by conducting interviews as a result of COVID-19 pandemic restrictions, a great deal of work went into procuring the most accessible and easy-to-use survey distribution platform. In addition, otherwise verbally provided clarifications on survey questions had to be considered and were integrated as notes below the survey questions.

5.1.2. Technological Accessibility

Transitioning a participatory or action research methodology to an online environment is its own challenge, but the resulting methods and platforms come with indirect difficulties that are not always easy to predict. Technological accessibility issues are some of the most relevant challenges resulting from digital transition. These refer to issues with the use of technology and digital tools by the participants in a project, which can occur for a variety of reasons.

Among the papers analysed in this review, 16, or 42%, included mentions of some type of technological accessibility issue that hindered the research process. These issues could refer to lack of available hardware, software, or internet access, which manifest differently depending on several factors. In some cases, these challenges could be directly attributed to the socioeconomic conditions of local research participants, as reported by several authors [16,35,36]. Certain groups, often those considered vulnerable or isolated, are likely to possess fewer means to engage with digital activities due to a lack of access to computers and high-speed internet connections, which can be a challenge for PAR processes. Some authors report this situation on larger scale, such as Call-Cummings and Hauber-Özer [37] and Saeed [10], who describe lack of access to technology for the general population of Turkey and the Maldives, respectively. Auerbach et al. [16] suggest that using more informal means of communication can be beneficial when conducting research with communities in conditions of vulnerability, such as WhatsApp, which can help “*reduce digital exclusion of hard to reach, vulnerable social groups*”.

Another project, described by Banks and von Köppen [38], encountered challenges due to the specific nature of the environment in which they were conducting research. In their case, in a nursing home in Germany, the facilities did not have the necessary technological equipment to allow for the residents to participate in online participatory events.

For some other authors, technological accessibility challenges were related to the specificity of the digital tools required. Rivera et al. [39] described the difficulties in supplying specific paid software packages to participants during the pandemic. As they were working with students, they would normally be working on school computers with the necessary software installed, but during the lockdown, this was not possible. The same issue is recounted by Kodura [40], with an added concern regarding the shifting of responsibilities to the students, who may not own suitable hardware to run certain software.

Finally, Manderscheid et al. [30] commented on the age of the participants as being associated with technological challenges, as a certain group of participants they were working with was of an older age, and reported having “little experience with computers, the internet, and online tools”.

It is known that the COVID-19 pandemic did not affect everyone in the same manner, but rather served to intensify existing societal inequalities [41,42]. This factor is especially relevant when considering digital equity and how it can impact a study relying on digital means to apply a PAR approach. Indeed, the INCCA project also experienced these challenges during the online workshop events. The stakeholders involved in the project

were known to have access to the necessary devices required to attend the workshops; however, some of them did not have as much technological know-how as would be desirable. The INCCA team introduced the participants to both the Zoom and Miro applications; still, facilitators were required to explain, repeatedly, the correct usage of these tools to several participants.

During the events, the stakeholders were assigned to their respective Zoom breakout rooms, but some of them did not understand the structure of the videoconferencing platform and, sometimes, trying to minimize or close the plenary session room, they ended up accidentally leaving the meeting altogether. In addition, being forced to alternate between the Zoom meeting window and the internet browser window in which the Miro platform was interfaced generated confusion among some of the less technologically adept participants. Some claimed to be unable to perform some of the activities, and it was often impossible for the facilitator to ascertain whether this was due to a user error or an actual technical problem, forcing them to improvise a solution. Another issue, which could only be identified in hindsight, was that some participants decided to attend the online events using their mobile phones or tablets rather than using a computer, which made interacting with the Miro board a bothersome task and slowed down the whole process. In addition, some users had unstable internet connections, causing them to occasionally drop-out from the call, or experience lag and distortions in their communication, as well as sometimes forcing them turn off their cameras to guarantee they at least had enough bandwidth for voice-only interactions.

Some similar situations were experienced by the UNaLab team during the Feedback Workshops with project partners. These were held using the Microsoft Teams videoconferencing platform, but the issue with participants not understanding the automatic redirection from the plenary session to breakout rooms, and mistakenly leaving the call, occurred in the same manner as seen in the INCCA workshops. Equally significant were the issues with internet stability, as the participants were attending from several different countries and not all had access to stable connections. The participants were asked to interact with the online SDST/NBS-SVT for certain exercises, and the UNaLab team was glad to see that almost everyone had advanced technological competencies and operated the system with relative ease. Unfortunately, the tool works with large datasets, which can be challenging for some users' computers, and it was found that these hardware limitations resulted in some users having difficulty getting the tool to load results correctly, which generated frustration. This was an unforeseen difficulty as, in normal situations, these workshops would have relied on the use of previously tested devices that would be able to handle the tool's requirements, as opposed to the participants' personal or work computers.

In the Scenario Workshops, all participants were acquainted with Microsoft Teams, and the breakout room function was not used, so these issues did not occur. However, difficulties appeared when using uMap, as this was an unknown app for all participants. A guide was developed to help users understand the tool and its intended usage; however, repeated reference to this caused the flow of the events to slow down, extending their intended duration.

5.1.3. Adaptation of Methodologies

One big question that many PAR researchers asked themselves at the beginning of the COVID-19 pandemic regarded how these changes would affect their planned methodologies. In this category, we consider challenges described by authors where they enacted changes to a project's methodology, scope, or workflow as a direct or indirect response to changes brought on by the pandemic situation. The direct challenges linked to the transition to a digital environment (as described in Section 5.1.1) are not considered part of the present category for the purposes of this review.

