

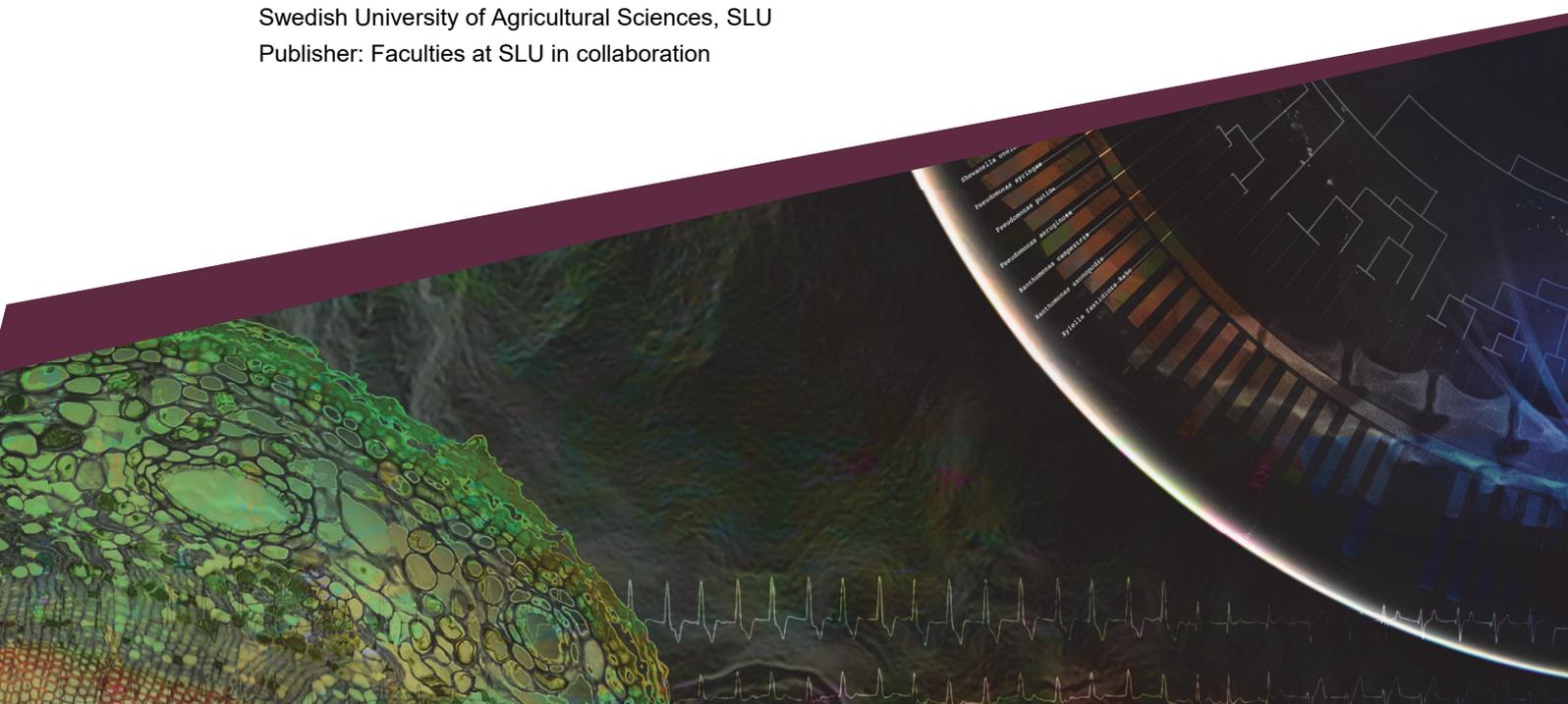


Digital solutions replacing academic travel during the corona pandemic – what can we learn?

A mixed methods study of experiences at SLU

Hanna Smidvik, Emil Planting Mollaoglu, Emma Bergeling and Felicia Olsson

Swedish University of Agricultural Sciences, SLU
Publisher: Faculties at SLU in collaboration



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Errata for Digital solutions replacing academic travel during the corona pandemic – what can we learn?

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- Page 4 Location: Second bullet
Is now: Our quantitative findings illustrate that people’s
work and research either has been mainly
positively affected, equal parts positively and
negatively affected or not affected at all by not
being able to travel.
Should be: An overwhelming majority of the survey
respondents (83% and 72% respectively) reported
that their work in general and research in particular
either had been mainly positively affected, equal
parts positively and negatively affected, or not
affected at all by them not being able to travel.
- Page 4 Location: Fifth bullet
Is now: The study recommends a better mix between
digital and physical meetings in a post-corona
context.
Should be: The study recommends a more thought-through
mix between digital and physical meetings, with a
greater share of digital meetings, in a post-corona
context.
- Page 6 Location: Andra punkten
Is now: Våra kvantitativa resultat visar att människors
arbete och forskning antingen har påverkats
huvudsakligen positivt, lika delar positivt och

negativt påverkat eller inte alls påverkats av att inte kunna resa.

Should be: En överväldigande majoritet av respondenterna (83% respektive 72%) rapporterade att deras arbete i allmänhet och forskning specifikt hade påverkats antingen huvudsakligen positivt, lika delar positivt och negativt, eller inte påverkats alls av att de inte kunnat resa.

Page 6

Location: Femte punkten

Is now: Studien föreslår en bättre blandning mellan digitala och fysiska möten i en postcorona-kontext.

Should be: Studien föreslår en mer genomtänkt blandning mellan digitala och fysiska möten, med en större andel digitala möten, i en postcorona-kontext.

Page 62

Location: Last sentence in first section

Is now: Our quantitative findings illustrate that people's work and research either has been mainly positively affected, equal parts positively and negatively affected or not affected at all by not being able to travel.

Should be: Our quantitative findings illustrate that an overwhelming majority of the respondents thought that their work and research either had been mainly positively affected, equal parts positively and negatively affected, or not affected at all by them not being able to travel.

Summary

During the spring of 2020, the corona pandemic created an entirely new context for university employees to work within. In a matter of weeks, it became customary to replace physical meetings with digital alternatives whenever possible. Conferences, seminars, meetings and doctoral thesis defences – among other activities – were moved to digital platforms. Meanwhile, many activities were either postponed or cancelled. The crisis resulted in a vast decrease in air travel and significantly reduced physical mobility.

Increased digitalisation and reduced emissions from aviation were central to SLU's policies and strategies prior to the corona pandemic. A part of SLU's ambition of becoming a climate-neutral university by 2027 is to significantly reduce emissions from business trips and, since 2016, SLU is requested by the Swedish government to increase the share of digital and travel free meetings. SLU is also developing a new strategy for 2021-2025. A better understanding of the implications of increased digitalisation is highly relevant in this work.

This study aims to provide a better understanding of how SLU staff members experienced the drastic reduction in travel and the increased use of digital solutions during the spring of 2020. We also want to shed light on what types of activities – that originally were intended to include a business trip – could be replaced by a digital alternative with maintained or improved quality and what activities that on the contrary were difficult or impossible to carry out using a digital alternative.

In order to fulfil our aims, we conducted a mixed-methods study based on semi-structured interviews and an online survey. The results from the survey indicate that a majority (83%) of the respondents have experienced that their *work in general* was either mainly positively affected, equal parts negatively and positively affected, or not affected at all by the decrease in business travel and increase in digital meetings. The respondents also painted a picture as to what activities that can work well and what activities that will be difficult to perform digitally *after* the corona crisis. Fieldwork stood out as the least suitable activity to perform digitally, as 60% of the respondents could imagine replacing 0% or 0-25% of the fieldwork with digital solutions. What stood out on the opposite side was that a vast majority thought that between 50-100% of project meetings, administrative meetings and seminars could be replaced with digital options. As for workshops, conferences, and reviews and presentation of research, the opinions varied much more. These findings also resonate with the experiences that were brought up in the interviews.

Some of the main findings in the interviews was that digital meetings were perceived as more efficient, but that they lacked in terms of social and creative aspects. Furthermore, informants largely agreed that brainstorming, spontaneous discussions and forming of new relationships was harder to achieve digitally. On the other hand, well-structured interactions with a clear agenda between people that had previously met in person worked excellent on digital platforms. Many informants expressed that they were surprised regarding how well the digital meetings had worked and pointed to the many benefits of replacing travel with digital solutions in terms of increased equality, accessibility, efficiency, reduced stress and reduced emissions.

Looking forward, participants talked about a better mix of digital and physical activities. Many believed that some activities – for example establishing new relationships and performing fieldwork – to a larger extent than other activities require travel for maintained quality. Other types of activities – such as administrative meetings, project meetings, seminars and presentations – were considered possible to replace with digital solutions to a higher degree with maintained, or even enhanced, quality of work and life.

The study concludes:

- A majority of the SLU employees that participated in our study reported that it in general had worked well to replace longer business trips with digital alternatives during the spring of 2020.
- Our quantitative findings illustrate that people's work and research either has been mainly positively affected, equal parts positively and negatively affected or not affected at all by not being able to travel.
- Certain types of fieldwork and data collection, as well as activities requiring spontaneous discussions and networking were experienced as the most difficult to perform digitally.
- Well-structured interactions with a clear agenda and people that had previously met in person, as well as activities such as administrative meetings, project meetings and seminars, were perceived as most suited to perform digitally.
- The study recommends a better mix between digital and physical meetings in a post-corona context. SLU should strategically make use of digital solutions and replace longer business trips to improve the work situation of the employees, the quality of their work in addition to reducing GHG emissions.

Keywords: digital meetings, academic traveling, academic exchange, travel policy, corona pandemic, climate change, emissions reduction, business trips, Covid-19

Sammanfattning

Under våren 2020 skapade coronapandemin en helt ny kontext för universitetsanställda att arbeta inom. Det blev inom loppet av några veckor rutin att ersätta fysiska möten med digitala alternativ när så var möjligt. Konferenser, seminarier, möten och disputationer – bland många andra aktiviteter – flyttades till digitala plattformar. Samtidigt sköts många aktiviteter upp, medan andra ställdes in. På det hela taget resulterade krisen i en kraftig minskning av flygresor och fysisk mobilitet.

Ökad digitalisering och minskade utsläpp från flyg var centralt i SLUs policys och strategier redan innan coronapandemin. En del av SLUs ambition att bli ett klimatneutralt universitet till 2027 är att markant minska utsläppen från tjänsteresor och sedan 2016 har SLU i uppdrag från regeringen att öka andelen digitala och resfria möten. Vidare är SLU i färd med att utveckla en ny strategi för 2021-2025. En bättre förståelse för konsekvenserna av ökad digitalisering är högst relevant i detta arbete.

Denna studie syftar just till att ge en bättre förståelse för SLU-ansälldas upplevelse av den drastiska minskningen av tjänsteresor och ökade användningen av digitala alternativ som ägde rum under våren 2020. Vi ämnar också synliggöra vilka typer av aktiviteter – som ursprungligen skulle inneburit en längre tjänsteresa – som kunnat ersättas med digitala alternativ med bibehållen eller förbättrad kvalitet, samt vilka aktiviteter som i motsats var svåra eller omöjliga att genomföra digitalt.

För att fullfölja studiens syfte genomförde vi en flermetodsstudie med semistrukturerade intervjuer samt en online-enkät. Enkätresultaten indikerar att en majoritet av respondenterna (83%) upplevde att deras arbete generellt antingen påverkats huvudsakligen positivt, lika delar negativt och positivt eller inte påverkats alls av minskningen i tjänsteresor och ökningen i digitala möten. Respondenterna gav en bild av vilka aktiviteter de ansåg kan fungera bra och mindre bra att genomföra digitalt även efter coronakrisen. Här stod fältarbete ut som den minst lämpade aktiviteten, då 60% av respondenterna kunde tänka sig att genomföra 0% eller 0–25% av framtida fältarbeten digitalt. I kontrast till detta stod projektmöten, administrativa möten och seminarier ut, då en klar majoritet ansåg att mellan 50–100% av nämnda aktiviteter kunde bytas ut med digitala alternativ. Vad gäller workshops, konferenser samt granskning och framläggning av forskning varierade åsikterna mer. Dessa resultat återspeglar även vad som framkom i intervjuerna.

Några huvudresultat från intervjuerna var att digitala mötesformat var mer effektiva men hade brister gällande sociala och kreativa aspekter. Vidare uttryckte en stor del av informanterna att brainstorming, spontana diskussioner och skapandet av nya relationer var svårare att åstadkomma digitalt. Å andra sidan fungerade välstrukturerade interaktioner med en tydlig agenda mellan personer som tidigare hade träffat varandra utmärkt via digitala plattformar. Flertalet informanter uttryckte förvåning över hur bra digitala mötesformat hade fungerat, och pekade på de många fördelar som följer av att ersätta tjänsteresor med digitala lösningar vad gäller jämlikhet, tillgänglighet, effektivitet, minskad stress och minskade utsläpp.

Vad gäller framtiden pratade deltagare i studien om att få till en bättre kombination av digitala och fysiska aktiviteter. Många ansåg att vissa aktiviteter – som exempelvis etablerande av nya relationer samt fältarbete – i större utsträckning än andra aktiviteter kräver resor för bibehållen kvalitet. Andra typer av aktiviteter – såsom administrativa möten, projektmöten, seminarier och presentationer – ansågs i högre grad kunna bytas ut med digitala lösningar med bibehållen eller till och med förbättrad, arbets- och livskvalitet.

Slutligen konstaterar studien följande:

- En majoritet av de SLU-anställda som deltog i vår studie rapporterade att det generellt hade fungerat bra att ersätta längre tjänsteresor med digitala alternativ under våren 2020.
- Våra kvantitativa resultat visar att människors arbete och forskning antingen har påverkats huvudsakligen positivt, lika delar positivt och negativt påverkat eller inte alls påverkats av att inte kunna resa.
- Vissa typer av fältarbete och datainsamling, liksom aktiviteter som kräver spontana diskussioner och nätverkande, upplevdes som svårast att genomföra digitalt.
- Välstrukturerade interaktioner med tydlig agenda mellan personer som tidigare träffats, liksom aktiviteter såsom administrativa möten, projektmöten och seminarier ansågs fungera bäst att genomföra digitalt.
- Studien föreslår en bättre blandning mellan digitala och fysiska möten i en post-corona-kontext. SLU bör strategiskt använda digitala möten och ersätta längre tjänsteresor för att förbättra de anställdas arbetssituation, kvaliteten på deras arbete samt för att minska universitetets växthusgasutsläpp.

Nyckelord: digitala möten, akademiskt resande, akademiskt utbyte, resepolicy, coronapandemin, klimatförändringar, utsläppsminskning, tjänsteresor, Covid-19

Preface

The project has been carried out by four students from different academic disciplines at SLU, and all four of us have put equal amounts of thought, time and energy into the report. We have been supervised by the Environmental Manager at SLU and an Associate Senior Lecturer at the Department of Energy and Technology. Support was also provided by the heads of departments at the funding departments. Thank you for all the help and valuable input. We also want to direct a warm thank you to all the staff members that participated in the interviews and completed the survey, and to everyone who in different ways have helped and encouraged us. Last but not least, we want to thank the Climate Group at SLU for coming up with the idea of this study.

