



Demography and the data revolution

What have we learned? What role could IUSSP play?

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List of acronyms

AI	artificial intelligence
CRVS	Civil Registration and Vital Statistics
CSOs	Civil Society Organisations
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
GPSDD	Global Partnership for Sustainable Development Data
GRID3	Geo-Referenced Infrastructure and Demographic Data for Development
IDRC	International Development Research Centre
IUSSP	International Union for the Scientific Study of Populations
LMIC	low- or middle-income country
NSOs	National Statistical Offices
PAA	Population Association of America
PARIS21	Partnership in Statistics for Development in the 21st Century
PERN	Population-Environment Research Network
SDGs	Sustainable Development Goals
SDSN	Sustainable Development Solutions Network
UNFPA	United Nations Population Fund

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Background reading

This report mainly covers the IUSSP's activities in the area of the Data Revolution that were undertaken between 2018 and 2020. Readers who are keen to find out more details about the rest of the programme – IUSSP's training, research and innovations to data and methods – are referred to the following websites:

- The [IUSSP webpage](#) detailing the full set of activities and outcomes of IUSSP work in this area since 2014
- IUSSP position paper, submitted to the UN International Expert Advisory Group on the SDGs: [Defining and successfully accomplishing the Data Revolution – The perspective of Demographers](#)

And to the work of three related scientific panels:

- IUSSP Panel on [Digital Demography panel](#)
- IUSSP Panel on [Population Perspectives and Demographic Methods to Strengthen Civil Registration and Vital Statistics Systems](#)
- [Population-Environment Research Network](#)

Executive summary

Between 2014 and 2020, IUSSP delivered a work programme furthering links between demography and data science. It aimed to strengthen demographers' capacity to conduct cutting-edge research on data for development and their ability to bring more accurate and timely evidence to data revolution activity; and to enable decision-makers, academics and civil society representatives to make better use of population data. The programme resulted in a plethora of workshops, seminars and other activities. It also led IUSSP to ask qualitatively how well the programme succeeded in addressing the spirit of its Hewlett Foundation grant, where it had been less successful and why, and to make recommendations to inform future strategy. This report addresses these questions by drawing on evidence from 27 interviews conducted in September and October 2020 with IUSSP members, panel Chairs, academics (demographers and data scientists), students and CSO representatives involved in data revolution activity. Following a discussion of how the programme succeeded in addressing the spirit of the Hewlett Foundation grant the report discusses eight specific themes that emerged in the interviews, which are summarised in turn.

The programme's successes

Interviewees appreciated the breadth and depth of the programme's activities and the quality and substance of the panel discussions and training sessions. They reported learning about issues that were both academically interesting and practically relevant: the panels and wider networking lowered barriers to bringing people together from different fields, serving as a neutral place for demographers and data scientists to discuss population issues. Several substantive collaborations developed as a result of these personal and institutional connections. Training was widely appreciated: participants in the Cape Town summer training institute spoke of its pivotal impact in exposing them to and immersing them in digital demography, while the CRVS Fellowship programme was highlighted for its interest in nurturing junior researchers. Several interviewees reported their aim to institutionalise digital demography as a discipline through the training and placement of junior scholars, creating a network in this new area. The IUSSP's Population-Environment Research Network, itself a collaborative of demographers, geographers and earth scientists, provides a salutary example of how interdisciplinary collaboration can develop over time.

Theme 1: Demography as a discipline: The changing context for IUSSP's work

The interviews prompted reflections on the nature of demography as a field and its waning popularity. This 'crisis' was linked alternatively to receding concerns over 'the population problem', a generational divide and to the small size of demography as a discipline. Our interviewees held differing views of what lies at the core of demography at present and how demographers define themselves in relation to data scientists and sociologists. Non-demographers noted that they often struggle to understand what demography offers other than a commitment to rigour and to certain types of data. Interviewees described the '*freight train of big data*', observing that it is overtaking the careful work of demographers to understand the detail of human data, but that it offers opportunities to steer discussions about its use. They questioned the extent to which demographers should emphasise methods or continue to focus on the full corpus of knowledge of human data. It was felt that IUSSP could help to redefine the contribution of demography to both academic and policy debates.