Among the papers analysed, 24, or 63%, indicated in some way that the conditions imposed by the COVID-19 pandemic required changes to the planned methodology of their research. These adapted methods were prompted by different circumstances depending on

the project and location. Many of them were indirect consequences of having to transition to digital formats, as authors describe necessary modifications to the methodology to fit this format [43,44].

Sometimes, these challenges were associated with technological accessibility issues as well, either because the existing digital methods failed and forced the researchers to improvise [45], or due to participants being unable to work with certain necessary tools, prompting the adoption of alternative ones [40].

For some authors, the restrictions implemented to deal with the pandemic, such as travel limitations and institutions closing down, also contributed to the methodological changes [46,47].

Another relevant factor was the strain on project resources, and the difficulty to reconcile all the changes with the originally planned methodology. Grace et al. [44] lament having had to cut certain elements out of their project as their development was no longer feasible, while Kramarova et al. [32] dropped one methodological alternative due to time constraints.

These changes to methodology can range from a relatively simple rearrangement of actions to changes in scope or even the abandonment of certain processes. A total of 50% of the authors denote that some of the activities they envisioned were impossible, and that the enacted changes were a necessary result of this. The most common examples are those that forced a digital transition, as previously mentioned, but there were also instances of specific activities being made impossible and having to be eliminated. This was the case for several researchers who could no longer enter facilities after the pandemic was decreed, being unable to travel to study sites and unable to contact participants to distribute equipment [38,39,48,49].

For the INCCA team, the necessity of adopting a digital format was the motivator of most of the changes to the planned flow of the research program. Firstly, the team did not expect that participants would be able to remain engaged throughout a full-day workshop in a digital format. Secondly, the possibility that issues could arise as a result of the change in methodology was a real concern, and delays were more likely to negatively impact the session the longer it lasted. This led to the decision to split the first online workshop into three separate, smaller, events. This also came with some disadvantages, namely, the fact that it was unlikely that the same participants would be able to attend all events, but it allowed the team to better manage the activities and ensure the stakeholders would not lose interest. This was also supported by the decision to hold shorter breakout sessions in the workshops, prompting regular segments where everyone returned to the plenary session to explain what they were doing and what would be done next.

Another change came as a result of the format causing the session facilitators of each group to be confined to their own breakout rooms, cut-off from the remaining groups, and having no way to gauge whether they were falling behind or advancing too fast. This prompted the adoption of the WhatsApp application as a way to share quick messages with the rest of the INCCA team, but this added another layer of complexity to the already strenuous task of moderating a group of several people in a virtual environment.

The Scenario Workshops in the UNaLab project also suffered changes to the planned activities. Firstly, one of the front-runner cities could hold their side of the workshop collectively while the other city adopted the individual format of every participant using their own device. Secondly, the transition to a digital format resulted in the final phase of the event, where the participants would be granted the opportunity to explore the SDST/NBS-SVT prototype, to be abandoned. The application was not available for public use at the time, and would require the researchers to set up a device in the workshop location for the users to directly interact with, which was impossible due to the circumstances. The Feedback Workshops suffered fewer changes in comparison, although they were arguably more impactful. The participants in these events had to explore the SDST/NBS-SVT application individually, on their own devices, as opposed to all exploring the tool as a

group using a more appropriate device provided by the team, resulting in both engagement and accessibility constraints.

5.2. Project Challenges

The COVID-19-related challenges we identified in this group are predominantly issues in the management and execution of the participatory research projects. These can be related to the viability of completing a project during the COVID-19 pandemic, as well as resource acquisition and recruitment. Challenges in this category are the second most prevalent in the analysed literature, occurring in 27, or approximately 71%, of the reviewed papers, and were also felt in both the INCCA and UNaLab projects. This section explores challenges related to the Research Plan, as well as Recruitment and Data Collection.

5.2.1. Research Plan

With the myriad difficulties imposed on researchers by the COVID-19 pandemic, many saw that their research plans were delayed or otherwise compromised. This was a universal occurrence in academia, and was not specific to PAR and related projects. There are 16 mentions of challenges in this category among the analysed papers, equivalent to 42% of the total. Most of these difficulties consisted of delays in research activities, as several authors explain, simply as a result of COVID-19 restrictions [47,50,51]. Others saw their research hindered as a result of resources being allocated to priority actions in times of intense stress caused by the pandemic [30,52].

These delays can have repercussions at the level of the overall research timeline [10], and some authors even mentioned needing to extend projects beyond the foreseeable deadline [53]. This includes Cohen et al.'s [54] project, which was not only impacted by delays to methodology application but also by administrative complications regarding funding requests.

Even more concerning are the cases where research projects suffered more drastic effects. Banks and von Köppen [38], for example, describe how the previously mentioned difficulties led to the research being left unfinished. Similarly, Swinson and Henderson [55] claim to have been unable to continue their research after the COVID-19 pandemic restrictions were lifted, and Grace et al. [44] noted their results were compromised by the pandemic situation, invalidating their research altogether.

It is reasonable to assume several PAR projects were cancelled over the duration of the pandemic as a result of the difficult circumstances, an opinion shared by Auerbach et al. [16]. This is a relevant point to consider, as one can argue that the earlier reported 42% incidence rate of challenges in this category is probably impacted by survivor bias; the literature is likely missing the accounts of many projects that never reached fruition.