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Abbreviations

SLU	Swedish University of Agricultural Sciences
GHG	Greenhouse gas
HEI	Higher Education Institution

1. Introduction

The corona pandemic's effects on travels created an entirely new context for university employees to work within during the spring of 2020. Conferences, project meetings and doctoral thesis defences – amongst many other common academic activities which usually involves business trips – were moved to digital platforms. Travel free meetings and gatherings that rarely were considered prior to the spring of 2020 became custom. Meanwhile, other activities were postponed or cancelled. Altogether, the situation resulted in a vast decrease in business trips, a corresponding decrease in greenhouse gas (GHG) emissions, and a significant increase in the use of digital solutions. In discussions on how to reduce higher education institutions' negative climate impact without compromising the productivity and quality of research, an important question is: *What academic business trips can be replaced by digital alternatives, with maintained quality?* The spring of 2020 presented us with an unexpected opportunity to seek an answer to that question.

1.1. Background

The topic of academia's GHG emissions in general and academic aviation in particular has in recent years been the focus of a growing number of publications in scientific journals as well as in mainstream media. This should be understood against a backdrop of a variety of factors and insights. For one, the presence of the climate crisis itself, i.e. a steadily rising global mean temperature, a growing body of literature on and experiences of the subsequent societal and ecological impacts (IPCC, 2018; NOAA, 2018; 2020), and a rapidly dwindling global carbon budget for keeping global temperatures in accordance with the Paris Agreement (Anderson et al. 2020). Second, the notion of aviation as one of the fastest growing sources of GHG pollution in recent decades (Bows-Larkin et al. 2016), characterised by a slow technological development unlikely to offset growth in demand (Bows-Larkin and Anderson, 2013). And third, the recognition of academic researchers as both among the highest emitters (Le Quéré et al. 2015) as well as potential leaders in a transition to a low carbon society, if combining advocacy with changes in their own emission habits (Nordhagen et al. 2014).

The large carbon footprints of researchers are primarily the result of emissions from flying to conferences, project meetings, and fieldwork (Le Quéré et al., 2015). Furthermore, in recent decades, mobility of students and staff within the higher education sector has been highly promoted as a result of institutional discourses favouring internationalisation (Ackers, 2008). To miss out on opportunities for research or networking may reduce an academic's ability to collaborate, to publish high-impact research, or to maintain visibility in a field in order to be frequently cited (Storme et al. 2013). However, it should be questioned and further investigated to what extent professional success of individual academics is related to frequent travels. A recently published study investigated the relationship between air travel emissions and metrics of academic productivity and found none (Wynes et al. 2019). Moreover, in regards to publishing high-impact research, studies have shown that simply informing about an issue unlikely leads to advocated changes, due to the value-action gap (Nordhagen et al. 2014), and in a more specific case, that the size of a climate researcher's carbon footprint affects their credibility in the eyes of the public (Attari et al. 2016). In regards to how emissions could be lowered, beyond the alternatives at hand for the individual researcher (to simply not travel or to choose a mode of transportation with lower emissions), life cycle assessment studies have shown that replacing physical conferences and meetings with digital solutions significantly could reduce the total carbon footprint of science (Achten et al. 2013; Borggren et al. 2013).

If some physical academic activities and events are to be replaced with digital solutions, the question of what academic business trips that can be replaced by digital solutions with maintained quality becomes central. In seeking the answer to this question, university employees' experiences from the period with a travel ban during the spring of 2020 are highly valuable. While several discussion pieces, insight reports, and smaller studies have been undertaken and published since the travel restrictions were imposed (Bidmon et al. 2020; Schwartz et al. 2020; ResearchGate, 2020), to the best of our knowledge no comprehensive in-depth studies on the matter have been conducted thus far.

The immediate context for this study is the Swedish University of Agricultural Sciences (SLU) and its employees. SLU is an internationally prominent university with campuses located between Alnarp in the south of Sweden to Umeå in the north. After accomplishing its goals for reduced GHG emissions from business trips in 2019 (SLU, 2020a), SLU is now in the process of deciding on new and sharper environmental goals. Moreover, as of the end of 2019, SLU is working to develop a new strategy for the period of 2021-2025. The strategy constitutes three focus areas, namely: 1) SLU's next step towards sustainability, 2) the Digital SLU and 3) One SLU. The overall objectives for the focus areas respectively are: 1) "*SLU is perceived as the leading University in Sweden for conversion to a sustainable*

society” 2) “*SLU uses digital development as an opportunity for increased quality in education, research and environmental monitoring and assessment*” and 3) “*A stronger common image of SLU internally and externally*” (SLU, 2020b). Studying the potential for digital meetings to replace physical ones that include longer business trips is of clear relevance for all three focus areas.

SLU is far from the only university working to reduce its GHG emissions and accelerate its digitalisation. In 2019, the government sharpened the requirements for Higher Education Institutions (HEIs) to reduce GHG emissions from their operations (The Swedish Government, 2019). During the same year, 37 universities, including SLU, signed the Climate Framework, thereby committing to implement measures in order to achieve emissions in line with the 1.5-degree target by 2030 (KTH, 2020). Business trips constitute one of universities’ largest source of GHG emissions (Swedish Environmental Protection Agency, 2020) and reducing emissions from this source is therefore crucial in order to meet the government's directive and reach the target of the Climate Framework.

Digital meetings, or travel free meetings, was already an important component in the ongoing digitalisation of Swedish agencies prior to the corona crisis (REMM, u.å. a). In addition to reducing the environmental impact, travel free meetings can contribute to better finances, more efficient operations and more harmonious employees (Arnfolk et al. 2010). Since 2011, the Swedish Transport Administration has been working to develop the usage of digital meetings within and between agencies through a project called REMM (Virtual Meetings in Public Agencies). Agencies that participated in the REMM project 2011-2019 decreased their carbon dioxide emissions from business trips with 23 percent per employee on average. The corresponding number for non-participating agencies was eight percent (Swedish Environmental Protection Agency, 2020). As of 2016, over 30 of the Swedish HEIs, including SLU, are through their appropriation directions commissioned to work according to the REMM method (REMM, u.å. b).

SLU provides many different tools for digital solutions today. On their staff website you can find plenty of support pages for which tool to use for specific activities and how to use them. SLU recommends staff to use the video communications platforms Microsoft Teams and Skype for Business for video meetings and Zoom for digital teaching and for students to use. They also provide computers, licenced deals, virtual application hosting, VPN services for working off campus, support both on and off campus and have a number of video conference rooms at different campuses (SLU 2020c).

This study is aimed at understanding SLU employees’ experiences of reduced business travel and increased use of digital alternatives during the spring of 2020.

In spite of the corona pandemic's horrendous effects, the employees' experiences are valuable to better understand some of the challenges faced by academia. More specifically, these experiences offer valuable insights to all three of the focus areas in SLU's forthcoming strategy. Regarding the wider discussion on researchers' frequent flying and its effects on the environment, this study seeks to pick up where the criticism of academic aviation leaves off by offering a glance at present and future alternatives and solutions.

1.2. Research purpose and questions

The study aimed to explore how SLU employees have experienced changes in their work related to digital solutions replacing business trips during the spring of 2020 and what type of business trips they think can be replaced by digital meetings in the future. To meet the aim of the study, we sought answers to the following research questions:

- How have SLU employees experienced the travel ban and the increased use of digital solutions during the spring of 2020?
- What type of activities that were intended to include a business trip have worked better, well, well enough or not at all to replace with a digital solution?
- What activities could be replaced with digital alternatives after the spring of 2020, and to what extent?
- What would facilitate a continued use of digital solutions that replace business trips?

2. Methods and definitions

The study is a mixed-methods study consisting of both qualitative and quantitative methods, namely semi-structured interviews in combination with an online survey. When compiling the results of the study, the survey constituted the quantitative foundation for conclusions and lessons learned, while the interviews served as a qualitative complement – providing a base for in-depth understanding of the reasoning behind the survey responses.

2.1. Semi-structured interviews

During the period of June 9th to June 18th, we used Zoom to interview 25 academic staff members at different positions (see Table 1) and departments of SLU. The informants were either based in Alnarp, Skara, Ultuna, or Umeå. Academic staff from two social science departments and four natural science departments were interviewed. Initially, we got suggestions for informants from the heads of departments that funded this study. Later on, we used the snowball method, asking our informants if they had suggestions on who to talk to next – preferably someone they thought had different experiences and thoughts regarding the research topic than themselves. 12 women and 13 men were interviewed.

Table 1. Overview of the number of different academic staff members interviewed in this study.

Work title	Number of informants
Professor	6
Head of department	1
Senior lecturer	2
Researcher	9
Associate professor	2
Postdocs	2
PhD-students	3
Total	25

The interviews centred on the informants' experiences of digital meetings and reduced business travels during the period with travel restrictions. We wanted to make sure that we had interviewed staff with different ideas about the importance of reducing the university's emissions from business travel. Therefore, we choose to ask control questions at the end of the interviews about the informants view on climate and environmental issues – related both to their professional as well as their private commitments.

2.2. Survey

The survey questions were developed in collaboration with the organisation Sustainable Development Solutions Network (SDSN) Northern Europe and scientists from 8 higher education institutions around Sweden, namely Chalmers, KI, LTU, Örebro, LU, KTH, GU and UU. The questions were partially based on insights gained from the interviews conducted with employees at SLU. The aim of the collaboration was to create a common set of survey questions in order to get comparative results from several universities. The other universities within the collaboration aim to send out the survey during the fall of 2020.

The survey was uploaded to Netigate by the service manager at the Faculty of Landscape Architecture, Horticulture and Crop Production Science (LTV) at SLU. It was then sent to 902 academic and administrative staff members at Department of Urban and Rural Development, Department of Ecology, Department of Soil and Environment, Department of Work Science, Business Economics and Environmental Psychology, Department of Forest Ecology and Management, Department of Energy and Technology, Department of Molecular Sciences, Department of Animal Nutrition and Management, Department of Animal Breeding and Genetics, located in Alnarp, Skara, Ultuna and Umeå. The survey was open for 48 days between June 26th and August 12th. 260 respondents started the survey and 225 respondents finished it. The respondents were informed that by business trips, we meant all types of business trips longer than 300 km and that the time period regarded the duration from when the travel restrictions were introduced until the point in time when they answered the survey. The full set of survey questions can be found in Appendix 1 and the interview guide is provided in Appendix 2.

2.3. Definitions and scope

The scope of this study is limited to investigate digital solutions replacing physical ones that were intended to include a business trip longer than 300 km. Given this

limitation, the digitalisation of courses and lectures that normally are held at SLU, digital version of e.g. departmental meetings, as well as informal coffee chats in the corridors at one's regular workplace lie outside the scope of this study. In order to understand what type of academic activities that require business trips, we asked the interviewees about what types of trips they usually do, and for what purposes. The activities that were identified are summarised in Table 2 below.

Table 2. Summary of common academic activities and related examples of digital formats. Own processing of Schwartz et al. (2020).

Activity	Main characteristics	Digital formats and tools
Seminar	Highly formal interaction from one or a few speakers to a few attendants	Webinar, video-streaming
Workshop	Formal interaction with inputs to and from a few participants. Diverse formats, often aimed at active engagement	Video-streaming, web-based text processors, online facilitation tools
Project meetings	Formal interaction among a few participants	Video-streaming, web-based text processors, web-based project organization and communication tools
Conference (research and others)	Highly formal and informal interaction. Combines multiple formats, typically involving tens to thousands of participants	Video-streaming, online facilitation tools, web-based event tools
Administrative meetings	Formal interaction among a few participants. Highly structured and with a clear agenda.	Video-streaming, web-based text processors, web-based organization and communication tools
Review/presentation of research	Formal interaction with a clear structure. Questions and feedback from participants.	Video-streaming, web-based text processors, online facilitation tools
Fieldwork	Can be with or without interaction. Differs between natural and social science. Examples are field trials and sampling, interviews, farm visits, and lab work at other facilities than one's home university	For example, interviews via video-streaming or telephone. Sampling sent by post. Field visits through video streaming.

Furthermore, we would like to stress that the special circumstances surrounding the spring of 2020 have led to *other* changes in our informants' work situations apart from not being able to travel. These are changes that, while not necessarily concerning cancelled business trips or new digital solutions, have shaped the SLU

employees' overall experiences and hence influenced the results. For example, the conversations often touched upon experiences of working from home. Although the informants' experiences and thoughts about working from home are not the focus of this study, they are still important to recognise in order to understand within what context the informants have experienced the decline in business trips and related increase in digital meetings. In a scenario where policies rather than a pandemic would generate a reduction in academic travel and an increased use of digital solutions, informal meetings and other social aspects of work at the regular workplace would not be affected. The implications of this is further discussed in chapter 5.

Finally, the term *quality* requires some attention. We did not define the term 'quality' prior to the interviews. Instead we identified different aspects of 'quality' based on our informants' responses, in which they largely related experiences of digital solutions to experiences of physical counterparts.

3. Results and analysis of the survey

The results of the survey questions are presented in five sections below. The first section introduces the respondents. The following two sections present results from survey questions regarding how the reduced number of business trips and increased number of digital interactions have affected the respondents' work, how much of their work that was replaced by digital alternatives and how those alternatives worked. The two final sections present results from questions regarding the future, namely: what would facilitate a continued use of digital meetings and what kinds of academic activities that could be replaced by digital alternatives after the corona pandemic, and to what extent?

3.1. About the respondents

The number of respondents on every question varies between the number of respondents initiating the survey (260) and the number of respondents completing the survey (225), which gives a response rate of between 25% to 30%. A majority of the respondents (55%) were female, while 43% were male. In addition, 2% were nonbinary, did not want to answer or were unsure. Age and titles are displayed in the diagrams in Figure 1.

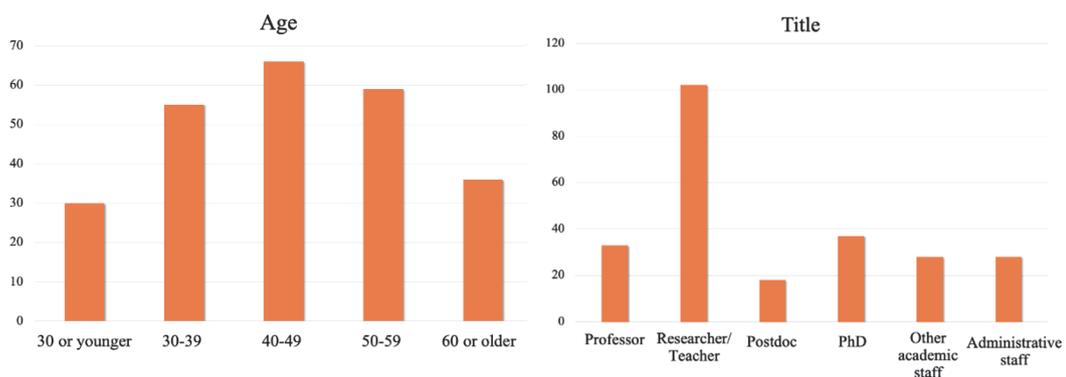


Figure 1. Age (left) and title (right) of the respondents.

3.2. Effects on work in general and research in particular

The following section illustrates the survey results regarding experienced effects of reduced business trips and increased digital meetings on the respondents' work in general and on their research in particular.