Theme 2: The politics and ethics of data for development

The use of data not only requires technical skill but also raises deep political and ethical questions, such as the biases and limitations inherent in the collection and interpretation of ‘big data’ and its (mis)use in public life, as well as the premise that *better data leads to better lives*. Some interviewees identified these debates as integral to demography and therefore as an area well-suited to IUSSP activity. They agreed that IUSSP has the clout (and the reputation for impartiality) to insist that its members act as a sounding board in data revolution debates. Given IUSSP’s mandate and aim of advancing linkages with lower-income countries, one concern that emerged was that funding flows to data science are creating unequal power dynamics, acting to marginalise institutions, researchers, knowledge and insights from the Global South.

Theme 3: IUSSP’s offer and reach

Interviewees acknowledged IUSSP as the premier international organisation of demographers, running technically rigorous workshops, seminars and panels; convening high-level experts from diverse communities (demographers, data scientists, policy-makers); fostering the uptake of new data and methods; and encouraging young researchers. However, they argued that IUSSP should articulate more clearly its offering vis a vis the data revolution. Some thought that insisting on the ‘correct’ use of data could provoke valuable and necessary conversations. Others felt that to an extent, IUSSP is ‘stuck in its ways’, sceptical of data science and ill-equipped to engage in political and/or policy-oriented processes. Looking ahead, building the IUSSP’s reputation for robust input on data issues could help its members feel entitled to a ‘seat at the table’, help steer debates about data quality and promulgate a common (positive rather than defensive) view about what demographers can offer. One interviewee noted the need to help funders understand demography’s unique contribution, given that few have the technically sophisticated understanding of the Hewlett Foundation in setting up this IUSSP programme. A broader question is how IUSSP can continue to promote demographers’ participation in data science and data for development in the current project-based funding climate.

Theme 4: Communications and outreach

A common recommendation was that the IUSSP stress public engagement – doing more to build and maintain its brand within a rapidly changing global context and improve the communication of research, particularly to policy-makers, but also to communities who could make use of its insights. Suggestions included supporting rapid responses to current events with a data quality angle (e.g. Covid-19, racial inequalities) and packaging data for a much wider range of diverse audiences using multiple media (blogs, podcasts, videos, visual presentations) to give demography a greater reach and ensure demographers remain at the forefront of topical debates.

Theme 5: Partnerships and networks

Both data scientists and demographers felt that IUSSP had made pivotal contributions to the burgeoning field of digital demography and could use its status to strengthen the subfield’s legitimacy. To date, IUSSP’s work on digital demography was felt to be the province of specific individuals, though some interviewees pointed to steps they were taking to ‘institutionalise’ the discipline by training junior scholars and fostering academic exchanges. Interviewees opined that the Union should expand membership among students and non-demographers

interested in data (e.g. data scientists, human geographers and others), though they also commented on structural impediments to undertaking interdisciplinary work in academic settings. While praising IUSSP's partnerships to date, our interviewees identified additional potential to expand beyond immediate allies, particularly with organisations such as PARIS21, SDSN and GPSDD. They also discussed the value of institutional partnerships for specific purposes: with journal editors to talk about data sharing, with organisations that have development programmes to provide expertise in human data and data quality, and with organisations that can broker relationships with NSOs and other statistical organisations.

Theme 6: Training

IUSSP has invested heavily in training junior scholars through workshops, summer training institutes, and other smaller-scale initiatives. These included the CRVS Fellowship Programme which involves the intensive mentoring of a small cadre of eight young researchers interested in studying a particular aspect of CRVS. The Cape Town summer training institutes in 2018 and 2019 were highly praised by students for the utility of the issues covered and the techniques taught, with several students going on to design and deliver similar courses at their own institutions. Successes notwithstanding, the interviews also pointed to challenges – chief amongst them a dearth of training opportunities in Sub-Saharan Africa and difficulties in recruiting fellows from the region, but also the teaching of new tools in short courses (e.g. R, Python) and insufficient funds to scale-up training programmes.

Theme 7: IUSSP and junior scholars

Two graduate student members of IUSSP offered their perspectives on the Union. They cited many of the same benefits as their senior colleagues: IUSSP's international reach, high-quality workshops and the connections they helped forge, and regular newsletters (particularly for their information on new research and job opportunities). But they also highlighted areas where they felt IUSSP fell short, including a lack of readily accessible information about other members and support in navigating the research and funding landscape. Both students had joined IUSSP at their supervisor's behest – suggesting that IUSSP could do more to raise its profile among junior scholars.