The INCCA project was also affected by delays due to the COVID-19 pandemic. When the first lockdown was instated in 2020, it was thought that the situation would be transitory, and we would be back to our regular activities relatively soon. The first phase of confinement ultimately lasted over four months. With the pandemic restrictions in effect, even after the end of the confinement period, holding an in-person participatory workshop was impossible. The team decided to wait for an easing of the restrictions and a general improvement in the situation; however, the project schedule was severely impacted by this delay.

The UNaLab project was comparatively faster to respond to the circumstances. As the project spans several countries, the members of the team were already accustomed to using videoconferencing tools, so a quicker transition was undertaken, and less time was spent waiting for ideal conditions. However, being a more complex project with several interconnected parts, as well as requiring the actual establishment of nature-based solutions on the ground, the project had to be extended by 6 months beyond the foreseen 60-month duration. Despite the preparation, the two online Scenario Workshops suffered a small delay of a couple of months due to the necessity of adaptation to the digital format.

5.2.2. Recruitment and Data Collection

Personnel recruitment for participatory research activities, such as workshops and interviews, was significantly affected during the COVID-19 pandemic. Data collection was also negatively impacted by these conditions, although, in many PAR projects, these two factors had a very significant overlap, which led to this review considering them both in the same category of challenges as project management.

From the analysed literature, 16 papers, or 42%, mentioned issues in this category. Several factors that were directly or indirectly associated with the pandemic situation impacted the recruitment processes of PAR projects. Indeed, the general restrictions that were imposed were enough to cause challenges in some projects regarding data collection [54,56]. For some, the issues were due to the nature of the newly adopted digital format. Auerbach et al. [16] reflected on the fact that participants signed-up for face-to-face activities and were no longer interested when the format changed to digital, while Call-Cummings and Hauber-Özer [37] lamented having lost the spontaneous recruitment of curious students stumbling into their activities as they walked past their classroom.

Technological accessibility issues were also detrimental to recruitment, especially when attempting to reach certain groups of people who were more isolated by the pandemic due to the exacerbated social inequalities [16]. Salma and Giri [57] express concern regarding the difficulty to recruit marginalized groups with fewer technological skills, as they recruited “highly educated, affluent, and digital savvy older women” much more easily. This matter is of particular importance as, not only does this phenomenon have implications in terms of research ethics and social justice, but it also brings into question whether the research being conducted is collecting representative data, or whether some significant groups are accidentally excluded by the limited access to these groups.

For some authors, even regularly accessible groups of participants proved hard to reach during the COVID-19 pandemic; LeMasters et al. [58] describe struggling to recruit youth through Facebook (Available at: <https://www.facebook.com/>, accessed on 8 December 2022) and listserv services.

Another significant barrier to participant recruitment, as explained by Auerbach et al. [16] in one of their projects, was the difficulty getting people to trust the researchers when all contact was via e-mail. Hence, it was difficult to convince participants that were sceptical of academia and proved unreceptive to the idea that the research would benefit them as a community.

Saeed [10] also comment on how the stressful conditions the pandemic forced upon the general population were a hindrance to recruitment—resulting in their participants dropping-out of the project in large numbers. Similarly, Madden et al. [45] explain how fear of the disease itself kept community members from interacting with the researchers who visited them to hand out flyers in an attempt to recruit participants.

Additionally, Hartman et al. [50] had to deal with the more drastic effects of COVID-19, as their participants were succumbing to the disease: “Furthermore, the 6-month delay and further COVID-19 waves regrettably continue to lead to the passing away of participants, increasing the need for new recruitment”.

The INCCA project team was somewhat affected by challenges in this category. The imposed restrictions made it very difficult to schedule face-to-face meetings with potential participants for the purpose of recruiting them for participation in the workshop events. This was especially relevant when trying to contact key stakeholders, such as representatives from municipalities and organizations. The act of personally introducing the project to a stakeholder, creating trust, can be much more persuasive than an e-mail or a phone call. At times, the inability to proceed in this manner hindered the process of gathering the right number and type of stakeholders for the workshops. This is also one of the reasons why common citizens are underrepresented in the list of stakeholders. It was not easy for the team to ascertain which individuals would be interested in participating without being in the field and meeting them; additionally, obtaining their contact information was challenging as they were unaffiliated with known organizations.

The UNaLab project did not encounter difficulties of this type concerning the workshops, as stakeholders were already engaged and integrated in the project well before the COVID-19 pandemic. However, the ADOPT Surveys were visibly impacted. In order to ensure the forms reached the community, the team had to rely on the local government, which communicated the survey via newsletters (Eindhoven) and social media (Tampere). It was found that response rates in the City of Eindhoven were large (over 1000 responses within one week) while in Tampere, no responses were obtained. The latter may be related to the fact that the survey was only available in English (in Eindhoven, the survey was available in Dutch and English) as well as the announcement being made through social media only (dropping down from the top of the website quickly as new posts came in).

5.3. Participatory Challenges

This section discusses challenges generated, or exacerbated, by the COVID-19 pandemic, and which are especially relevant to participatory action research. These pertain to the social aspects of participatory methodologies and the way in which participant involvement is impacted by the circumstances described. The authors of 12 of the analysed papers, approximately 32%, mention observing effects that fall into this category as a direct or indirect consequence of the pandemic. In the following sections, the participatory challenges in Engagement and Communication, as well as Building Trust, will be detailed and discussed.