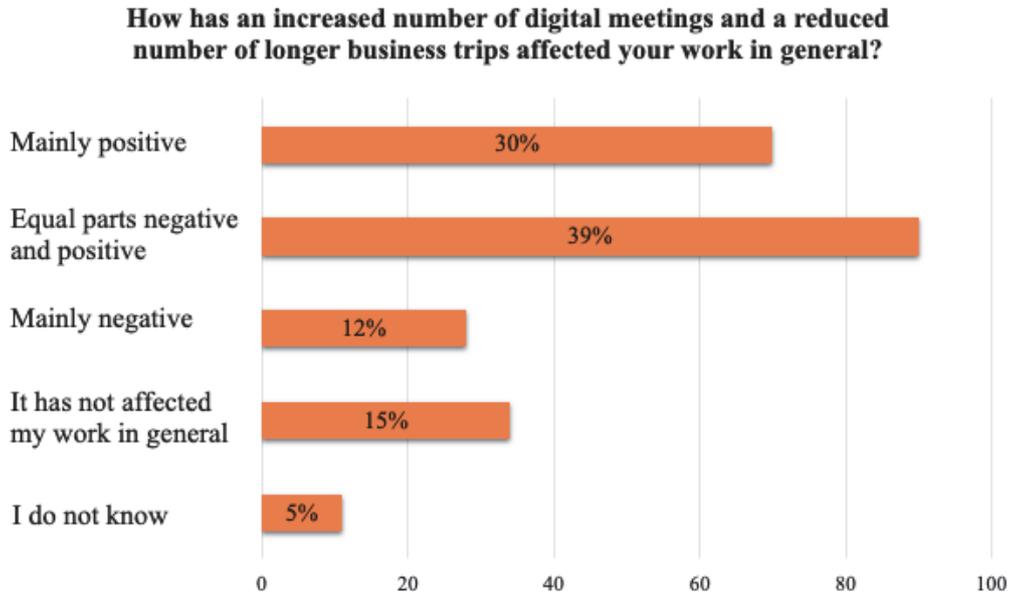


Figure 2. Effects on work in general.

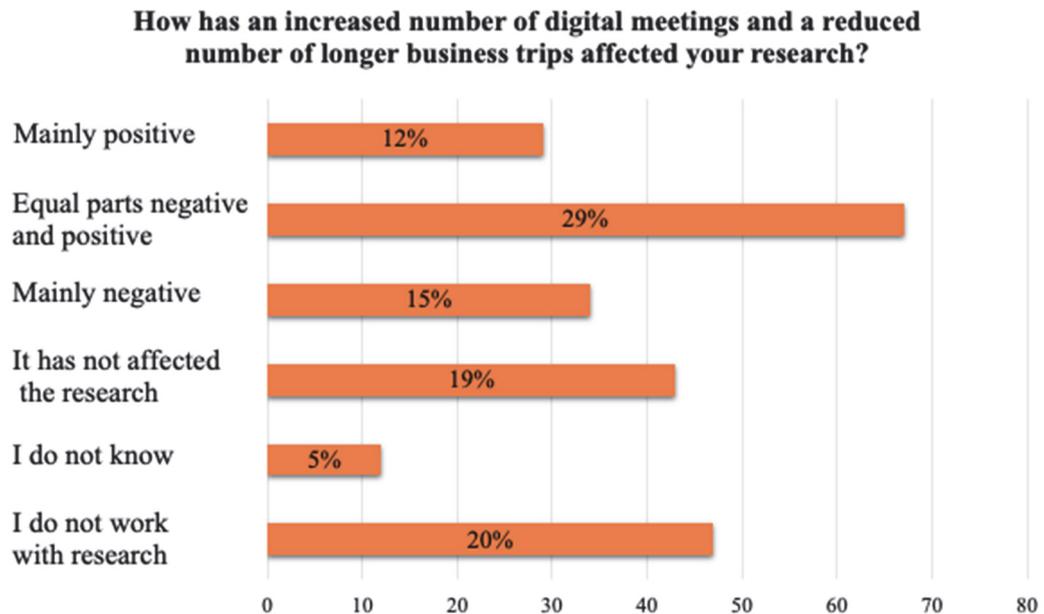


Figure 3. Effects on research in particular.

The question in Figure 2, was answered by 233 respondents while 232 answered the question in Figure 3. The result in Figure 2 shows that a majority of the respondents (83%) experienced that their work in general had been either mainly positively affected, equal parts positively and negatively affected, or not affected at all by the increased use of digital solutions and reduced number of longer business trips. In Figure 3, we asked how the respondents' research had been affected. In this question, 20% answered that they did not work with research. Of the respondents working with research, 75% reported that their research had been either mainly positively affected, equal parts positively and negatively affected, or not affected at all by the increased use of digital solutions and reduced number of longer business trips.

The survey had three questions aimed specifically at researchers (see Figure 3, 4 and 5). To learn more about how our respondents' research had been negatively and positively affected, we provided different alternatives to choose from based on aspects that recurred in the interviews.

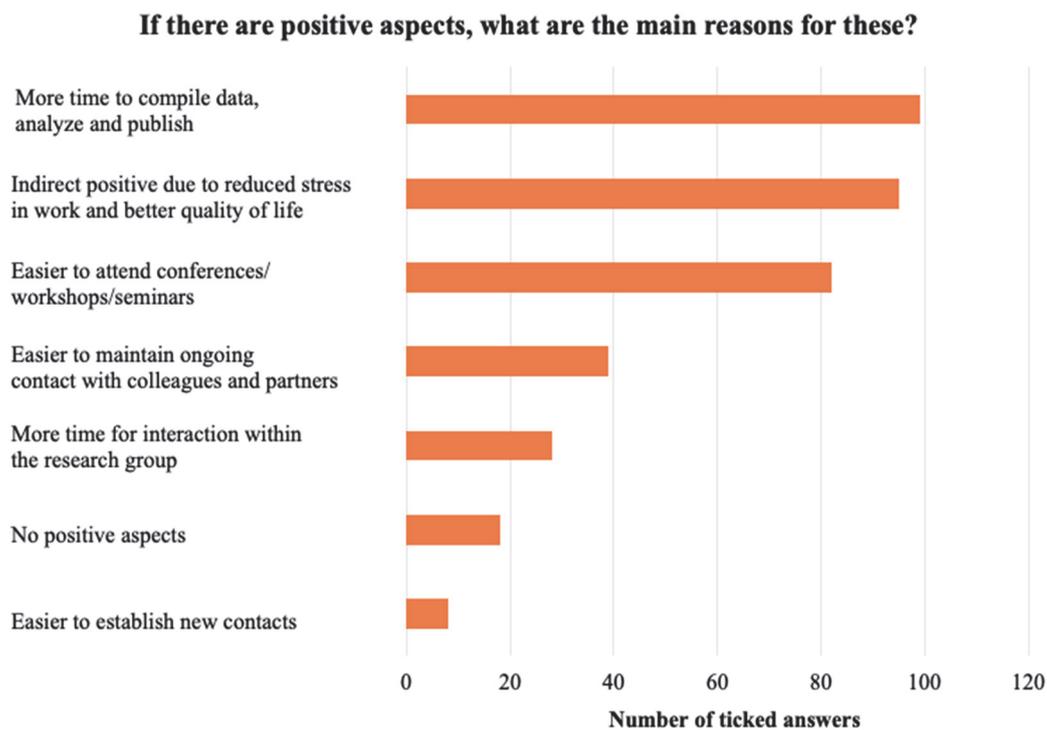


Figure 4. Main reasons for positive aspects of an increased number of digital meetings and reduced number of longer business trips.

If there are negative aspects, what are the main reasons for these?

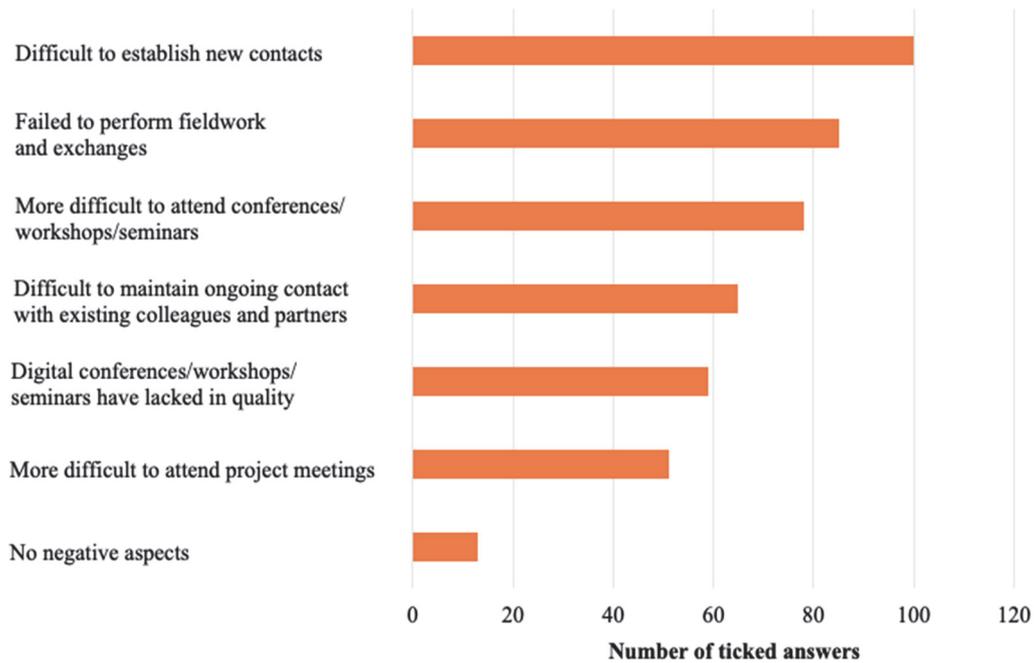


Figure 5. Main reasons for negative aspects of an increased number of digital meetings and reduced number of longer business trips.

The question in Figure 4 has 369 answers, while the question in Figure 5 has 451. Both questions are for researchers only and have 183 respondents. The most selected reason for negative aspects was *Difficulties to establish new contacts*, and the most selected reason for positive aspects was *More time for compiling, analysing and publishing*. Another interesting observation is that the options *Easier to attend conferences/workshops/seminars* and *More difficult to attend conferences/workshops/seminars* got almost equal numbers of responses.

The free-text field of the question concerning positive aspects (see Figure 4) consisted of several positive experiences, mainly due to less time spent on travelling and that meetings tend to get shorter and more efficient when conducted online. Comments from the question concerning negative aspects (see Figure 5) on the other hand, consisted of negative experiences due to stress from having too many digital meetings and the fact that most of the informal interaction between people was lost when not meeting in person. Several comments also stressed that a lot of fieldwork and other project activities had been cancelled or postponed, something that is mirrored both in the number of respondents selecting *Failed to perform fieldwork and exchanges*, as well as the respondents' ability to initiate international collaborations (see Figure 9). Other comments concerned the difficulty of hosting

and participating in digital conferences where hosts and participants were in different time zones.

3.3. What has been replaced, to what extent, and how it has worked

The question asked in Figure 6 is: *To what extent have you been able to replace longer business trips with digital alternatives?* Of the 232 respondents answering this question a vast majority (80%) reported that they had been able to replace longer business trips with digital alternatives to an extent of 50-100%.

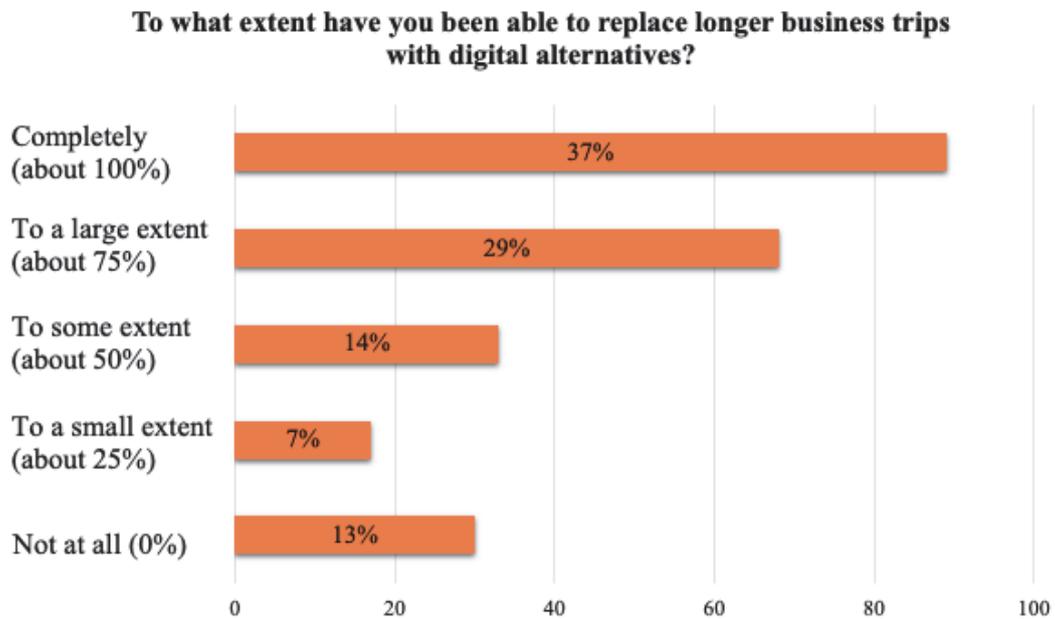


Figure 6. How much of the longer business trips have been replaced with digital alternatives?

This question had most comments, many concerning difficulties to interpret the question. Several comments to this question were from respondents not normally having any business trips at all. Other respondents stressed the fact that most planned trips and events had been postponed during the corona pandemic, and that they therefore did not have anything planned that could be replaced. Hence, a potential source of error is that options like *“Had no longer business trips planned”* or *“I do not normally do longer business trips in my work”* did not exist.

Have you been able to participate in digital versions of conferences, workshops and/or seminars you had planned to travel to during the travel restriction period?

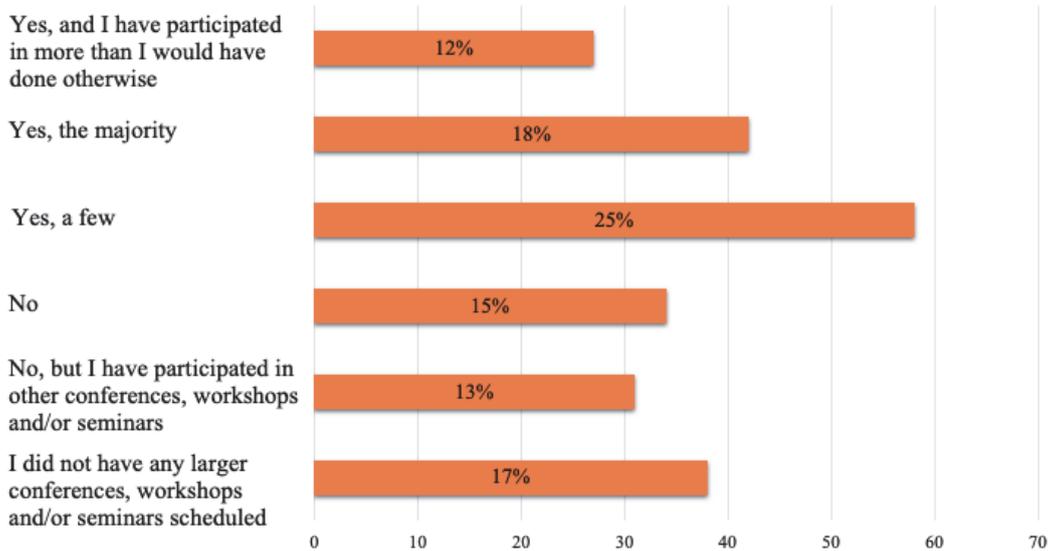


Figure 7. Participation in digital conferences, workshops and/or seminars.