Theme 8: Issues to work on

Reflecting the diverse interests of its members and allies, interviewees made several recommendations for topics IUSSP could work on, such as: further work on CRVS (especially intercensal population estimates); debates around pandemic recovery – e.g. the production of quick estimates of Covid-19 prevalence linking population and epidemiological data; dedicated attention on individual SDGs to interrogate available data, its limitations and the ethics of combining different data sources; and identifying emergent policy domains with important population angles, e.g. urbanisation, climate refugees, etc. Cross-cutting areas that emerged included a focus on data and code sharing, interoperability; the convening of journal editors to talk about data sharing; and fostering broad (and more political/ethical) discussions about the data ecosystem to include survey data, big data and administrative data.

1. Introduction: the motivation for this report

This report is about the IUSSP (Box 1) and its recent efforts to engage in new areas of academic and policy debate. Between 2014 and 2020, the IUSSP delivered a work programme designed to cultivate and strengthen links between the fields of demography and data science. Funded by the Hewlett Foundation, the programme sought to increase demographers' capacity to conduct cutting-edge research on data for development and thereby contribute to the burgeoning 'data revolution' (Box 2). This, in turn, would enable decision-makers, academic researchers and civil society representatives to make better use of population data to inform development priorities and interventions.

The 2014–2020 work programme had four specific aims:

- To foster and disseminate methodological advances for collecting, processing and disseminating data in developing countries (including mortality monitoring and efforts to strengthen CRVS);
- To strengthen the capacity of population researchers, especially those from low-income countries in this area;
- To ensure the involvement of top technical demographers in key international groups and forums, and
- To create opportunities for exchanges and the development of collaborations between demographers and non-demographers: epidemiologists, computer data scientists, statisticians and econometricians.

Beyond supporting specific activities to enhance collaboration between demographers and data scientists, and enabling demographers to engage with the data revolution activity, the IUSSP Hewlett Foundation-supported programme also contributed (with other funders) to advancing the work of three scientific panels: digital demography, population perspectives and demographic methods to strengthen CRVS systems and the Population-Environment Research Network (PERN).

The final grant report set out a comprehensive inventory of activities undertaken between 2018 and 2020 to leverage innovative demographic methodologies and knowledge sharing, and a set of intended outcomes¹. The report clearly speaks to the large number of activities that IUSSP was able to realise despite its limited resources. The present report was commissioned for a different purpose: to help IUSSP understand qualitatively how well the programme succeeded in addressing the spirit of the Hewlett Foundation grant and where it had been less successful and why. The assessment was also expected to yield recommendations to inform future IUSSP strategy.

¹ IUSSP (2020). Final Narrative Report for The William and Flora Hewlett Foundation Grant #2017-5950. *Leveraging innovative demographic methodologies and knowledge sharing for sustainable development*, 31 March.

Box 1 The IUSSP and its membership

The International Union for the Scientific Study of Population is a bottom-up association of scientific researchers interested in population issues with a mission to promote the study of population, encourage global exchange and stimulate interest in population issues. Founded in 1928, it now has 1,548 members and student associates in over 120 countries. IUSSP organises seminars and workshops, researcher training and an International Population Conference every four years; publishes its research outputs in various publications intended for diverse audiences; and maintains a website to encourage member collaboration and provide information on population science to a general audience. It is funded through a mix of membership fees, core funding from bilateral and philanthropic donors and funders who support specific work programmes. The Union is run by a small administrative secretariat (consisting of four full-time staff); its broad set of activities is largely defined and run on a voluntary basis by its members.

A little over half of IUSSP's members are based in high-income countries of Europe, North America, and Asia, while 30% work in low-income countries and the remaining 15%, in middle-income countries. Men make up 55% of the membership and women 45%. The average age of members is 56, with half under the age of 55. Student associate memberships have been growing in recent years, especially since membership was made free for all students in 2018. Of the 512 current student associates, 47% are based in low-income countries in Africa and Asia and 30% in high-income countries in Europe and North America. Women make up approximately 43% of student associates, in part reflecting fewer women in higher education in Africa and South Asia.

While the membership is geographically diverse, the leadership of IUSSP panels is less so. Approximately 67% of panel members are based in a high-income country; 39% in North America, 25% in Europe and the remaining 35% in Africa, Asia and Latin America. The IUSSP Council has long maintained a policy of geographic diversity in selecting panel members; though many are based at research institutes and universities in North America or Europe, they are often nationals of countries in the South. In 2019, IUSSP scientific panels organised 25 scientific meetings, including ten training workshops. These included 885 participants, 40% of whom were from a low- or middle-income country (LMIC).