5.3.1. Engagement and Communication

The way in which PAR researchers could interact with participants was affected during the COVID-19 pandemic, as well as the way in which participants themselves could interact with the projects. Of the papers analysed in this review, 5, or 13%, included mentions of participants being less engaged in research than they would have been under normal circumstances. It was found that this phenomenon was almost always correlated with the transition of the methodologies to the digital format, as authors comment on lowered levels of engagement when the activities were held online [37,39,43]. Technological accessibility issues are also highlighted as a justification for the lack of natural communication, as several authors noted that internet connectivity issues and delayed communication produced a sense of disconnection [10,39,53].

The relatively low number of authors writing about engagement and communication issues in their participatory projects is surprising considering how the social aspects of activities can differ when transitioning from face-to-face to virtual workshops. The INCCA team felt that the project was especially impacted by these issues. The differences between the traditional face-to-face workshops and the new digital format were visible as soon as the first participants joined the first event. Most people entered the meeting room silently; some of them did not even turn on their frontal camera until prompted. The moderators did their best to greet the participants, but without the option of addressing individual people, as opposed to the entire room, the participants refrained from interacting, fearing they would be speaking over someone else or generally remaining detached, serving more as observers than actual participants. During the plenary sessions, it was evident that several stakeholders lost interest, frequently becoming distracted by other activities, such as reading e-mails or looking at their mobile phones.

Inside the breakout rooms, the stakeholders seemed engaged and eager to mechanically interact with the co-creation platform activities when casting votes or selecting the desired MAM. However, they did not initially interact with one another by means of discussion, especially during the first workshop event, instead waiting for the facilitator to lead the session. Throughout the length of the breakout sessions, and with significant effort from the facilitators, the participants eventually overcame their hesitancy, and this was more noticeable in successive workshop events. Then, the team observed that these growing group dynamics would be almost reset to an awkward silence whenever the participants were called back to the plenary session for updates, and again when redirected to their

respective breakout rooms, making it difficult to maintain a natural, constant state of engagement. The same was observed when the participants came back from the coffee/lunch breaks between activities. This was a clear difference in behaviour when compared to the latter face-to-face workshop events, where participants engaged more actively and were less prone to distractions.

The virtual format also made the natural occurrence of parallel discussions within a group impossible, affecting the natural social interaction as a whole. The facilitators found that their role was more difficult as a result. Participants that were shy interacted even less than usual, and the participants who were more outspoken easily dominated the conversation for longer stretches of time. It was harder to read and express body language and more difficult to use tone and volume of voice as a way to gain attention and manage the discussion, and trying to engage more timid participants was especially complicated.

In the UNaLab project, similar phenomena were observed across the different events that were organized, especially the SDST/NBS-SVT Feedback Workshop sessions during the consortium meetings. The participants appeared interested in interacting with the online tool in their respective breakout rooms, but they were silent throughout the exercise. Each participant explored the tool individually, only speaking up when they required assistance from a facilitator regarding the use of the tool, and they hardly engaged when the facilitators asked how the process was going, or if they wanted to move onto a discussion. When the time came for the participants to cast votes on which NBS they found to be most useful using the Mentimeter application, it was found that several of them did so slowly or even abstained. The discussion segment was also a challenge, as the stakeholders seemingly kept exploring the tool and did not discuss their findings with one another, as was the goal of the session. The facilitators sometimes had to forcibly appoint one group member to be the spokesperson in the plenary feedback session, as no participants volunteered.

In the UNaLab NBS Scenario Workshops, in comparison to the face-to-face workshop, the online discussion process was affected in different ways: not only due to the online-imposed distancing but also due to the different group dynamics. In the case of Tampere, the participants were all together, which facilitated discussion between them, but hampered the organizers' perception and leading capacity. This was also reinforced by the language factor, as participants tended to discuss more in their native language. In the case of Genova, all participants were present individually (working from home), which facilitated the leading capacity, but, in turn, constrained the engagement of some participants, similarly to what the INCCA project observed, which might have weakened the workshop output.

5.3.2. Building Trust

In the field of participatory research, it is of vital importance to establish trust-based relationships with the communities with which one is working [13,59]. Several processes regularly used to build trust with participants have, thus, been affected by the COVID-19 pandemic—limiting their effect and the integrity of these projects overall. The authors of 9 papers in this review, almost 24% of all papers, claim to have struggled with this social aspect of their research plans due to the pandemic. To most authors, trust-building issues encountered were a result of the hindered manner in which people develop relationships in virtual environments [29,33].

Some authors mentioned that digital accessibility issues were the primary barriers to successfully establishing trust with participants. This may include *“talking to black screens with their video off”*, as Saeed [10] put it, or even the reduced length of online interactions when compared to in-presence events [39], all of which slow the process of establishing relationships with participants. Additionally, adopting less personal recruitment methods (listservs, social media) as a result of pandemic restrictions also impacted participant trust according to Madden et al. [45].