Out of the 230 respondents that answered the question in Figure 7, 55% reported that they either had been able to participate in more than-, the majority of-, or a few of the activities they had planned to participate in during this period.

How do you think the quality of conferences, workshops and/or seminars was affected by taking place digitally?

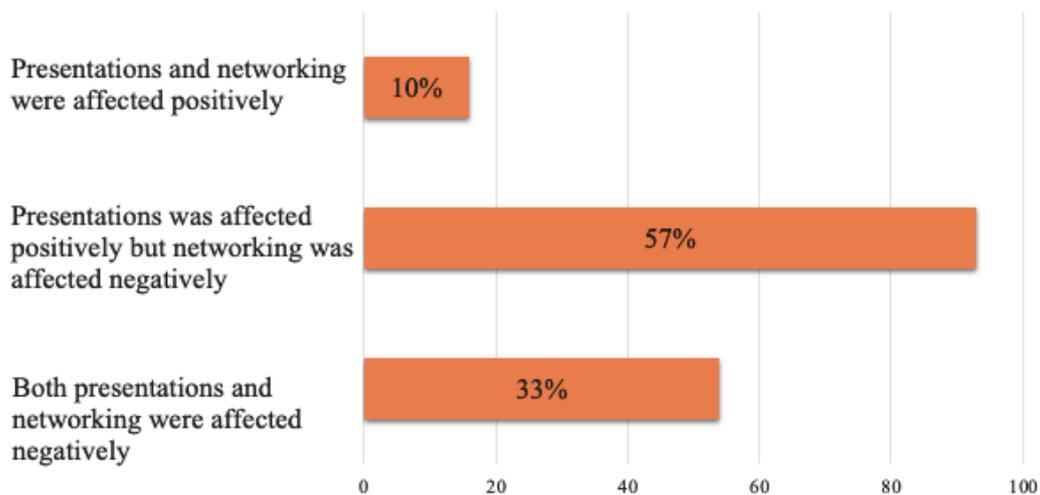


Figure 8. Experienced quality of digital conferences, workshops and/or seminars.

The question in Figure 8, was answered by 192 people out of which 29 reported that they had not participated in any digital conference, workshop or seminar. Figure 8 displays the responses of the 163 respondents that had participated in digital versions of the activities. A vast majority of the respondents (90%) reported that the quality of networking was affected negatively by the fact that the activity was held digitally. 43% answered that presentations during conferences, workshops and/or seminars were affected positively.

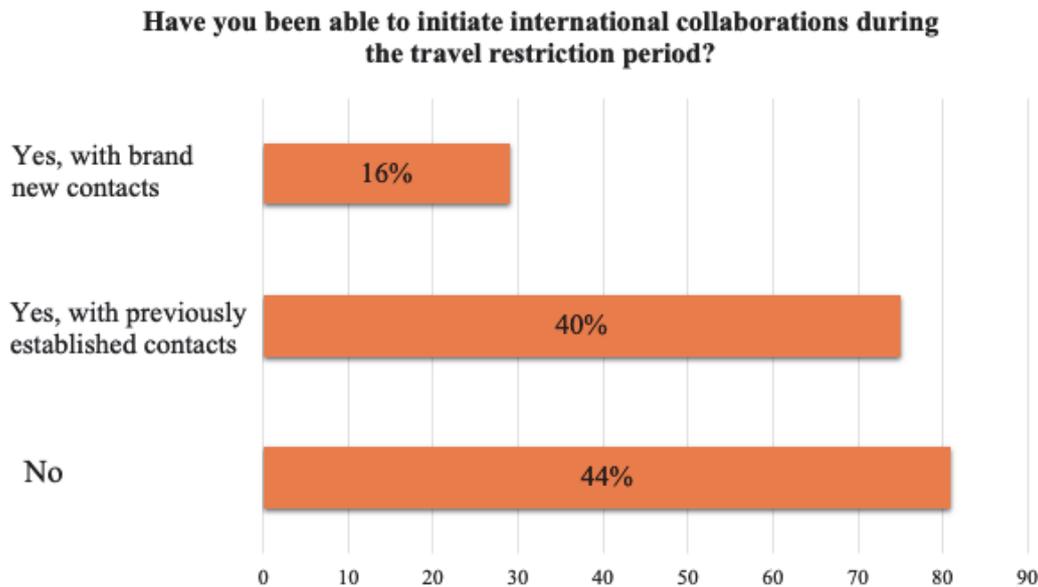


Figure 9. Initiation of international collaborations.

The question in Figure 9 concerns international collaborations, a large part of working within academia, and something closely connected to travelling. Of the 229 respondents answering the question “*have you been able to initiate international collaborations during the travel restriction period?*”, 19% reported that they did not work with international collaborations. Only the answers from the 185 respondents working with international collaboration are displayed in Figure 9. Of these respondents, 56% reported that they had been able to initiate international collaborations during this period, of which 16% had done so with brand new contacts and 40% with previously established contacts. The remaining 44% had not been able to initiate international collaborations at all during this period.

A source of error in this question could be that there was no option such as “*I work with international collaboration but did not intend to start any new collaborations this spring*”. Followingly, people who did not try to initiate international collaborations might have answered “*no*” to this question.

3.4. A continued use of digital solutions

Since all staff at SLU had to replace almost all physical interaction with digital alternatives during the spring of 2020, there is a lot of accumulated experience of what constitutes a good digital meeting, and what would facilitate a continued use of them. The result displayed in Figure 10 is from a multiple-choice question and has 655 answers from 226 respondents.

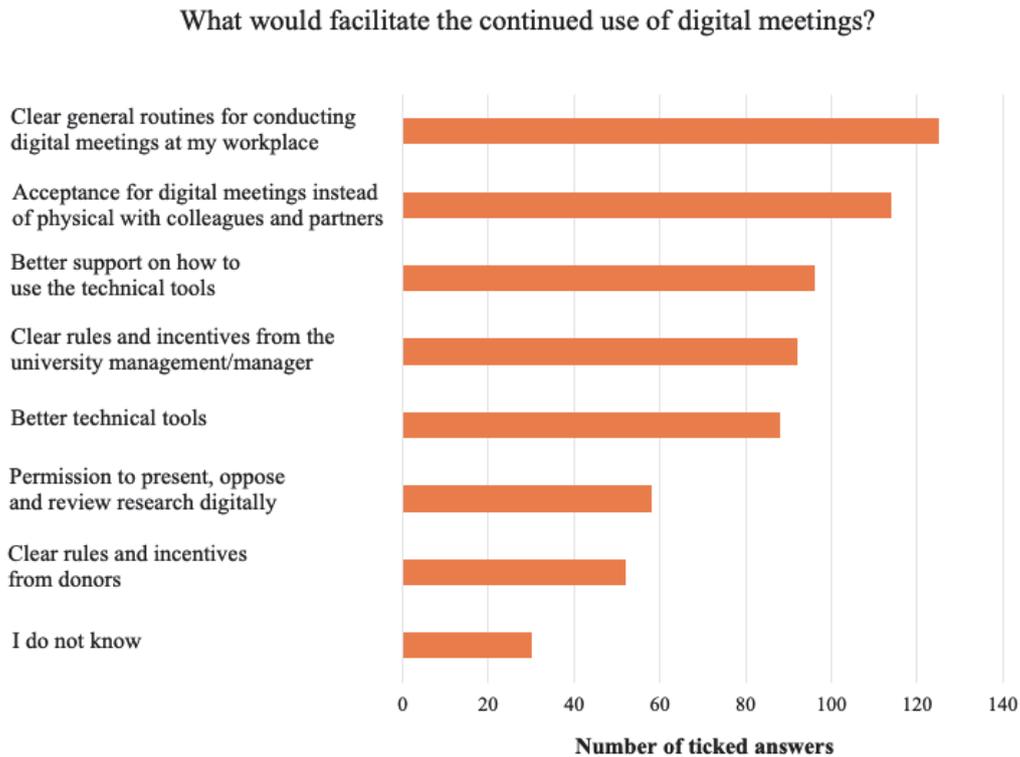


Figure 10. Elements that would facilitate continued use of digital meetings.

A majority of the respondents reported that the two main elements for continued use of digital meetings are “*clear routines for conducting digital meetings at my workplace*” and “*acceptance for digital meetings instead of physical with colleagues and partners*”.

3.5. Looking forward – what could be replaced, and to what extent

To find out what activities the respondents believed could be replaced with digital alternatives after the pandemic, and to what extent, they estimated what share of eight different academic activities they believed could be replaced with digital

alternatives. The options were 0%, 0-25%, 25-50%, 50-75%, 75-100%, I do not know and Not a part of my work. 226 respondents answered this question and the result is displayed in Figure 11.

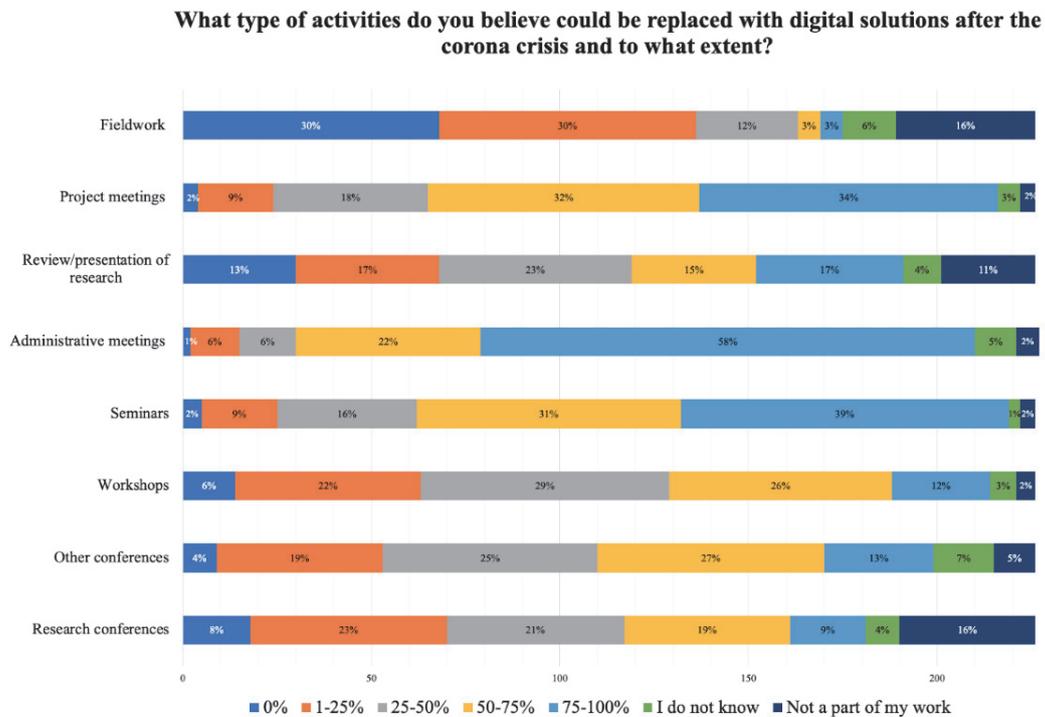


Figure 11. What type of activities do you believe could be replaced with digital solutions after the corona crisis and to what extent?

Fieldwork stands out as the activity the respondents thought was most difficult to replace to a large extent, while the results for *Project meetings*, *Administrative meetings* and *Seminars* indicate that it would be possible to replace these with digital solutions to a larger extent. The categories *Conferences*, *Workshops*, and *Review/presentation of research* show a more scattered result. This result also mirrors the findings from the interviews, which are presented in chapter 4.

When calculating the average of the respondents that did not answer *I do not know*, or *Not a part*, we received the following average for each activity.

3.6. Conclusions of survey results

In conclusion, the reduction of business trips and following increase in the use of digital solutions have predominantly affected the employees' work and research either in a positive way, equal parts positive and negative way, or not at all. While

researchers found it impossible or difficult to perform fieldwork and to establish new contacts, they also experienced less stress in work and had more time to compile data, analyse and publish material. Many activities have been replaced by digital solutions. However, there were clear differences between the extent to which it has been possible to replace different types of activities as a whole or only certain elements of activities. Networking and initiating collaborations with new people are for example elements that the respondents have experienced to be more difficult to carry out digitally than for example conducting presentations. Administrative meetings, project meetings and seminars were the activities that our respondents thought it would be possible to replace with digital alternatives to a large extent also after the spring of 2020. Fieldwork and research conferences stood out in terms of having a more limited potential for being replaced by digital alternatives. Clear routines for conducting digital meetings and acceptance for digital meetings instead of physical meetings with colleagues and partners are the main things that the respondents thought would facilitate increased use of digital interactions also in the future.

4. Results and analysis of qualitative material

The results from the interviews are presented in six sections. We begin by going through the informants' general experiences of academic activities at a distance in section 4.1. Subsequently, in section 4.2 we present findings on the theme of relationships and collaborations. Other prominent themes in the interviews were overall workload (see section 4.3), equality and accessibility (see section 4.4) and technical conditions and important routines (see section 4.5). The chapter is concluded with section 4.6, in which we present the informants' views on the future for using digital solutions to replace longer business trips.

4.1. Experiences of academic interaction and activities at a distance

4.1.1. Presentations

The overall opinion of our informants was that presentations are one of the most suitable types of interactions to perform digitally. This finding is also supported by the survey, where 67% of the respondents answered that presentations during seminars, workshops and conferences were affected positively by being digitalised (see Figure 8). The informants generally said that presentations are well suited for digital versions, as they follow a clear structure and often are characterised by one-way communication. *“To travel down to Italy to listen to a PowerPoint presentation is completely worthless. You can do it online – it works just as well.”*
- Researcher 6

Other informants said that the need for a digital presentation to capture the audience is greater compared to a physical presentation. One example regarded presentations at conferences.

“A mediocre lecture can get by if you have a charismatic lecturer in person, but it won't get by digitally. And you can't just have slides that are your main points but you need to have some films and animations because the viewer is only watching the screen, you can't see the lecturer so you can't use your body language and such.” - Professor 5

Different solutions for presentations at online conferences came up in the interviews. One example was a conference with tens of thousands of participants where each presenter gave a 10-minute written presentation in the chat. According to the informant, this gave a good overview of what people were working with.

“This chat function was interesting. Every participant had 5 minutes to present the research and then get some questions, no, 10 minutes in total. It was completely without video so everything that happened was just by typing. /.../ I was very suspicious, I could not imagine that it worked, but it worked. /.../ I would say for getting a brief overview of what people were doing it was quite helpful.” - Researcher 7

Several informants stressed the importance of a good meeting host, a clear agenda and reliable technical equipment to carry out presentations of equally good quality compared to physical presentations. The informants had experiences of different types of digital presentations from the spring and thought that, in terms of information sharing, it had worked very well. When it comes to the interactive parts usually following a presentation, however, the views varied more.

4.1.2. Formal interaction

Formal interactions range from the very structured questioning during a PhD thesis defense or following a seminar presentation, to highly interactive project meetings including for example brainstorming sessions. Regarding interactive sessions, most informants had both good and bad experiences. Number of participants, participants' access to stable internet connection and technical equipment, type of activity, previous interaction between participants, and meeting facilitation were all mentioned as factors influencing the quality of the interaction.