Many members view IUSSP as the population association that promotes the study of demography. The fields of study members list in their membership application mostly bear this out. Of those who provided this information, 78% of members and 70% of students listed demography as a field of study, though only 10% listed demography alone. Members (35%) and student associates (47%) also listed population and development, making it the second most cited field of study. In addition, 25-35% of members and students selected sociology, statistics, public health and/or epidemiology. Among students, economics and geography were also popular. Just 1% of members and 3% of student respondents noted computer science as a field of study.

Source: IUSSP

Box 2 Defining the ‘data revolution’

The phrase ‘data revolution’ was coined in May 2013 by the High-Level Panel of Eminent Persons on the post-2015 sustainable development agenda. The report of IAEG (2014) defined it as:

An explosion in the volume of data, the speed with which data are produced, the number of producers of data, the dissemination of data, and the range of things on which there is data, coming from new technologies such as mobile phones and the ‘internet of things’, and from other sources, such as qualitative data, citizen-generated data and perceptions data; [and] a growing demand for data from all parts of society.

The report further describes the data revolution for sustainable development as:

The integration of these new data with traditional data to produce high-quality information that is more detailed, timely and relevant for many purposes and users, especially to foster and monitor sustainable development;

The increase in the usefulness of data through a much greater degree of openness and transparency, avoiding invasion of privacy and abuse of human rights from misuse of data on individuals and groups, and minimising inequality in production, access to and use of data;

Ultimately, more empowered people, better policies, better decisions and greater participation and accountability, leading to better outcomes for people and the planet.

Source: IEAG, *The World That Counts*, 2014 (p. 6)

This report’s findings draw on evidence from 27 interviews conducted in September and October 2020. With IUSSP’s help, we purposively selected interviewees. The majority were IUSSP members who participated in the Hewlett-funded programme (e.g. panel Chairs or members, demographers working for international organisations, academics demographers and data scientists). Other interviewees were IUSSP members and academics who were less directly involved in the work programme, and some CSO representatives who knew of IUSSP through their engagement in data-revolution related activity. Among the interviewees were five African researchers who had attended the 2018 or 2019 summer training institute held at the University of Cape Town (see Section 7 below). The aim was to include people who were very familiar with the Union and its mandate and others with a more peripheral relationship who offered a wider perspective on how the initiative aligned with global debates concerning development data. Despite IUSSP’s global reach, only nine interviewees were based outside Europe or North America – a point we revisit in Section 4. Interviews lasted between 20 minutes and one hour.

Throughout all the interviews, a strong sense of goodwill emerged towards IUSSP and its work on data for development, as shown in Section 3. However, most interviewees also held the opinion that the Union could be doing more to further links between demography and the data revolution, and that quick and purposive activity was needed to realise this aim – though this also raises the question of what is feasible (Box 3). One interviewee noted that ‘*by definition and by design, we (demographers) are a modest bunch*’ with the implication that the field as a whole may not be geared to engage in some of the very political global debates around

data. But at the same time, the interviews raised a set of deep questions/themes that IUSSP needs to tackle as it develops its future strategy and messaging.

Box 3 What is feasible for IUSSP to take forward

IUSSP's secretariat consists of four full-time staff while the bulk of its activities are advanced by its members on a voluntary basis. The challenge for its membership, therefore, is to reflect on what is possible given IUSSP's organisational and budgetary limits as well as its specific strengths – e.g. in convening, leading the development of research agendas and in specific initiatives (e.g. training, mobilising panels, etc.). In what follows, we aim to distinguish overall suggestions and recommendations for developing the field from those that IUSSP is likely to be best placed to consider and to advance.

The Union's mission – to promote the study of population, encourage global exchange and stimulate interest in population issues – may need rethinking, to ensure it remains relevant as new global challenges emerge and as the field continues to evolve. It is hoped that this report could be a useful input in guiding this process.

Following a discussion of how well the programme succeeded in addressing the spirit of the Hewlett-funded programme, the report is organised around eight themes that arose in the interviews. Within each, we discuss interviewee perceptions of the benefits of IUSSP's work and challenges that were encountered. We also list the recommendations of our interviewees and/or questions they posed that could help inform future strategy within each theme.