Habermann et al. [48] comment on how, in their project, building trust was difficult for seemingly paradoxical reasons. In one study area, connecting with the community was challenging due to fear of the COVID-19 disease: *“The participants were at first hesitant to*

interact with outsiders, especially those from Nairobi, because there was a general perception at the time that COVID-19 was coming from Nairobi". At the same time, in a different study area, the same authors experienced a very positive reception, but were unable to reciprocate, as they were required to keep a more distanced approach due to ethical reasons: *"Following local norms and customs relating to greetings, socialization and hospitality is a central aspect of cultural respect which is fundamental to successful PAR collaboration. However, following COVID-19 safety protocols put us in direct tension with basic local practices such as handshaking and sharing meals".*

The impacts of the pandemic on the trust-building processes were not felt as significantly in the INCCA and UNaLab projects. It is possible that this is due to the prevalence of members from academia, local government, and public institution actors among the projects' participants; these are people who understand the nature of research and are less sceptical of these processes than some of the general population. The fact that several of the participants in both projects had worked together in the past, and that some of them had worked with members of the research teams previously, meant that trust was already partially established from the beginning. Even if there were no major barriers to building trust in this case, the workshops that were held in traditional face-to-face format make it evident that the quality of relationships and social interactions between stakeholders/partners (for INCCA and UNaLab, respectively) and researchers is noticeably lower in virtual formats. As stated in the previous section, the ability to develop parallel conversations and direct connections between individuals creates an indirect cohesion within a whole group, and this is much harder to accomplish in a videoconference room where everyone speaks to everyone else.

Another very important factor, as explained by Auerbach et al. [16], is the ability to solidify these relationships outside of the proper event activities: *"They [the authors] missed the opportunities for the small talk and watercooler moments; conversations before or after meetings with individuals, walking and chatting about informal issues, or engaging in non-work events, all of which contribute to relationship building and trust, [...]".* This reflects one of the main ideas voiced by both researchers and stakeholders when asked for feedback after the first INCCA participatory events, as well as the UNaLab workshops: they all missed the social moments generated by the coffee breaks and lunch periods that are traditionally included in whole-day, face-to-face PAR events, and which are impossible to replicate virtually.

5.4. Personal Stability Challenges

The COVID-19 pandemic affected people individually as much as it did organizations and collectives. Because PAR leans heavily on social actions and community engagement, it is no surprise that some projects of this type would be negatively affected as a result of the difficulties felt by the people, whether those conducting the research or those participating in the activities. Challenges in this category were mentioned in 14, almost 37%, of the papers assessed in this review. Of those, 11 (29%) mention how their participants suffered from stress, overwork, or fatigue that was in some way associated with the pandemic, which was mentioned in the previous challenge categories as a justification for some of the difficulties encountered. While the personal issues of PAR researchers are not mentioned as often, they are equally crucial to the understanding of the pandemic's effects on these projects, and mentioned in 5 (13%) of the assessed papers.

Auerbach et al. [16] mention the "professional precarity for some research project co-leads" in one of the projects presented in their paper, further mentioning bureaucratic issues regarding funding: *"[...] author JA was awarded a community grant but his institute requested 50% of the funds for University overhead despite all the research taking place within the community. To avoid these overhead costs and ensure that the funds would be allocated completely for PAR, author JA established himself as an independent consultant. This resulted in not only additional challenges for author JA, such as finding and purchasing professional liability insurance, [...]".*

McKinnon et al. [47], also mention issues related to researchers feeling anxiety, with one of them being described as "finding it hard to adjust to the 'new normal' (working

from home, teaching online), and feeling apprehensive about the future”. Saeed [10] shared a similar feeling as a researcher trying to complete his studies at the time.

Salma and Giri [57] also point out that several researchers suffered the additional stress of performing their activities while having additional personal responsibilities during the pandemic lockdowns, especially parents having to care for and teach children while schools were closed.

Because the effects of the COVID-19 pandemic were so ubiquitous during 2020 and even 2021, it is hard to say where they began and ended, especially where personal conditions, such as mental health, are concerned. The UNaLab team contained several doctoral students whose activities were directly impacted by the pandemic, several of which ended up asking for grant extensions in order to finish their planned activities. The INCCA project team consider themselves fortunate that no major issues in this category occurred during the pandemic period. Still, the general state of anxiety regarding the global health crisis, as well as being forced to live confined to one’s own home, were phenomena that could be perceived, even if only at a residual level, during work meetings and planning stages of the project. The team tried their best to appear positive during the online workshops, and their success may be, in part, owed to this mindset, as it also helped the participants to feel more connected.

6. The Pandemic’s Positive Aspects for PAR

The effects of the COVID-19 pandemic were largely detrimental to PAR researchers in many different ways, as seen in previous sections of this study. Knowing this, it is understandable that more focus is given to negative experiences and perceptions when trying to conduct such programs during pandemic times. Despite these challenges, the authors of approximately 40% of the papers in this review point out that the pandemic, and the transformations to PAR processes that occurred as a result, also had several positive impacts that should be acknowledged.

One of the more frequently mentioned positive aspects of the pandemic is related to the added convenience and reduction in expenses that accompanied the transition from traditional in-presence research to using virtual formats [10,31,48]. This was likely felt by researchers across different areas of study, but it is particularly relevant for PAR processes since it benefits not only the researchers and their project, but also the research participants.

Another related factor is the expanded reach and capacity of the participatory events. With the added convenience of being able to attend an event from the comfort of their own homes and offices, more participants could be included, and they could do so from faraway locations that would otherwise make their presence a logistical challenge [16,29].