Interactions following presentations

Several informants talked about online chats as a medium for discussions and interactions following presentations of different kinds. For the conference where all interaction took place in the chat (see section 4.1.1), the informant said that they did not get as far in the discussions and did not get as many questions as they would have in a regular conference. However, the informant described that people

exchanged email addresses in the chat and stated that this setup provided an opportunity to get in contact with new people within your field.

Another informant had a contrasting experience of chat interactions following a presentation, where a postdoc of theirs had presented their work digitally in a seminar and gotten much more response on it than they had expected.

“The advantage was that he [the postdoc] got a completely different kind of feedback on his presentation. When people are sitting in front of their computers and can write [their questions], he got much more questions than what you would usually get. So we were a little surprised both of us, actually. I am not sure why, if it is because you don’t have to raise your hand in front of a lot of people, but instead, it is a lower threshold, if you are writing.” - Researcher 1

Our informants had both good and bad experiences of different ways of moderating and facilitating discussions after presentations. Different chat functions and discussions in smaller groups in breakout rooms were examples of ways to compensate for not being able to physically raise your hand or having a spontaneous discussion in an audience. One type of interaction format that several of the informants had positive experiences of, and that includes interactions following presentations, was conducting PhD thesis defenses online. One informant described an event like this:

“We sat in Alnarp with the PhD-student. /.../ We had an opponent that sat in their living room in England and an examination committee that sat at different places around Sweden – I think there was someone in Finland and two in Sweden – and that worked splendidly.” - Professor 3

Structured interactions with clear agendas

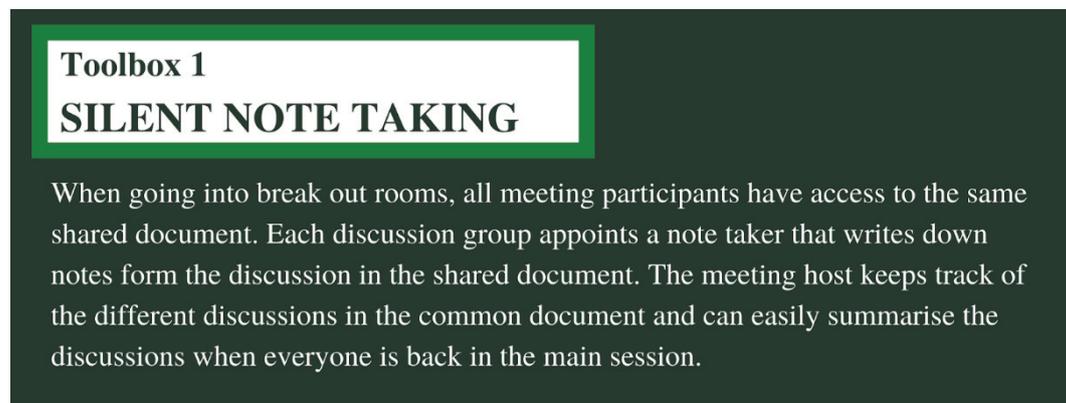
Along with presentations, administrative meetings is another type of interaction that several informants said worked equally well or even better when performed digitally. One informant emphasised that administrative meetings often are characterised by a clear agenda and follows a clear format, making them suitable for digital platforms. *“Some types [of meetings] are more suitable than others. /.../ Especially /.../ when you treat matters according to a specific format and you discuss based on a lot of facts.” - Professor 1*

Another example came from an informant that had a budget roadshow planned during the spring. As a result of the pandemic, the plans were changed, and the meetings were held digitally instead.

“We had planned a small roadshow to reconcile the economy for every project partner in Europe and we thought that we would travel and see them and had planned for that but now we instead replaced the meetings with digital ones and we realized that there was no reason for this roadshow and to spend all that time on travelling. /.../ When it comes to very concrete matters that aren't too complicated it [digital meetings] works excellently”. - Researcher 6

Another informant's positive experience of digital meetings stretched beyond administrative meetings but also emphasised the importance of a clear agenda and the advantage of familiarity between meeting participants. The informant stated that: *“All meetings where I have an established relation [to the meeting participants] and where there is a clear agenda, and limited number of participants, then I think digital meetings should be the standard. Everything else is a waste of time.” - Researcher 4*

The same informant also emphasised the importance of having an experienced digital meeting leader to create a successful digital meeting, describing that with a good facilitator and by using tools such as silent note taking (see Figure 12), highly interactive meetings with up to 15 participants had worked very well.



Toolbox 1
SILENT NOTE TAKING

When going into break out rooms, all meeting participants have access to the same shared document. Each discussion group appoints a note taker that writes down notes from the discussion in the shared document. The meeting host keeps track of the different discussions in the common document and can easily summarise the discussions when everyone is back in the main session.

Figure 12. Toolbox 1: Silent note taking.

Moreover, during the interviews we heard several examples of digital meeting formats taking place during this spring that had made informants look back at previous experiences with new eyes. One informant argued that a meeting where people from nine countries were flown to Sweden for one day worth of efficient working time to write a research application easily could, and should, have been done online instead.

Loosely structured interactions and interpersonal aspects

We have chosen to distinguish between interpersonal aspects of formal interaction, e.g. being able to read another meeting participants' expressions and body

language, and the purely informal interactions, e.g. chats during coffee breaks or spontaneous meetings at conferences. The latter is further elaborated in section 4.2 while the loosely structured and interpersonal aspects of formal interactions are presented below.

Workshops are typically characterised by a high level of interaction, and followingly contain a lot of interpersonal aspects. The informants' experiences of online workshops were that they had worked, but not as well as the physical versions. Several informants mentioned the breakout room tool as a way to create better online discussions. They also emphasised that unconstrained discussions in larger groups had been more difficult to carry out online as opposed to in a physical setting. Not being able to see each other in the room was mentioned as a key factor here.

“[It was] harder to get an exchange of experiences and the discussion-based sessions. /.../ Breakout rooms work, they are what works better, but if you are in bigger groups it is hard to get that unconstrained discussion that went pretty well when we met physically and sat so that everyone could see each other.” - PhD-student 3

This informant was not alone to bring up somewhat abstract aspects of interactions, such as being able to see the other participants' expressions and body language. With regards to activities such as workshops, one informant stated that the work can be done but that the interpersonal and softer aspects of the interaction is what digital settings fail to completely replace.

“You miss out on some of the interaction when it comes to workshops. You don't reach 100%, you reach maybe 75-80%. For it is still the meeting, there is something there in the humane connection that you don't quite get even though you see and listen to each other. But you get far.” - Researcher 6

Following this thought, one informant described how loosely structured meetings require the participants to be able to sense vague signals from each other, and therefore are more difficult to carry out digitally. This informant had an example where difficulties in reading other participants' moods, thoughts and reactions had resulted in misunderstanding and conflict. One participant had left the meeting unannounced, which some of the other participants interpreted as a provocation. To mitigate potential confusion or misunderstandings, this informant had initiated to develop a code of conduct for digital meetings. Another informant said that the reading of expressions works fine in smaller groups, but that it goes missing when you cannot see everyone's picture on the same screen as the number of participants reaches a certain level.

“You can't really see how people react when you say something, so you won't really get that feedback. It works, but only when you are a few participants and can see everyone. When you can't see people it's a little bit difficult to know: have they understood what I want to say, and have they interpreted it in the right way?” - Professor 2

Another format for interaction is chat, and one informant described that they experienced it to be easier to achieve creative and spontaneous discussions when writing in a chat with colleagues, rather than talking to them through a video call.

“When you are chatting, in writing, then everyone can sit and write ‘over the top of each other’ [skriiva ‘i mun på varandra’] and it works great. And this means that the social interaction actually can be better in chat formats, than in video calls.” - Researcher 4

Another topic that came up is that of equality between meeting participants. It is partially related to the interpersonal aspects of digital interactions and partially related to structure and facilitation. Some informants associated digital meetings with more equal discussions and distribution of opportunity to speak compared to physical ones.

“I think there is, well perhaps one thing is, a bit more equal weight of all participants that you don't necessarily have in a room. Because then people who are more imposing in terms of how they behave, occupy the space or talk, would monopolize more the talk or speech, while in the video conference it will be more equal. If someone starts talking the others cannot talk.” - Postdoc 2

On the other hand, there were informants who pointed to less equal terms for participation in online meetings. One of them explained that when you cannot read the body language and see if someone else is about to start talking, it is whoever is quickest to start talking that gets to speak the most. A similar example was also identified in a chat conference, where people who were slower to type would not get their questions answered.

One informant stated that digital alternatives to physical meetings had worked less well with their international contacts, mainly from African countries, due to a combination of unreliable internet connection and difficulties to overcome barriers related to meeting culture. However, they also mentioned a few long lasting, ongoing collaborations with partners in African countries, for which digital solutions had worked well. The same informant also explained that some partners, when joining online meetings from areas with less reliable internet connection, had

to turn their video cameras off, further hampering the interpersonal aspects of the interaction.

Several informants mentioned the number of participants and type of activity in combination as crucial factors of a meetings' success. Loosely structured and highly interactive meetings with a high number of participants were experienced as difficult to conduct digitally. Smaller interactive meetings in which everyone can still see each other's reactions on the screen, as well as larger meetings when no one expects all the participants to be able read the other participants expressions, were experienced as easier to carry out digitally.

When elaborating on the interpersonal aspects of formal interactions, two informants emphasised the intimacy of video meetings, mentioning both the close-up picture of people's faces – *“you are actually quite close to each other”* (Researcher 5) – and the fact that people were sitting in their homes. However, the fact that people have been able to complement each other's homes or say hello to each other's children through the screen is a result of working from home and not directly connected to digital meetings per se.

Some of the informants had experiences of how to improve the interpersonal aspects in the formal video meetings, by making time for non-work-related chats about e.g. people's *“cats, dogs or gardens”* (Researcher 5). These informal chats could then contribute to making it easier to read each other's reactions in the formal context. Here, the line between interpersonal aspects of the formal interaction and the purely informal interactions gets blurry.

According to several of our informants' experiences, one way to improve the formal interactions is to make time for informal interactions. The informant who shared the story about a misunderstanding resulting in an unannounced meeting exit (mentioned above) stated that such misunderstandings usually can be solved easily during a coffee break. To schedule e.g. fika breaks in digital meetings could therefore contribute to mitigating some of these challenges. One of our informants shared their experiences on this subject.

“Some meetings are actually just for small talk, which should not be despised. [...] It is important that you plan them more, because otherwise they will not happen. [...] It requires that you also formalise small talk, because you have to book an appointment for that meeting. You can't just have it. Even if you don't have an agenda, you have to decide to have the meeting.” - Professor 6

4.1.3. Collection of data and fieldwork

Different types of data collection and fieldwork are without a doubt important parts of academic work and often require longer business trips. How data collection and fieldwork is conducted also differs between the social and natural sciences. Activities that were identified in the interviews within this wide category include field trials and sampling, interviews, farm visits, and lab work at other facilities than one's home university. Experiences regarding these activities are presented separately below.

Field trials and sampling

As described in the survey results, fieldwork was one of the things that the informants thought had been most negatively affected during the spring (see Figure 5). Only a few informants had been able to proceed with field trials and sampling during the pandemic. One informant said that they had a hard time imagining how one could do fieldwork or samples at a distance. *“If you want to take soil samples or grow something, how can you do that at a distance? It becomes very difficult.”*
- Head of department 1

One informant had planned to travel to take samples, but due to the travel restrictions, someone on the spot had to do it for them and then send them the sample. The samples arrived a week late and were no longer frozen, so they could not be used. However, the informant stressed that they were unsure to what extent that was just a result of the general mess of the pandemic. Normally, refrigerated transport should not be a problem.

Interviews and observations

When it comes to performing interviews, the perspectives were divided. On the one hand, conducting interviews digitally rather than in person enabled more interviews to be carried out and a more diverse set of informants to participate, since it in some cases were easier to get people to agree to an interview online or via phone. On the other hand, some informants decided to postpone planned interviews until they were able to do them in person because they feared difficulties to establish a deeper connection.

Informants expressed that the nature of the interview was important for whether or not it was suited to hold digitally. When it came to more fact heavy, shallow topics where you look for straight forward answers, the digital format had worked.

“The interviews themselves work on the superficial level – to simply get the information you want and get answers to questions. But to pick up body language – most often you can only see the face in Zoom – things that you communicate with body language become harder digitally.” - PhD-student 2

Informants expressed that more personal interviews require trust and a personal connection, which can be harder to establish online.

“We [the research group] don’t think that you get the same trust in conversations or interviews if you do them either by the phone or via Zoom. There are also some ethical and trust building aspects to this. I have no control of for example – where you are sitting [the interviewer], I’m looking at you now – who else is in the room? Who else is listening to me now? Those kinds of things. You don’t have the same context for trust like when you sit together with another person and have this conversation, if there is a person new to the interview situation and you are going to discuss more sensitive issues.” - Professor 3

Another informant said that what person you interview also plays a part in whether or not you can conduct the interview online or via phone. The informant shared an example of how it simply is not possible to get people from the Thai government to be part of interviews over the phone – they had to be there physically in order to get an interview with government officials.

One of the perks of conducting digital interviews was, according to one informant, that they are less time consuming and therefore created time for more interviews: *“I had planned 4-5 interviews, which would mean a lot of travelling time, but to do them on digital platforms instead has freed time to do more interviews.” - PhD-student 2*

In some cases, interviews and observations are closely connected, and interviews might have to be conducted within a certain environment. One PhD student described how they had to cancel these types of combined interviews and observations during the spring.

“The way I work /.../ is /.../ not just doing interviews but actually being there when people have meetings, when people work, to see what their everyday workdays look like, not just asking about it but actually being there and seeing how it is. So, that has changed quite a lot [during the spring] and I have simply had to remove some things.” - PhD-Student 2

In conclusion, there are many intersecting factors – such as the context, topic and actor you are interviewing – that are important for whether or not the interview can be conducted online with maintained quality.

Lab work

Lab work was not brought up to a large extent in the interviews but was mentioned by some informants. One informant shared this experience related to laboratory work, which illustrates how it has been possible to find travel free solutions during the spring.

“Yesterday we had a meeting with a new researcher in Uppsala that only one of us had met before, and we were four people who had a meeting, and we agreed that he will analyse samples for us, and it worked really well, and it meant that no one had to go to Umeå or Uppsala.” - Researcher 1

Although it did not come up much in the interviews, several comments in the survey concerned lab work. These stated that a lot of laboratory work at other universities had been cancelled during this spring, but they also emphasised the possibility of sending samples and in some cases pay local staff to proceed the work for them.

Farm and operation visits

Some informants go on visits to farms and other types of operations that are located further away than 300 km, both for educational purposes and within different projects. The replacement for these types of activities have been phone calls or video meetings, but as some informants described, they did not deliver the same value as going there in person would have done. Smell, touch and other sensations that are experienced by being present at a location, and that also are a key to understanding an operation or location, were missing.

“One thing that has been negative is that we haven’t been able to go out. It’s a project we are starting at an agricultural school in southern Sweden and we can’t go there. /.../ We have been able to have these types of [digital] meetings but it is not at all on the same level as when you sit at the foreman’s office pointing at what pigs to take and feeling and fibbelling with the fodder.” - Senior Lecturer 2

4.2. Relationships and collaborations

4.2.1. Networking and informal interactions

The networking part of academic interaction has been a central theme emerging from our interviews. Several of the informants stated that networking is the most

important part of visiting conferences and larger seminars, since other benefits of going to these events, such as catching up on the latest research within one's field, easily can be achieved through digital platforms.