2. The programme's successes

The final grant report sets out in detail how the recent IUSSP-organised activities contributed to each of the programme's four aims (as set out above). Our interviewees appreciated the breadth of its activities (*'IUSSP does really great meetings: there's always something new going on and one learns a lot'*) with people keen to continue their collaboration (*'...fantastic work, and I'm super happy to collaborate with them – I hope I get the chance to work with the panel for an additional two years'*). One highlighted the free and frank nature of discussions (*'we do have the ability to speak our mind on the panel'*).

Opportunities to network at IUSSP events were also widely appreciated. They enabled people to make connections that continued after the events had ended (*'a couple of big new projects came out of meeting new folks... we could move along some new ideas'*).

The following quotes highlight our interviewee's feedback from the December 2019 Expert Meeting and other convenings:

'I was able to do some networking and had great even out-of-session discussions, the sessions were made in a sense that even during breaks, we became very excited about the topics that we continued discussions offline.'

'One of the things that I've really appreciated about the IUSSP is that they really lowered the entry cost for people to approach a new field or

new activities. ... IUSSP has done that consistently... And I think at this point, the entry cost in terms of learning methods or finding tools is not so high anymore, because there's been quite a bit of work in terms of building courses and so on.'

Interviewees noted the substance of the discussions held at IUSSP events, relating to the fact that people had *'thought quite carefully and had useful things to say, proposing things that were important and feasible.'*

Several commented on the long-term utility of what they learned:

'What has been discussed in IUSSP sessions will definitely be used, especially now, with the pandemic.'

'Because of my engagement with IUSSP, I'm able to share what I learned and I'm trying to influence in (my) country (so) that we do also what others are doing in other countries.'

'I had great discussions with colleagues from the World Bank on the initiatives on data revolution, big data, data science, but also with other colleagues from other countries on the research that they are doing.'

'(I learned about) problems that are worth tackling that might have an academic contribution and a practical value.'

The computer scientists we interviewed were more likely to feel they had been introduced to a new appreciation of the issue of data quality (*'I wasn't aware of just how bad some of the international development data is'*) or new understandings of how to analyse data (*'Understanding more about the different ways of thinking about data – e.g. the concept of the age-period-cohort model... fascinated me (because) it's traditionally not done in a lot of social media analysis... this is just one example of an idea that could be applied more broadly in computer science'*). Though the sample was small, it was less common for our demographer interviewees to report a similar sense of excitement at being exposed to new ideas from data science.

The grant enabled demographers and data scientists to make both personal and institutional connections: *'the events they've organised... have been very helpful to connect me more to domain experts and the domain-specific challenges and problems.'*

'In my mind, it was not just individuals that ... IUSSP engaged, but also institutions....what is really great about what they're doing is the institutional engagement... (the initiative) becomes even more sustainable if you involve institutions, but of course you have to choose champions, individuals who will really be part of the passion of IUSSP.'

The *'pretty innovative'* CRVS fellowship programme was praised for its interest in nurturing junior researchers and its commitment to supporting them (*'we are meeting extensively over four weeks... following the fellows... so I think it's something really solid... which doesn't happen very often nowadays'*). The outputs from this initiative were felt to be particularly useful (*'the work the panel is doing is technically robust... we are coming to interesting conclusions and... interesting findings in the work of the fellows, which would actually be able to... create some noise in the field'*). More broadly, some interviewees spoke of steps they were taking to *'institutionalise'* digital demography as a discipline through the training

and placement of junior scholars, which they hope will lead to a network of scholars focused in this new area.

In this, the two-week Cape Town summer training institute was cited as fundamental in helping to develop the field of digital demography within sub-Saharan Africa – several attendees commented that it had transformed their research and careers:

‘Digital demography is something that I found through the [training course] in Cape Town... Before ...I did not know how to do web scraping, how to collect mega data on networks (e.g. Twitter) ... I decided [afterwards] to put [computation science techniques] in all in my research I decided also to not do my PhD in the old way... [rather] I’m using data science methods... for me it is the future of research.’

‘I completely pivoted from social scientist to a data scientist, and I must say that ... those two weeks were pivotal in that process... it just was a fantastic experience. And it started the snowball on quite a lot, at least at Stellenbosch University.’

‘What’s happening [with the summer school] is the next year gets better and it gets better... because I come back and I say, “Oh, that was brilliant. It’s the most productive two weeks of my career”, and then the next person also wants to go and they also want to challenge themselves, so that’s, in my opinion, why [it] is going from strength to strength.’