This added convenience is doubly important for those participants who are already burdened with responsibilities such as caring for their children during lockdowns, as suggested by McKinnon et al. [47] who noticed that *“parents with young children found the online meeting to be an easier commitment”*. Additionally, Jahangir et al. [49] suggest that this phenomenon can also improve the results of certain PAR processes, as it allows for a potential upscaling of community-based initiatives.

Some authors also comment that the restrictions imposed by the pandemic opened up new opportunities that were not considered viable before. Félix and Sanfiorenzo [60] explain that the virtual formats promoted the presentation of materials and speakers due to the improved popularity of videoconferencing and digital work, which would otherwise be unavailable, as well as promoting virtual site visits for learners.

Other positive aspects of the digital transition, as stated by some authors, include better organization, as well as more frequent communication, between researchers and participants [16,61].

The digital nature of the new methodologies also led to the benefit of making it easier to record events, allowing researchers to study the videos and audio records later, and ensuring better record-keeping.

Additionally, some authors claim that the effects of the pandemic improved the engagement of their participants [37,62], which is surprising as it contrasts with the recounts of several other authors, as seen in Section 5.3.1. This effect was also observed by the UNaLab team, specifically in the ADOPT Surveys. While the online distribution of the survey in Tampere had extremely low participation rates, the online surveys disseminated to the Eindhoven community resulted in a very large number of responses.

The INCCA project team members agree that one of the most significant benefits of the pandemic was, indeed, the reduction in costs associated with travelling to the study area, renting spaces to hold the participatory events, and paying for additional related services such as catering. This allowed the project to allocate funds to other tasks, such as the dissemination of results and participation in conferences, which had a noticeable impact overall. Again, these benefits extended to the participants, who may have been more likely to attend the events due to the option of doing so from home. This would save money and time but also could have meant participants could more easily accept the suggested schedules. The UNaLab team had a similar perception; there was a significant reduction in costs for travel, accommodation and even materials (e.g., printing maps) when adopting the online format. This was especially beneficial in this project as the events were all to be held in different countries, and the consortium meetings implied large logistics expenses.

Despite the issues with digital transition and lowered engagement in both projects, the adoption of the digital format also brought other advantages, as mentioned by some of the authors. The ability to hold events without being constrained by limitations on the number of participants was very welcome, as was the added ease of recording the activities for further analysis when writing reports. The ability to impose strict time limits on breakout rooms also ensured that the event proceeded according to the established daily plan, without delays, even if, at times, this resulted in incomplete activities.

As the UNaLab project revolves around sustainability and green transition, the added benefit of avoiding unnecessary carbon emissions and waste generation by staying at home was fitting and welcomed. The solidarity between different work package teams within the UNaLab consortium was also uplifting, and further solidified the sense of unity between researchers in a way that is only possible through the cooperation of multiple teams affected by the same circumstances.

Lastly, the INCCA team members believe there is an inherent value to overcoming the challenges imposed by COVID-19 on a personal and professional level. Being forced to adapt methodologies and learn new skills at short notice may have been difficult, but having overcome these hurdles and seen the project succeed regardless leaves a sense of accomplishment and personal development that one could argue is fundamental to the nature of a PAR researcher.

7. Conclusions and Lessons Learned

This study presented an enumeration of the most significant challenges encountered by participatory action researchers during, and as a result of, the COVID-19 pandemic. This was completed by way of a rapid literature review, analysing the experiences described by authors of 38 works in the academic literature, with additional insights and perceptions from two projects in which the authors of this study participated. This review organizes existing information and contributes to the growing body of literature exploring the impacts of the global phenomenon of the COVID-19 pandemic on society, particularly in the context of academia.

The transition from participatory action research (PAR) to a digital environment was a challenging process for most researchers, however, and even though this transition came with certain disadvantages, it also opened up new opportunities. In order to fully navigate these new spaces for participation and action research, the technological skills and economic status of the target audiences must be properly assessed. The complexity of the tools being used must be considered so that participants can easily perform their activities, and to

avoid wasting time with troubleshooting and repeating procedures. The tools themselves should be selected to allow for equal access to all individuals involved, as failing to account for lack of access to suitable resources (hardware, software, internet connection, etc.) can exclude certain groups—leading to incomplete or even biased research results.

In order to maintain interest and promote engagement in online environments, it may be beneficial to consider organizing shorter events to avoid virtual fatigue and, if necessary, scheduling several meetings at different times. These should also be divided into shorter segments, and promote interaction between participants as much as possible during collective activities; forming a group of participants and then asking them to work individually should be avoided in these cases. In data collection surveys, it is extremely important to understand the target users and make sure the forms are being actively delivered to them, as opposed to simply being publicly posted and passively waiting for the participants themselves to take interest and decide to engage.

In project planning, when exceptional conditions occur, such as the COVID-19 pandemic, the authors argue that early pivoting to alternative strategies is the best course of action, as taking the passive approach of waiting for more favourable conditions can lead to unforeseeable delays. The methodologies themselves should be carefully considered, but not so much as to make the process inflexible and liable to be invalidated by the failure to carry out tasks as they were originally planned. PAR processes are characterized by their human component; just as humans are creative and adaptable by nature, PAR processes must be as well.