I highly value these social interactions, that is what I go in for at conferences. My tactic is not to go to oral presentations, but to go to the posters and the social part of it – that is where the interaction happens. I am not too keen on picking up new science [at the conference], that is also accessible through digital ways to begin with, through digital presentations online (...) Platforms where people already share [research], databases etc that will expose you to “what is going on”. - PhD-student 1

Almost all informants, with a few exceptions, stated that networking had been challenging. The study is meant to explore experiences of digital solutions, but in the case of networking, most informants lacked such experiences. The informants' perceptions of digital networking are therefore to some extent based on expectations and assumptions, rather than experiences.

The few experiences our informants had of digital networking were of different characters. One PhD student told us that they, following an online PhD thesis defense, had been invited to a “5 o'clock digital drink” in zoom breakout rooms. However, the informant in question explained that for them, the threshold to actually attend such an event digitally was much higher compared to going out for drinks physically. During the interviews we also heard some examples of successful digital informal coffee breaks and after work sessions taking place between colleagues.

Another example of digital networking came from an informant that had participated in an online conference. The researchers that presented had ten minutes each to present and then all questions and discussions between the participants took place in the zoom chat. According to the informant, the presentations provided the participants with a good overview of who were doing what and posed an opportunity to get in contact with the people they were interested in collaborating with. Another informant who had participated in an online conference described a zoom fika where they were introduced to a new contact as “*better than no networking at all.*” - Postdoc 1

Almost all informants, with a few exceptions, emphasised that networking during conferences or seminars is a very important type of interaction in their professional careers.

“When you work in such a narrow field, international contacts are very important, and while conferences of course include that you show your research and learn from others, it is also a lot about networking and making new contacts and new groups for applications and projects – and that is something you miss.” - Senior lecturer 1

A few of the informants had slightly different perspectives. They stated that while the spontaneous type of networking that occurs during conferences and similar events is highly important, it might not be *as* important as it often is described to be. One informant questioned the efficiency of in-place networking and described that they had attended a conference and not met anyone they did not already know. This phenomenon leads us on to another theme within the area of networking that emerged during several of the interviews, namely the differences between young and more senior researchers’ professional needs for networking.

PhD students as well as professors witnessed about the decreasing importance for networking with increasing seniority. One informant said that physical meetings and soft types of interactions that had inspired and fuelled a lot of their work. Another reflection concerned funding.

“As a young researcher you rarely get permanent employment, and even if you do it’s on the premise that you obtain your own funding and in order to do that you need a network. It [networking] is important for everyone, but it’s even more important for young researchers because no one will look us up. If you are old you’ll be contacted and you’ll already have established a network while us young researchers are still building it.” - Researcher 8

4.2.2. Starting collaborations and new relationships

A common experience among our informants was that digital interactions had been more efficient when the participants already were somewhat familiar with each other. A reoccurring opinion was that physical meetings are important at the beginning of collaborations and projects with new groups of people. Several reasons were provided for this, among others, being able to get to know each other better, establishing trust, understanding cultural differences and norms and reaching a mutual understanding of the project. Informants also expressed that, to a certain extent, the importance of an initial physical meeting depended on the type of collaboration.

“To be able to have good meetings over a long period of time when working intensely together, it is important to have met first. If you are only doing one thing

together, for example evaluating a research application – it's not the end of the world [if you don't meet].” - Senior lecturer 2

Another opinion that came up was that new collaborations could work without physical meetings if the group members had a common educational or work background that made it easier to understand each other. One informant expressed that the further the distances between people’s opinions are, the more important it is to meet in person.

“You must have a discussion over coffee to understand each other and understand the problem in order to get somewhere. There is a need to really understand why – what is the reason that your opinions differ so much from ours.” - Professor 5

Informal interaction is something that a majority of our informants described as the most difficult element to accomplish digitally. It seems that these interactions often are of a somewhat indefinable character, but many informants stressed the importance of spontaneous and informal conversations in order to get to know new people within the research network, to brainstorm new ideas and to start new projects and collaborations. *“I don’t know what you read into these conversations, but it is something.” - Researcher 5*

4.2.3. Maintaining collaborations and relationships

Regarding up and running projects, several informants stated that the need for physical meetings was lower in comparison to new projects with new people. Once contact was established, many meetings could be held digitally without jeopardizing the quality of the project, but instead bring positive aspects in terms of resource efficiency. To what extent the informants wanted to make physical meetings digital varied. One informant said that: *“No one really wants to travel this much – it costs money and time. You still need to meet once a year or so. But we could reduce the physical meetings by half with maintained quality.” - Professor 5*

Another said that, in EU-projects, it is enough to have a good start up meeting and have the “once a year”-meeting online. A third informant concluded that the experience of digital meetings this spring has been an eye-opener, that it has worked surprisingly well and that there is no need to travel and meet physically as much as they have done in the past. They also said that the project group had more short follow up-meetings than before.

“What’s positive in the project is that digital meetings lead to more short follow-ups. If you had a physical meeting planned, you didn't have a reason to schedule short briefings but instead saved them for the meeting. Now [during the spring] you addressed an issue as soon as it came up with an online meeting, which results in a better flow in the project. As a coordinator, I think I have a better overview of the project's parts than I had before.” - Researcher 6

All in all, the informants had a positive view of (to certain extent) replacing physical meetings with digital ones when it came to maintaining collaborations and up and running projects.

4.3. Overall workload – energy saved and energy spent

Some of the informants said online meetings were more tiring than physical ones – that digital meetings were easier to zone out from and required more focus. Others, on the contrary, said it was easier to keep focus in digital meetings due to fewer distractions. Another matter that came up was the loss of changeover time that naturally occurs between physical meetings. With digital meetings it is possible to schedule them right after each other, which made some informants experience the set up as more stressful. *“If this is to be a way of working, we need to learn how to schedule breaks [between meetings] a lot better – and that also goes for pauses in digital meetings.” - Professor 6*

Regarding the length of meetings, there was a consensus among the informants that digital meetings need to be shorter and include more breaks than physical ones. The explanation for this included that they had experienced it as harder to stay focused in digital interactions, that you sit in a more monotone position in front of your computer and simply that it is more tiring to watch a screen.

“It's much easier to stay focused during a two-day meeting IRL [in real life], than digitally. It's much easier to zoom out or start doing something else when you are sitting in front of the computer by yourself.” - Researcher 8

One reason for the increased need for breaks and shorter sessions might be the increased efficiency of digital meetings. Almost all informants shared the experience that most digital meetings tended to become more efficient than physical meetings, and that this efficiency was achieved on behalf of social aspects of the meetings.

There is less talk [“dösnack”] at meetings, as long as the technology works, it will also be more efficient meetings. People say the important things, and not much more, which also means that there is more time saved.” - Professor 1

Most informants expressed an appreciation of the increased efficiency, mentioning more time to do other things as a key reason for this, but noted that the social parts were important in the long run. Here, several informants talked about a new balance between digital versus physical meetings, where a larger share of digital meetings could increase the efficiency in their work, but some meetings should be kept physical in order to maintain the social relationships between the participants.

When it came to workload, informants witnessed days overflowing with digital meetings because they were so easy to schedule. One informant had solved the issue by having meeting free days in order to be able to focus on other things.

4.4. Equality and accessibility

4.4.1. Within SLU

Due to the fact that SLU’s campuses are geographically spread over Sweden, the question of accessibility and equality is relevant within SLU – between its employees. Prior to this spring, it appears that employees in Skara often travelled to Ultuna for different types of meetings or alternatively joined meetings hosted at Ultuna through video link. Many of the informants in Skara experienced an increased equality in the meetings during the spring of 2020, since everyone has participated online.

“The interactions – when everyone is not there via link – and especially when the lion share of the meeting participants are in the same room, the same physical location, and you might be on your own or a few people via link, the dynamics are a lot harder and it’s harder to get the same space. Sometimes they [the people in the same room] don’t even remember that there are other people there. When you have it this way – when everyone sits at their respective computer – it is much easier that everyone gets the same space.” - Researcher 8

One researcher described that one way to reduce the gap between the digital and physical participants, and make sure the digital ones are not forgotten, is to have the meeting leader participate online. These are however new concepts that need to be further developed and routines that need to be improved. One informant had tried to do the above but described it as a strange situation. *“I have tried to lead meetings*

at a distance when everyone else sits in a room and it works but it becomes a strange situation.” - Professor 1

In terms of accessibility for people involved in SLUs research projects, one informant shared an example with a reference group consisting of farmers. Since these reference group meetings had been digitalised, more farmers had been able to participate.

“I work a lot with farmers, and now everyone participates, there is no problem /.../ to stomp in from the barn and do a reference group meeting – it’s almost more available. /.../ It is the same invitation but more participants.” - Senior lecturer 2

In conclusion, the informants almost exclusively witnessed about increased equality and accessibility during the spring. They can bridge the geographical distance between different campuses, and in some ways redefines the terms for who takes up space in a conversation.

4.4.2. Beyond SLU

As for interactions beyond SLU, multiple perspectives came up and digital formats can make an interaction both more and less inclusive than a physical one. One reason that digital meetings risk becoming less inclusive is the unequal access to a stable internet connection. Our informants stressed the importance of access to reliable internet connection in order to maintain contact and collaborations with partners.

“The African projects have been a nightmare when it comes to digital meetings because they have a way to poor internet connection. They have been locked out of their universities where there is at least some internet connection and therefore sit at home with their phones. /.../ They have to charge them, or someone calls so they fall out of the meeting all the time.” - Professor 5

Once again it is important to distinguish between what is an effect of the corona pandemic and what is an effect of the digital format. In a normal year without a pandemic, the informants collaboration partners would most likely be able to be at their universities. Regardless, poor internet connection and/or technical equipment can be an excluding factor.

On the other hand, when it comes to physical meetings, excluding factors might instead be a lack of time and monetary resources or difficulties for obtaining a visa. *“A bigger meeting was a seminar /.../ with 7 panellists and 60 participants – people*

from Ghana and Nigeria that normally never would have gotten a visa could all of a sudden attend.” - Associate professor 1

Digital alternatives greatly reduce participants costs for travel and accommodation, and thereby makes them more accessible.

“/.../ for many countries or research departments who don't have a lot of funding, it [online conferences] will offer them the chance to attend while you can not necessarily spend 1000 euro on plane tickets and five days of hotel in an expensive western country. So, it will be much better for international collaborations.” - Postdoc 2

Another aspect that informants brought up was that of information sharing between the global north and the global south. The corona pandemic and the new ways of working has changed the landscape for digital interactions between different parts of the world.

“The South Asia academic circle has started doing things online which has never happened before. Like India has a lot of great researchers but they have a difficult time reaching out to the world. If you want the knowledge you have to travel there. But now there are a lot of things going online so it's very easy for us to access that knowledge. It's not only the Global North to the Global South, the Global South has a lot to share with the Global North.” - Researcher 9

One informant shared a clear positive example of when international conferences went online due to the restrictions of the pandemic. Since one of the conferences they wanted to attend was not explicitly within their research area, the informant in question could neither motivate nor afford to attend it if it would have been held physically. But due to the fact that it was held online and free of charge, the informant was able to participate.

Lastly, something to consider with digital meetings is the time difference if you aim to bring together participants from all over the world. *“We just organized a workshop [with participants] from 17 different countries and we had early evening from Australia and three in the morning from Argentina.” - Researcher 9*

4.4.3. Reaching out with research

Several informants talked about the increased potential to reach out with research to the general public when using digital formats. This theme is an example of something we did not expect to touch upon during the interviews, but one that came up repeatedly in several of the interviews. By conducting seminars online and

recording videos of for example lectures and educational material for stakeholders outside of academia, the content had been able to reach many more.

One informant talked about information sharing outside of the scientific community and in general to a wider audience. *“I think that it will also be a step towards making these kinds of seminars available to a wider audience online, which is probably one of the things that the scientific community wants to head towards.”* - Postdoc 2

The knowledge the scientific community holds, that might usually be presented and discussed at a conference or another closed occasion, is through online seminars etc. made available to anyone in possession of a computer or corresponding device, and internet connection.

One of our informants shared an example of how switching to digital platforms had made it possible to increase the information sharing with participants from e.g. Ethiopia, Rwanda, South Africa and India. The informant said that having digital workshops had made it possible to spread knowledge across a wide range of countries at a very low cost, emphasising that this is an important part of social justice that should be considered now as well as in the future.

4.5. Technical conditions and important routines

4.5.1. Technical conditions

The informants were generally happy with the technical conditions at SLU and felt that they had everything they needed to have good digital meetings, but that the support and available technical equipment varied between departments and campuses. Many emphasized that Zoom has worked surprisingly well compared to other platforms such as Skype. Appreciated functions were breakout rooms, screen share and simplicity in connecting to meetings. *“The technique has been with us. Zoom has been liberating, it has worked so well to rapidly try out a new system that seems to have been quite easy to handle for most.”* - Professor 1

When asked if they wished for anything else when it comes to technical resources, some expressed that Zoom is partially incompatible with the video conference systems at SLU (functions like muting and steering the camera does not work). Others would like better Wi-Fi, further education in online tools and a third wished for better technology in general.

“Much better technology would be required to get the feeling that people would really be there. Right now, we have large video conference rooms with large screens where the person who is there via link is projected on the entire wall, without really being involved. It gets a little weird and uncomfortable /.../ Ways where everyone is there on the same terms would be needed.” - Associate professor 1

Another question that came up was that of security. Some informants were unsure of whether zoom was secure enough in order to use for research purposes. We have not made any further investigation on this topic, but we consider it highly relevant in future discussions of digitalisation within academia.

In relation to what technology is available to the employees, the question of how to use the digital tools in an optimal way was also brought up by our informants. People can connect unlimitedly to each other and questions regarding the best way to handle that were brought up. One of our informants described it in terms of choices related to accessibility: *“when do I want to be accessible to others, and when do I want access to others?”* (PhD-student 3). The informants requested strategies for and further development of how these tools are best used.

4.5.2. Important routines

Digital interaction is far from new to the scientific community, but the forms are constantly developing and just like for physical meetings, good planning and routines is the foundation of a good meeting. Several informants emphasised that a digital meeting is not just a digital version of a physical meeting – it is something else. As a result of the spring's vast increase in digital meetings, the informants had a lot of tips and tricks to share about routines they believed characterised a good meeting.

“In a digital context, I think you need to put up rules or make it clear from the beginning [what applies]. Make sure people have their camera on, have much shorter segments – don’t think “lecture one hour and then break” – but talk for maybe 20-25 minutes and then have a short break and see if there are any questions. Make sure that you have a routine that if there is a question, write in the chat. And in the best-case scenario – be two – have a co-host that keeps track of the chat and helps interrupt. If you are alone as a lecturer, it is hard to keep track of a larger group – it is better with shorter segments and pause for questions.” - PhD-student 2

Informants also brought up the importance of norms for how to behave when you listen to someone digitally.

“How does one act when listening to someone? We have to think that I am looking at you [the interviewer via Zoom] now too. Even if we are not sitting next to each other you might nod and show that you can hear and that you appreciate each other and that is surely even more needed now, if not for other reasons in order to not lose focus and interest, both for talking and listening.” - Researcher 8

A list of tips and tricks for a successful digital meeting that were identified in the interviews are summarised in Figure 13 below.