However, two interviewees critiqued what they saw as an imbalance in the way demographers and data scientists had been drawn together under the IUSSP programme. They felt that while data scientists had been relatively successfully brought ‘in’ to learn about demography, the programme had been less effective at encouraging demographers to develop their appreciation of what data science offers:

‘Demographers know the question but can’t marshal the modern data and methods to get it [the analysis] done... they have some skills but need more...’

‘IUSSP is in the business of fostering networks... it’s been good at doing that with demographers and health scientists but not data scientists.’

‘In the conference we have these big themes, but we don’t have a high-level theme which is the data science aspect of all this work. But just creating that isn’t going to solve the problem because we have this cultural divide which is the real nub of the issue.’

Focusing on young people (... *‘though IUSSP isn’t a young folks-oriented organisation’*) was felt to be an important way of bridging this divide – a point we revisit.

3. Theme 1: Demography as a discipline: The changing context for IUSSP’s work

The interviews prompted some reflections on the nature of demography as a field

and how it is changing – questions that are critically important in (re)defining the role of IUSSP.

Box 4 Understanding ‘demography’ and ‘population sciences’

It is helpful to distinguish between the core, traditional definition of ‘demography’ and ‘population studies’. The former concerns itself with measurement issues; including in places where data are limited and care is needed to obtain robust estimates, often using indirect methods. Demography also covers the mathematical modelling of population dynamics – the complex and highly structured interrelations between population stocks (characteristics of populations at a point in time) and flows (births, deaths and migrations). In contrast, population studies is an interdisciplinary effort to understand populations and related topics such as the changing nature of families, economic development and climatic shifts.

The bulk of doctoral training in demography in the US occurs at population studies centres – ensuring that students acquire knowledge of basic core demographic methods, as well as analysis of population phenomena, typically grounded in demography, sociology, economics or public health. ‘Population studies’ is therefore more interdisciplinary than the narrow definition of ‘demography’. At a doctoral level, most training in demography is more likely to resemble population studies, while at the professional MSc level, it focuses more on measurement issues.

The question of what a demographer must know, or where demography ends and another discipline begins, is therefore unclear. This has led to concerns within the major population research training centres about how to ‘modernise’ demography; incorporating new data, methods and areas of research into university curricula while maintaining the essential core that provides a rigorous comprehension of population dynamics and a grounded strategy for analysis.

Source: IUSSP

Several interviewees pointed to a crisis of confidence in demography as a discipline – with one even suggesting that it may be time to rethink whether it has a long-term future. This crisis was linked to receding concerns over a ‘population problem’, which had anchored demography in global debates for many years.²

‘I think there’s a bigger issue which is extrinsic to IUSSP, which is what is the scale and scope and future of demography as a discipline... it’s been very badly affected by global changes and epistemological changes and changes to the funding framework. If you go back 20–30 years almost all the big American foundations were really concerned about population issues. Over the past 10–15 years that has dissipated quite strongly: lots of funders think that the ‘population problem’ is over, the population will start declining at some point. So I think the discipline itself has really struggled.’

‘Demographers are the original data scientists and have been left in the dust.’

² Now, according to one interviewee, young people were more likely to study topical issues such as climate change, or migration.

'I look at who's going to the population conferences and what they're interested in, and demography used to be front and centre but it's now out to the side of what they're doing.'

Some interviewees also attributed the declining interest in demography to a generational divide, with classic demographers 'ageing out' of the field as its popularity waned. Others stressed that the crisis was partially one of size: *'I'd question the old age effect. I think it's more of a small discipline problem'*. But interviewees also raised more fundamental issues related to what lies at the core of demography in the present day. Even among demographers, views differed, while non-demographers noted that they often struggle to understand what demography offers other than a commitment to rigour and to certain types of data.

This crisis of confidence is taking place within a rapidly changing global data environment. More than one interviewee described the *'freight train of big data'* that is rapidly overtaking the careful work done by demographers to understand the detail of human data, the questions that can be asked of it and, in particular, *'what to do when the data aren't that great'*. On the other hand, the need to react to this data and steer its use was felt also to be a source of strength, opening the possibility for demographers to bring their unique skill set to bear on many data issues involving population.

A key issue this tension raises concerns the extent to which demographers should emphasise method at the expense of the idea that demography requires a specific corpus of knowledge, not least given that demographic tools can be widely applied to many different fields (e.g. population health, economic development). The benefit of a focus on methods is that it applies to a plurality of social issues, thereby underscoring the relevance of demography:

'Demography is both a small and large kind of community... many people that are actually working on demographic-related topics, even though they don't label themselves as demographers per se.'