The COVID-19 pandemic affected participatory processes in very diverse ways, often negatively, but also led to certain positive aspects. It is important to consider these experiences and learn from them to improve the adaptability and efficacy of this type of research—both in times of crisis and during normal times. It should also be noted that PAR was able to evolve and face the challenges brought on by the COVID-19 pandemic in a sustainable and resilient manner, as the digital transition phenomenon largely reduced the need for long-distance travelling and waste generation, lowering the carbon footprint of the process. Additionally, this shift to digital formats can promote the optimized use of resources, minimizing needless expenses and promoting the inclusion of wider groups of participants in these processes.

There is no doubt that, going forward, participatory action research will be different from what it was before COVID-19. After the recent development and popularization of online tools, PAR researchers will have more avenues to employ hybrid systems as opposed to the strictly face-to-face formats that existed before the pandemic and the strictly virtual formats that were often the norm during the pandemic. This added flexibility, acquired know-how, and widespread acceptance of these methods and utilities will be a benefit to PAR and several other fields going forward.

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Appendix A

Table A1. List of academic papers assessed in the literature review.

Authors	Title	Year	Source Title
Ravalier J.M., Wainwright E., Smyth N., Claburn O., Wegrzynek P., Loon M. [63]	Co-creating and evaluating an app-based well-being intervention: The how (healthier outcomes at work) social work project	2020	International Journal of Environmental Research and Public Health
Valdez E.S., Gubrium A. [31]	Shifting to Virtual CBPR Protocols in the Time of Corona Virus/COVID-19	2020	International Journal of Qualitative Methods
Banks S., von Köppen M. [38]	Ethical Issues for Practice and Research in Congregate Settings During the COVID-19 Pandemic: Cases and Commentaries	2021	Ethics and Social Welfare
Call-Cummings M., Hauber-Özer M. [37]	Virtual photovoice: Methodological lessons and cautions	2021	Qualitative Report
Cohen M., Karrington B., Trachtman H., Salas-Humara C. [54]	Allostatic stress and inflammatory biomarkers in transgender and gender expansive youth: Protocol for a pilot cohort study	2021	JMIR Research Protocols
Guy B., Arthur B. [43]	Impact of COVID-19 on a Participatory Action Research Project: Group-Level Assessments With Undergraduate Women in Engineering	2021	Journal of Higher Education Outreach and Engagement
Hartman E.A.R., Groen W.G., Heltveit-Olsen S.R., Lindbaek M., Høye S., Sundvall P.-D., Gunnarsson R., Skoglund I., Snaebjörnsson Arnjots E., Godycki-Cwirko M., Kowalczyk A., Platteel T.N., Zuihthoff N.P.A., Monnier A.A., Verheij T.J.M., Hertogh C.M.P.M., Van De Pol A.C. [50]	Multifaceted antibiotic stewardship intervention using a participatory-action-research approach to improve antibiotic prescribing for urinary tract infections in frail elderly (ImpresU): Study protocol for a European qualitative study followed by a pragmatic cluster randomised controlled trial	2021	BMJ Open
Karavas E., Iakovou M., Mitsikopoulou B. [35]	Responding to the Challenges of Adult Refugee Language Education through Action Research	2021	International Journal of Learner Diversity and Identities
Maycock M., Dickson G. [64]	Analysing the views of people in custody about the management of the COVID-19 pandemic in the Scottish Prison Estate	2021	International Journal of Prisoner Health
Nauen C.E., Arraes Treffner M.F. [53]	Translating SSF Guidelines Into Practice With the Small-Scale Fisheries Academy	2021	Frontiers in Marine Science
Porter G., Murphy E., Adamu F., Dayil P.B., De Lannoy A., Han S., Mansour H., Dungey C., Ahmad H., Maskiti B., S C., Van der Weidje K. [65]	Women's mobility and transport in the peripheries of three African cities: Reflecting on early impacts of COVID-19	2021	Transport Policy
Salma J., Giri D. [57]	Engaging Immigrant and Racialized Communities in Community-Based Participatory Research During the COVID-19 Pandemic: Challenges and Opportunities	2021	International Journal of Qualitative Methods
Adesanya L.O., Graham M.A. [46]	Effective communication of learning intentions and success criteria in the mathematics classroom: MERLO pedagogy for Senior Phase South African schools	2022	Pythagoras
Auerbach J., Muñoz S., Affiah U., Barrera de la Torre G., Börner S., Cho H., Cofield R., DiEnno C.M., Graddy-Lovelace G., Klassen S., Limeberry V., Morse A., Natarajan L., Walsh E.A. [16]	Displacement of the Scholar? Participatory Action Research Under COVID-19	2022	Frontiers in Sustainable Food Systems
Brydon-Miller M., Williams B., Aguja S., Blumrich M., De Sousa L., Dzerefos C., Kolb B., Marimbe L., Muller I., Pillar G., Prudente M., Rabin S., Rauch C., Rauch F., Way A. [36]	Creating a virtual space for collaborative project planning using the future creating workshop process: building the global climate change education initiative	2022	Educational Action Research
De Marchi B., Ficorilli A., Biggeri A. [62]	Research is in the air in Valle del Serchio	2022	Futures
Eaton A.D., Hui J., Muchenje M., Murzin K., Chan Carusone S., Ibáñez-Carrasco F., Novik N., McCullagh J.W., Nicolay S., Walmsley S.L. [66]	Adapting Cognitive Remediation Group Therapy as an Online or Hybrid Intervention for People Aging With HIV and Cognitive Concerns: Focus Group Protocol	2022	International Journal of Qualitative Methods
Félix G.F., Sanfiorenzo A. [60]	Learning Agroecology Online During COVID-19	2022	Frontiers in Sustainable Food Systems
Grace K., Klaassens B., Bray L., Elton-Pym A. [44]	An Open-Ended Blended Approach to Teaching Interaction Designers to Code	2022	Frontiers in Computer Science
Habermann B., Crane T.A., Gichuki L., Worku T., Mugumya R., Maiyo N., Kiptoo E., Goshme S., Mohammednur F., Tugume G., Satia K.A., Siamito J.R. [48]	The Art of Letting Go: Transforming Participatory Research on Adaptation Practices Among Local Livestock-Keepers in East Africa in Times of COVID-19	2022	Frontiers in Sustainable Food Systems
Jahangir, T., Lucas, D., Lemon, E., Ogbeide, I., Latimer, S., Bates, A., Adams, A., Renfro, T. L., Woods-Jaeger, B. [49]	Implementing Photovoice Online to Promote Critical Consciousness, Agency, and Action Among Black Youth During a Pandemic	2022	Journal of Participatory Research Methods
Kodura M. [40]	Evaluating the effectiveness of an online course in translation technology originally developed for a classroom environment	2022	Interpreter and Translator Trainer
Kramarova P., Stowell F., Ries J. [32]	A soft systems inquiry into the notion of 'food deserts' during the COVID-19 pandemic	2022	Systems Research and Behavioral Science
LeMasters, K., Maragh-Bass, A., Stoner, M., Bhushan, N., Mitchell, J., Riggins, L., Lightfoot, A. [58]	Lessons Learned from Conducting Community-Based Research on HIV Prevention with Youth During COVID-19	2022	Journal of Participatory Research Methods