Toolbox 2
6 hacks for successful digital meetings

- **Digital meeting etiquette**
Remember that it is harder to read people’s reactions and body language in digital meetings. To avoid misunderstandings, inform the participants of the rules for your meeting. Video on or off? Muted when not talking? How should we exit the meeting? Develop common guidelines for your work group.
- **Clear routines for formal interactions**
Raising a hand, breakout rooms, silent note taking or chat discussion? Inform the participants of what method is used for your meeting.
- **Have a co-host**
The co-host keeps track of the chat, moderates the interaction and helps with technical matters, so that the host can stay focused.
- **Equal participation**
Make sure that everyone is participating in the meeting on the same terms. When some participate online and some physically, one way to enhance equality is to have the host participate online as well.
- **Make room for informal interaction**
Schedule meetings for coffee breaks and make room for breakout room chats about food, pets and gardens!
- **Mini breaks**
Remember that digital meetings can be more intense than physical ones - schedule mini breaks more frequently, both in meetings and between meetings.

Figure 13. Toolbox 2: 6 hacks for successful digital meetings.

4.6. Moving forward

The final questions in the interviews centred around the informants’ thoughts on the future. We asked if and how the experiences of the spring had affected their view on business trips and the use of digital alternatives. In their answers, many said that the spring had been an eye opener to digital meetings and that they definitely wanted to continue using them in the future. *“The positive experience with Zoom meetings will make us use Zoom more than before. I hope at least. I hope that we don’t forget this pandemic too quickly.” - Professor 4*

However, a red thread through the answers was that while the informants wanted to keep certain elements from this spring, they almost exclusively did not wish to have digital meetings to the same extent they had during the spring. The result from the survey question in Figure 11 and our informants' answers to these forward looking questions paints the same picture, namely that according to SLU's staff, digital solutions could replace a significant share of the business trips for most academic activities, but not for all of them.

"I still believe we should have more digital meetings. Perhaps not quite as many as we had this spring, but somewhere between before and now, so that we reach a middle ground." - Professor 6.

In response to our questions regarding visions for the future, several informants talked about the unexplored potential of digital interaction.

"We have the possibilities technically speaking, but what do we make of them? [...] We are currently using the new tools in the old way, but when are we going to start using the new tools in a new way? A better way?" - PhD-student 3

Many informants reasoned around possible solutions to the lack of social and creative aspects in digital meetings.

"What I would like to see in the long run, is how to get to know each other, how to socialise, how to create that relaxed atmosphere with strangers. But there are companies that have co-workers around the globe, and they have a lot of knowledge about how to work via link. We should make use of their knowledge." - Researcher 5

Several informants argued that the experience with increased digital meetings have made them consider what type of activities that actually needs a physical meeting and that they have started asking questions like: *"Is this a meeting that motivates that we meet physically or can do it at a distance?"* (Professor 3). The same informant also said that a key lesson is to reflect on what you want to get out of the meeting and choose the meeting format accordingly.

"I'm sure you can reduce the amount of physical meetings quite considerably, and that the [physical] meetings you do have you can spend some more quality and preparations at them so they are well motivated and so that you get the most out of them. 'Which are the good conditions and perks of meeting in person?' And then make sure to optimise them." - Professor 3

Similarly, another informant said that a key lesson for the future is to think carefully about what you do when you meet people physically and to make it worthwhile.

“I believe, and hope, that the physical meetings we have will be more rewarding because they will be better planned – that you really think about ‘Do we have to meet physically? [...] What do we want to achieve particularly with a physical meeting?’ And that you then make sure that the meeting really achieves it. [...] Sometimes you have physical meetings that are so packed that you could just as easily have had a digital one [...].” - Professor 5

The spring seemed to have made informants aware of up until now taken-for-granted practices, something that was reflected both in answers as to what they thought about the future, and to how this spring had changed their view on the subject. Some focused on mental limitations and barriers still present within our minds.

“Technically speaking I believe we pretty much have the tools we need – I’m sure there are things that I haven’t thought of – but that’s not where I see the limitation. The limitation is right here, between the ears.” - Professor 6

Others focused on the experiences of limitations and barriers that have been torn down. The abovementioned ‘limitation between the ears’ seems to have somewhat loosened for many. Present in most informants’ answers on how it had worked in general to replace business trips with digital solutions was an element of surprise. *It has worked beyond expectations* or *surprisingly well* were common formulations. Several informants stated that due to former negative experiences, or a lack of experience of digital meetings and video conferences they had not expected it to work as well as it had. The fact that more or less all staff at SLU had to adapt to (and in some cases learn how to use) digital tools increased the acceptance, improved the routines and created habits of having digital meetings, which in turn also enhanced the positive experience of the quality of the meeting.

The rapid transition seems to have changed the way some of the informants think about the future. One informant shared an example of a colleague's idea to have a three-day conference circulating around the globe with physical hubs at different locations every day and the rest participating online. The informant had thought it was a crazy idea and dismissed it at first, but now, with the experiences from the spring in mind, concluded that: *“there are surely plenty of ways to do this that we have never tried, that might be better than what we are doing right now.” - Professor 1*

5. Discussion

5.1. Discussion of the research questions

5.1.1. Experiences of the travel ban and the increased use of digital solutions

Our study shows that in spite of the rapid transformation of ways of working that the pandemic caused, most of our informants and respondents thought that it had worked fairly well to replace longer business trips with digital meetings during the spring of 2020. In general, SLU employees seemed to have quickly adapted to the new situation and been able to keep many aspects of their jobs (that normally would have included a business trip) going quite well. On the other hand, there were specific types of activities that were found difficult or impossible to replace with digital alternatives. There were certain aspects of activities that suffered in quality as they were transferred to digital platforms, but also some that were improved.

The fact that we collected our data close in time to the changes caused by the pandemic has several implications for the results. We wanted to conduct the interviews and send out the survey when the impacts of these changes still were fresh in people's minds. However, the timing of our study meant that people's experiences were based on the ad hoc nature of the transition from business trips to digital meetings. For instance, several informants spoke of meetings that hastily had been transferred to digital platforms during the spring. Many larger events, such as conferences, had either been cancelled or were switched to digital platforms as a way of coping with the immediate crisis. All elements, for example the networking aspects of research conferences, were not always transferred to the digital venues. Therefore, few of our informants had actual experiences of networking through digital platforms. Instead, many talked about the lack of such activities and whether it would work well to network through digital platforms in the future. Also, it seems that people's perceptions of how difficult it is to network digitally has been affected by the lack of such activities rather than by bad experiences. This was detected

through probing in the interviews, but we do not know to what extent this also was the case among the respondents in the survey.

To study a greater range of experiences of digital meetings it would be useful to conduct a follow-up study at a later point in time. At a later stage of the pandemic, and also in a post-corona context, organisers of digital conferences and large-scale events would have had more time to design digital events that aim to e.g. include the networking aspects of research conferences. Events might also have been designed for digital platforms from the onset, as opposed to being transferred from physical meeting to a digital platform, which also could affect how the event is experienced by participants. In addition, a follow-up study could better capture the dynamic between short-term and long-term impacts of increased digitalisation and reduced business trips. This is an important aspect to study further, as several of our informants and respondents highlighted that effects of increased digitalisation might be positive in the short-term but that negative effects might take longer to notice. For instance, gaining more time for writing and compiling data was an immediate positive effect of the travel ban for many of our respondents and informants, while some expressed that consequences of lost opportunities for networking and of not being able to perform field work might appear more clearly over time. On the other hand, there are prominent researchers that do not travel by airplane and have been able to not do so for many years that still are able to perform well as researchers. This illustrates that there are good examples of how academics have been able to make digital and travel free meetings work in the long-term.

Overall, our interpretation of the findings is that most SLU employees that participated in our study were positively surprised by how well it has worked to replace longer business trips with digital alternatives. People have learned a lot about what types of trips they can replace with digital meetings and have practiced participation in and hosting of digital meetings to a greater extent than ever before. Several of our informants talked about an attitude change towards a greater acceptance for digital meetings as adequate (and sometimes better) alternatives to many types of physical meetings. They also expressed that themselves and their peers have begun to think in new ways about what it is that makes it important to meet others in person and what it is that makes a business trip necessary or not. In a working paper published by researchers at the Tyndall Centre for Climate Change Research, the authors concluded that “international travel is embedded in the culture of academia – and changing embedded practices is notoriously difficult.” (Le Quéré et al 2019). Our study shows that the spring of 2020 have resulted in an opening for changing these embedded practices. We argue that SLU and other HEIs should make the most of this unique opportunity and strike the hammer while the iron is hot.

5.1.2. Activities that have worked better, well, well enough or not at all to replace with a digital solution

The study found that certain meetings that were intended to include a business trip had been much easier to conduct digitally than others during the spring. The clearest examples of meetings that quite easily could be replaced by digital alternatives with either improved or maintained quality included 1) meetings with a clear structure and agenda, 2) meetings with limited social and creative interaction, and 3) meetings between people that have met in person before.

We identified several benefits of conducting meetings digitally. Many employees had for example been able to have more frequent follow-ups with their partners and colleagues. Respondents and informants also expressed that longer business trips often are both time-consuming and stressful and that they have had more time for compiling data and writing during the spring – as well as for spending time with their families and friends – as a result of not travelling. In addition, several informants mentioned that they had gained access to conferences they otherwise would not have visited and that they had been able to invite guests that otherwise would not have been able to participate in meetings, e.g. due to lack of time, resources or visa restrictions. This tells us that there is plenty of potential for utilising the advantages associated with replacing business trips with digital interactions, and that it has potential to lead to greater equality and accessibility in research activities, as it can lower the barriers to participation. Depending on the type of meeting, digital interactions can strategically replace business trips in order to improve both the SLU employees' work experience and have a positive impact on their life outside of work.

However, while digital meetings generally worked well (and sometimes better than business trips that they replaced) many meetings were also cancelled, postponed or lacked in quality, which had a negative impact on people's work. While having the potential to generate greater equality and accessibility as mentioned above, digital meetings can also exclude people with limited access to technical equipment and create difficulties in terms of handling time differences across geographical zones. Moreover, as mentioned above, a primary example of negative impacts that recurred among the informants and that also was seen in the survey results was that people had lost opportunities for networking and establishing new contacts. These results partly mirror the results of Le Quéré et al. (2019), which found that stimulating ideas and creating effective professional relationships were the most important benefits related to attending research conferences and meetings. Le Quéré et al. (2019) also made a similar observation as our study, namely that other benefits (aside from networking) of travelling to meetings and conferences often were compensated by the advantages of not travelling or meeting virtually.

It should also be mentioned that although none of our informants had attended digital conferences that particularly focused on social dimensions, such events have occurred during the spring of 2020. For instance, Bidmon et al. (2020) have published a career column in which they illustrate how a digital research conference was organised with emphasis on networking and interaction. Examples of how the social aspects of digital meetings and activities were enhanced included online hubs where people could mingle, networking roulettes where people either were paired at random or could be matched based on similarities through key words in their online profiles. A virtual bar and a sightseeing tour of Lisbon as well as office yoga sessions were available to the participants to make breaks more fun and to enable informal interactions. This is just one example of how people have used digital platforms for networking and social activities, but it illustrates that it is possible to perform these types of events and that there is plenty of potential for people within academia to connect to each other without having to make long trips.

Regarding activities that had worked less well when replaced with digital alternatives, our informants provided examples of poor digital interactions with project partners. In the worst case, people had failed to maintain contact with parts of their team. However, these findings were largely connected to the massive lockdowns that were implemented in order to halt the spread of the coronavirus. The lockdowns meant that project partners in other parts of the world could not enter their universities. Since they had limited access to internet connection from their homes, the digital meetings either suffered in quality or could not be carried out at all. In a post-corona context, when people are allowed to work from their offices, it might be a lot easier to maintain contact with partners at a distance.

Another aspect that made it difficult for some of our informants to work with international counterparts was the time difference between time zones. This is something that made it challenging to organise events with participants from around the world. Such difficulties will remain a challenge in a post-corona context and should be taken into account when organising events, if participation is to be based on principles of equality and accessibility.

Several informants and respondents have also experienced difficulties in conducting their fieldwork and data collection activities. In the survey results, our respondents pointed to fieldwork in general as a difficult type of activity to conduct during the spring of 2020. More specifically, conducting interviews at a distance was an issue for several informants. When discussing the potential for conducting interviews digitally, there were uncertainties among the informants regarding how that would work in practice. Thus, both our qualitative and quantitative findings indicate that data collection has been one of the most difficult activities for researchers to conduct during the early stages of the pandemic.

5.1.3. Activities that could be replaced with digital alternatives after the corona pandemic

Gazing forward, our results point to fieldwork as the least suitable type of activity to be replaced by digital alternatives, also in a post-corona situation. Even so, we do not know whether there are good ways of performing data collection and fieldwork at a distance that were not possible to perform during the pandemic (e.g. due to lockdowns in other parts of the world) which might have influenced people's views on this matter. It is possible that fieldwork and data collection activities were difficult to carry out during an early phase of the corona pandemic but that reliable digital solutions can be developed over time. Also, as a compliment to these digital solutions, collaborations with other researchers that can perform interviews or collect samples on site for SLU staff might be a pathway towards an increased level of travel free fieldwork. In terms of interviews specifically, the results indicate that clear guidelines that allow researchers to trust in digital interviews as a reliable option might be necessary in order to improve the prerequisites. Our findings leave us with questions about whether it would be easier to carry out fieldwork and data collection at a distance in a post-corona situation and whether there are good alternatives to business trips that have not yet been tested or that could be developed further.

Another theme identified in the study was that it might be more important for researchers that are in the early stages of their careers to travel more frequently in order to build their professional networks. Informants at different stages of their careers indicated that senior researchers are more likely to already have established professional networks, which then partially can be maintained through digital meetings. Likewise, many informants said that they enjoyed travelling for work much more when they were at an earlier stage of their careers. In a context where SLU's carbon dioxide budget has to be spent wisely in order to align with the university's emissions targets, it will be necessary to make priorities as to how the limited number of longer business trips by airplane will be distributed among the employees.

Regarding the types of meetings that our respondents and informants expressed can be replaced to a very high extent, administrative meetings, seminars, projects meetings, presentations, and meetings where you already know all of the participants from before were at the top of the list. Here, our informants and respondents really helped us understand that they themselves feel that there are too many unnecessary business trips at SLU and that it would be possible to make significant cuts, with maintained or improved quality of work.

5.1.4. Facilitating a continued use of digital alternatives that replace business trips

We identified several factors that would make it easier for our respondents and informants to continue to have a substantial share of digital meetings and hence reduce business travel. Many of these, such as having clear routines for conducting digital meetings at one's workplace and an acceptance for such meetings among colleagues and partners, have been presented in the survey results. These are things that SLU can work on internally in order to improve the meeting experience for its employees.

Other factors mentioned by our informants seemed closely connected to the pandemic itself. They are thus likely to be resolved when the pandemic is over. Firstly, our informants explained that the digital interactions had been much better with people who they already had met in person. This leads us to think that in a post-corona context, where the travel ban is lifted, one could improve the quality of digital meetings by enabling people to meet with new partners or colleagues in person, and then sustaining those contacts through digital meetings to a greater extent than before the pandemic.

Secondly, most of our respondents mentioned that it has been very challenging and sometimes tiresome to have *all* meetings online and that it has been difficult to not meet anyone – not even your colleagues – in person. Although we did not explicitly focus on this aspect, our informants frequently brought it up as an important part of their experience of the spring of 2020. This leads us to think that people's overall experiences of digital meetings will improve when people stop working mainly from home and can enjoy the social and creative interactions with co-workers at the regular workplace.

In addition, we identified factors that already have improved the experiences of digital meetings. For starters, our respondents expressed how their digital meetings had been improved by using Zoom compared to Skype for Business. Before the pandemic, many of our informants had never used Zoom but the programme has made digital interactions a lot smoother and more well-functioning. The only concern raised regarding Zoom was whether it was secure enough for certain types of meetings. Here we want to point to a discrepancy, since our informants seemed to prefer Zoom to other digital meeting tools, while SLU (2020c, 2020d) does not encourage its employees to use it other than for teaching. While most informants said that Zoom had worked well for them, there were also many that said that they probably only use a fraction of the programme's functions and several requested training in how to use the programme. We therefore encourage access to training in the use of digital meeting tools.

It is clear that there is a lot that SLU can do in terms of how they organise meetings and events internally as well as when SLU is hosting larger events for external participants. However, we also need to think about the bigger picture and look beyond SLU. There is a need for structural changes within academia if a larger share of the meetings is going to be digital and if this is going to work well in the long-term. There has to be viable online options that have developed better tools for social and creative interactions within academia at large. One way for SLU to influence these larger structures is to actively change their own practices. If SLU sets a new example this will influence their own students (Wynes et al 2019), several of which will stay within academia and in turn further influence these structures. The same goes for influencing structures in society at large (Attari et al 2016).

Through our findings, we clearly see that the transformation of how people work (as an effect the travel ban) has resulted in SLU employees learning a lot about how to replace longer business trips with digital meetings. The experiences and the lessons from the changed ways of working during the spring of 2020 means that there already is a solid foundation to build on as SLU develops new policies and routines and sets new targets for increasing the share of travel free meetings and reducing the emissions from business trips. That the employees managed to get past a number of obstacles posed by the travel ban indicates that SLU and other HEIs are agile and up to the task of tackling vast challenges, also in the future.

5.2. One SLU, taking the next steps towards sustainability and digitalisation

SLU's forthcoming strategy for 2021-2025 builds on three focus areas, namely 1) One SLU, 2) SLU's next step towards sustainability, and 3) The Digital SLU. The experiences of the spring of 2020 regarding how digital solutions can replace longer business trips offer valuable insights for all three of these focus areas.

Regarding *One SLU*, digitalisation has a great potential to reduce the distance between SLU's many campuses. For instance, informants in Skara experienced that the equality in meetings had increased when conducted digitally and that a closer connection with colleagues at the Ultuna campus had been established as the digital meetings were carried out on equal terms. In this case, equal terms meant that everyone participated online (which was not typically the case before the pandemic). One of our lessons learned is thus that digitalisation of meetings can, if done right, bring campuses closer together and create equal opportunities for participation among the SLU employees.

In terms of *SLU's next step towards sustainability*, this study shows that there is great potential to substantially reduce SLUs emissions from business trips by replacing a substantial share of them with digital alternatives. Reducing longer business trips is not the only aspect to consider when it comes to sustainability and there are several tools to work with here. However, we want to emphasise that when asking questions about which longer business trips that are necessary, the experiences of not flying during the spring of 2020 can help us come up with new answers to that question and challenge how things have been done in the past. In this study we found that the respondents on average thought that a significant share of the longer business trips could be replaced with digital solutions moving forward. This would not only lead to a drastic decrease in GHG emission, but simultaneously save a lot of time and money. Time and money that, in order to reduce the climate impact of the remaining share, could be used to finance more carbon efficient ways of travel such as train travel.

Finally, the experiences of the spring of 2020 have brought a vast increase in knowledge of how to arrive at *The Digital SLU*. Considering that many of the employees that participated in our study were positively surprised by how well the digital tools had worked, we imagine that a big step towards this goal in terms of using digital tools in research and administration is already taken. The question now is how SLU makes use of this knowledge and incorporates it into its routines and practices.

5.3. Study limitations

Regarding the survey, we did not receive permission to send it to all 3 062 employees – of which 1 604 researchers and teaching staff – at SLU, but to a total of 902 employees at nine departments plus the environmental management unit. Since the study reached only a limited proportion of the total number of SLU staff, it might not be representative for all SLU employees. We do however have reason to believe that the result illustrates a wide range of SLU employees' views, since the respondents were from both social and natural sciences, working at different campuses, and were spread across ages, genders, as well as work titles.

During the analysis of the quantitative results, we discovered that a few of the survey questions were deficient in terms of the options for answers that we had offered our respondents. If the options had been different, the accuracy might have been better and our findings more precise. These potential sources of error are identified on each respective question in chapter 3.

Potential biases among our respondents also represent an uncertainty in our study. We cannot be sure about who our respondents are and why they took the time to answer the survey. It is possible that our respondents think it is very important that SLU reduce its emissions from business trips and therefore have answered questions in a certain way. Based on the comments in the free text field, it seems that people that felt strongly about the matter – positively as well as negatively – were the ones that took the time to respond to the survey. Again, here it is difficult to know whether our respondents are representative of the experiences and views of the general employee at SLU. However, in the interviews we made sure to talk to people with different approaches to business trips and their role in mitigating climate change. Through the interviews, it also became quite clear that the informants, regardless of whether they thought reducing the number of business trips was important as a climate action or not, shared similar experiences of the quality of the digital meetings and experiences of unnecessary business trips. When the climate or environment was not mentioned, informants typically mentioned other reasons for wanting to lower the amount of longer business trips, such as reduced stress and better use of one's time.

6. Conclusions

This study has explored SLU employees' experiences of the changes in their work caused by the corona pandemic during the spring of 2020. We have studied how it worked when digital solutions replaced longer business trips as the travel ban was put in place, and what type of business trips our informants and respondents think could be replaced by digital alternatives in the future. The study shows that a majority of the SLU employees who participated in interviews for our study were surprised by how well it has worked to replace longer trips with digital alternatives. Our quantitative findings illustrate that people's work and research either has been mainly positively affected, equal parts positively and negatively affected or not affected at all by not being able to travel.

Certain types of trips were much easier than others to replace and it is important to consider both the negative and positive impacts that digitalisation may have on employees' work and lives in general. Activities such as fieldwork and other types of data collection, activities that required brainstorming, creative exchange, spontaneous discussions and forming of new relationships was harder to achieve digitally. Well-structured interactions with a clear agenda between people that had previously met in person in activities such as administrative meetings, project meetings and seminars worked well or even better on digital platforms.

Looking Gazing forward, our study suggests that there is a need for a better mix between digital and physical meetings in a post-corona context. SLU should make use of digital solutions and replace business trips strategically to improve its employees work situation and reduce the number of unnecessary trips. Our findings also show that there is a great potential for reducing emissions from business trips while maintaining or improving quality of work. A more thought-through mix between digital and physical activities is thus desirable both in terms of employees' time management and the university's work towards significantly reducing its GHG emissions.

In line with our findings, we suggest having a larger share of digital meetings than before the pandemic, but not as many as there have been during the spring of 2020. People in general need more physical interaction than they have had during this

crisis. Therefore, a middle ground between what was before and what has been during the spring seems sensible – with more physical meetings with one’s co-workers but with less frequent long-distance flights. Replacing a share of the business travel with digital solutions has the potential to save time, increase availability and simultaneously drastically reduce SLU’s GHG emissions. SLU employees will most likely have to make longer business trips sometimes – but our study has shown that they do not need to do so as often as they did before the corona pandemic in order to maintain the quality of their work. One further implication of the study is that the time saved on replacing some business trips with digital solutions could be used to enable more carbon efficient, but slower, ways of travel for the remaining share.

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Appendix 1 - Survey

To staff at SLU who usually travel in their work

About the survey

Longer business trips have almost ceased during the corona crisis. The purpose of this study is to find out to what extent you have replaced physical meetings or activities with digital alternatives. We also intend to investigate whether digital alternatives have worked well enough, better or worse than the physical counterparts, and whether there are activities that have been impossible to carry out digitally. **By business trips, we mean all types of business trips longer than 300 km, which usually would be made by train or flight.** The survey questions about your experiences refer to the period from the time the travel restrictions were introduced until today.

All information you provide is protected and anonymous. Your answers will be processed so that unauthorized persons cannot access them. By answering all questions and pressing "submit" at the end of the survey you consent to your answers being used in a compiled report.

The questionnaire contains 12 questions and takes 5-10 minutes to answer.

Background questions

Age

- a. 30 or younger
- b. 30-39
- c. 40-49
- d. 50-59
- e. 60 or older

Gender

- a. Woman
- b. Man
- c. Nonbinary
- d. Other alternative
- e. Uncertain
- f. I do not want to answer

Title

- a. Professor
- b. Researcher/Teacher
- c. Postdoc
- d. PhD
- e. Other academic staff
- f. Administrative staff

How many business trips over 300 km do you usually make per year?

1. By airplane

- a. More than 20
- b. 10-20
- c. 5-10
- d. 1-5
- e. 0

2. By train

- a. More than 20
- b. 10-20
- c. 5-10
- d. 1-5
- e. 0

Survey questions

1. To what extent have you been able to replace longer business trips with digital alternatives?

- a. Completely (about 100%)
- b. To a large extent (about 75%)
- c. To some extent (about 50%)
- d. To a small extent (about 25%)
- e. Not at all (0%)

Comment:

2. How has an increased number of digital meetings and a reduced number of longer business trips affected your work in general?

- a. Mainly positive
- b. Equal parts negative and positive
- c. Mainly negative
- d. It has not affected my work in general
- e. I do not know

Comment:

3. How has an increased number of digital meetings and a reduced number of longer business trips affected your research?

- f. Mainly positive
- g. Equal parts negative and positive
- h. Mainly negative
- i. It has not affected the research
- j. I do not know
- k. I do not work with research (proceed to question 6 by clicking “Next” twice)

Comment:

4. If there are positive aspects, what are the main reasons for these? You can choose several options if you want and add other aspects in the comment field.

- a. More time to compile data, analyze and publish
- b. More time for interaction within the research group (e.g. with doctoral students/supervisors/co-workers)
- c. Easier to attend conferences/workshops/seminars
- d. Easier to maintain ongoing contact with colleagues and partners
- e. Easier to establish new contacts
- f. Indirect positive due to reduced stress in work and better quality of life (e.g. more time for family/friends)
- g. No positive aspects

Comment:

5. If there are negative aspects, what are the main reasons for these? You can choose several options if you want and add other aspects in the comment field.

- a. Failed to perform fieldwork and exchanges (longer stays)
- b. More difficult to attend project meetings (shorter stays or daily meetings)
- c. More difficult to attend conferences/workshops/seminars
- d. Digital conferences/workshops/seminars have lacked in quality
- e. Difficult to maintain ongoing contact with existing colleagues and partners
- f. Difficult to establish new contacts
- g. No negative aspects

Comment:

6. Have you been able to participate in digital versions of conferences, workshops and/or seminars *you had planned to travel to* during the travel restriction period?

- a. Yes, and I have participated in more than I would have done otherwise
- b. Yes, the majority
- c. Yes, a few
- d. No
- e. No, but I have participated in other conferences, workshops and/or seminars
- f. I did not have any larger conferences, workshops and/or seminars scheduled

Comment:

7. How do you think the quality of conferences, workshops and/or seminars was affected by taking place digitally?

- a. Presentations and networking were affected positively
- b. Presentations was affected positively but networking was affected negatively
- c. Both presentations and networking were affected negatively
- d. I have not participated in any digital conference, workshop or seminar

Comment:

8. Have you been able to initiate international collaborations during the travel restriction period?

- a. Yes, with brand new contacts
- b. Yes, with previously established contacts
- c. No
- d. I do not work with international collaborations

Comment:

9. What type of activities do you believe could be replaced with digital solutions after the corona crisis and to what extent? (Answers are given as a percentage in the table: Not a part of my work, I do not know, None, 1-25, 25-50, 50-75, 75-100%)

- a. Research conferences
- b. Other conferences
- c. Workshops
- d. Seminars
- e. Administrative meetings
- f. Review/presentation of research (eg dissertations and oppositions)
- g. Project meetings
- h. Fieldwork (e.g. interviews, data collection)

Comment:

10. What would facilitate the continued use of digital meetings? You can choose several options if you want and add other aspects in the comment field.

- a. Clear rules and incentives from the university management/manager
- b. Clear rules and incentives from donors
- c. Better technical tools
- d. Better support on how to use the technical tools
- e. Clear general routines for conducting digital meetings at my workplace (e.g. roles in meetings, breaks, discussions, chat functions)
- f. Acceptance for digital meetings instead of physical with colleagues and partners
- g. Permission to present, oppose and review research digitally

Comment:

11. Is it important for you that your university or college reduce its climate impact?

- a. Very important
- b. Fairly important
- c. Not so important
- d. Unimportant

Comment:

12. What percentage of your longer business trips do you think you could replace, and are willing to replace, with digital alternatives in the future?

- a. 75-100
- b. 50-75
- c. 25-15
- d. 0-25
- e. None
- f. I do not know

Comment:

Appendix 2 - Interview guide

Interview guide for semi structured interviews

Inform of

- Anonymity: no personal information will be linked to the informant; we will not publish information about which institutions or campuses specific informants work at. (What we might publish is people's positions).
- Is it ok to record the interview? Only we will listen. Anonymised transcripts might be shown to our supervisors.
- The informant may skip questions or end the interview whenever they would like.
- Meetings - broad definition: business trips but not commutes.

Short, opening questions

How many years have you worked at SLU? (+ age, position, where are you from).

What different types of business trips and how many do you normally do in a year? For example, conferences, field studies, project meetings, network meetings, EU projects?

What do you think about traveling at work?

- Good, bad, fun, too much, too little?
- Are there situations where you don't have an alternative?

Main part of the interview

- 1. What is your experience of replacing physical meetings with digital ones during the pandemic?**
 - What type of meetings have worked equally well as physical meetings?
 - What type of meetings have worked better than the physical equivalent?
 - What type of meetings have lost in function/performance compared to the physical equivalent?
- 2. What made the meetings that worked best worked so well?**

- Have any new approaches, methods, techniques been used? New forms of meetings or workshops? E.g. whether "rounds" have become better/equal with digital options.
- Examples - as concrete as possible.
- Groups - did you know each other before or not?

3. What has made certain meetings less successful, or even impossible to carry out?

- What exactly has not worked well? Why?
- Are there any suggestions on how things could have been done better?

4. What would make the continued use of digital meetings easier for you?

- What is missing? Equipment, routines, support?
- Is there anything specific that would help you?
- What do you think about the social aspect? Is there a need for a social context outside the digital meetings?

5. How has the sharp reduction in business travel affected your work?

- Positively / negatively
- Writing applications / articles
- Research conferences
- Field studies
- Project meetings (based on the different meetings they have mentioned before).
- Examinations / defences
- More / less time / overall wellbeing

6. How did you reason regarding physical versus digital meetings before the travel restrictions were put in place?

- What types of transport did you use for longer business trips before the travel restrictions? Why?
- Is it important to you that universities reduce their climate impact by looking into their travel habits?

7. How has this spring affected your view of reduced business trips and increased digital meetings, even in the future?

- Do you think versions of this can work long term? What would you want to keep in the future?
- Which parts? Sort out what has worked and what has not worked.
- Do you think you will change your travel pattern in the future, compared to before covid-19?

8. Is there anything more that you would like to add?

Control questions:

Are you part of any environmental association?

Did you bike to work before the corona pandemic?

Do you have any other climate or environmental commitments?