Table A1. Cont.

Authors	Title	Year	Source Title
Loukes K.A., Anderson S., Beady J., Rondeau M.C., Robidoux M.A. [51]	Wapekeka's COVID-19 Response: A Local Response to a Global Pandemic	2022	International Journal of Environmental Research and Public Health
MacLellan J., Turnbull J., Pope C. [52]	Infrastructure challenges to doing health research "where populations with the most disease live" in Covid times—a response to Rai et al. (2021)	2022	BMC Medical Research Methodology
Madden, D. A., Ghebretinsae, T., Hoque, T., Mohammad, A., Alghader, M., Craven, C. K., Arniella, G., Cortez-Weir, J., Rose, B., Mayer, V., Horowitz, C. R., Vangeepuram, N. [45]	Going Virtual: Building Online Collaborations to Understand COVID-19's Psychosocial Impacts on New York City Adults	2022	Journal of Participatory Research Methods
Mahadew A., Hlalele D. [33]	Challenging Gender Certainties in Early Childhood Care and Education: A Participatory Action Learning and Action Research Study	2022	Educational Research for Social Change
Mahadew A., Hlalele D.J. [34]	Understanding inclusion in early childhood care and education: A participatory action learning and action research study	2022	South African Journal of Childhood Education
Manderscheid M., Fiala V., Edwards F., Freyer B., Säumel I. [30]	Let's Do It Online?! Challenges and Lessons for Inclusive Virtual Participation	2022	Frontiers in Sustainable Food Systems
McKinnon K., Hill A., Appel M., Hill D., Caffery J., Pamphilon B. [47]	Reflections on Reconfiguring Methods During COVID-19: Lessons in Trust, Partnership, and Care	2022	Frontiers in Sustainable Food Systems
Medina-García C., Nagarajan S., Van den Broeck P. [29]	The Leuven Gymkhana: Transdisciplinary Action Research Questioning Socially Innovative Multi-Actor Collaborations in COVID Times	2022	Frontiers in Sustainable Food Systems
Rivera, A., Okubo, Y., Harden, R., Wang, H., Schlehofer, M. [39]	Conducting Virtual Youth-Led Participatory Action Research (YPAR) During the COVID-19 Pandemic.	2022	Journal of Participatory Research Methods
Saeed S. [10]	Online action research in the Maldives amidst the COVID-19 pandemic: Unexpected challenges	2022	Waikato Journal of Education
Swinson J., Henderson G. [55]	Analysing the attitude and opinions of a 'difficult' year group in a secondary school	2022	Pastoral Care in Education
To P.D.N., Huynh J., Wu J.T.-C., Vo Dang T., Lee C., Tanjasiri S.P. [67]	Through Our Eyes, Hear Our Stories: A Virtual Photovoice Project to Document and Archive Asian American and Pacific Islander Community Experiences During COVID-19	2022	Health Promotion Practice
Verstraeten H.M.F., Ziyian C., Gerritsen D.L., Huijsman R., Nakanishi M., Smalbrugge M., Van der Steen J.T., Zuidema S.U., Achterberg W.P., Bakker T.J.E.M. [56]	Implementing a Personalized Integrated Stepped-Care Method (STIP-Method) to Prevent and Treat Neuropsychiatric Symptoms in Persons With Dementia in Nursing Homes: Protocol for a Mixed Methods Study	2022	JMIR Research Protocols
Walker A.P.P., Sanga N., Benson O.G., Yoshihama M., Routt I. [61]	Participatory Action Research in Times of Coronavirus Disease 2019: Adapting Approaches with Refugee-Led Community-Based Organizations	2022	Progress in Community Health Partnerships: Research, Education, and Action

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