'Maybe as a discipline we have to accept that we aren't able to withstand certain tidal waves... What's more important, preserving the integrity of a discipline or ensuring that the knowledge which that discipline holds is accessible and available? That's an existential question for university departments, national associations, certainly for IUSSP.'

The risk of this approach is that demography 'implodes', becoming a toolkit rather than a discipline, a risk that is accentuated by the lack of a strong overarching theory that underpins most social sciences. Despite internal clarity about the nature of demography (see Box 4), it is not well communicated externally. This was also perceived as a drawback to IUSSP's more effective engagement with broader data revolution activity:

'What's not clear to me is how demographers define themselves: do they have their own set of methods, their own type of data, or are they really a field of enquiry? ... I've never really understood what demography is, and the way they've engaged with the data revolution hasn't ever quite clarified it, and I think sometimes they have different definitions. If demography is an academic discipline, that's one thing. But if demography is a tool that can be put at the disposal of a government ... that's quite different.'

Fundamental questions

- In the current climate, what is demography – and by extension, IUSSP – bringing to the table?
- Does IUSSP want to ‘grasp the nettle’ and directly address the challenging question of what demography is becoming and how it wants to influence the discipline’s development?

‘We understand why population matters, but how to leverage that in a way which makes sense, and which is in the long-term interest of the discipline and the community? My sense is that at a strategic level IUSSP has never quite asked itself that question... I think that the union really has to be able to say this is what we can do, and this is why it matters.’

- What is the niche that demography should occupy? How should demographers define themselves in relation to data scientists, sociologists, etc.?
- Could and should IUSSP lend its credibility in the field of demography to give new methods (e.g. data science) greater legitimacy?

Practical suggestions

- Designing messaging around the importance of including demography is important – it is necessary to convince others that population matters as does the ability to work with population data and understand its context.
- IUSSP, both as an institution and as a group of committed individuals, could play a leading role in helping to redefine the specific contribution demography makes to both academic and global debates, as a long-term project.

4. Theme 2: The politics and ethics of data for development

Data use not only requires technical skill but also raises deep political and ethical questions regarding how it is collected and used, by whom and for whom. Some interviewees identified these debates as integral to demography, and therefore, as an area that is well-suited to IUSSP activity. The interviewees agreed that IUSSP has the clout to insist that its members act as a sounding board in data revolution debates and believed its impartiality would lend additional credence to such involvement.

‘I think [IUSSP has] ... a good natural positioning as being academic and freer than their UN colleagues.’

Specific elements of these debates to which IUSSP could contribute include scrutiny of the fundamental premise of many organisations involved in advancing elements of the data revolution (‘They subscribe to the “better data leads to better lives” agenda – which we need to question’); a willingness to interrogate the political economy of data use (where estimates are coming from, who is using them and who might ultimately benefit) and the identification and examination of ethical issues arising from the adoption of new data sources and data science methods.

Indeed, the use of data raises deep political and ethical questions, such as the biases and limitations inherent in the collection and interpretation of ‘big data’ and its (mis)use in public life.³

‘It’s not just about another deep learning architecture...there are fundamental questions about the biases and power dynamics inherent in AI (and new forms of data).’

A particular concern, which we highlight given its critical importance to IUSSP’s mandate and aim to undertake work in and further linkages with lower-income countries, is that the nature of funding flows and thus the geographic distribution of expertise may be disempowering and marginalising knowledge and insight from the Global South (Box 5).

The key challenge cited to IUSSP’s engagement in this area was the limited number of demographers schooled in the politics and ethics of data use: *‘there’s a school of demographers who are interested in ... ethical issues and human rights ... issues when it comes to population data and the data revolution [but] they’re overburdened so we don’t have a huge cadre of members ready to engage.’*

Fundamental questions/suggestions

- Work on the politics and ethics of data could expand ‘*by leaps and bounds*’, to potentially involve:
 - High-level interrogations as to what IUSSP is doing and why, and the implications for knowledge and insights from communities in the Global South.
 - Consideration of the types of data emerging from digitalisation processes (e.g. Facebook), thorny ethical issues (e.g. privacy, legal identity, human movement) and how demographers can engage in a scientific and appropriate way.
- Increase exposure of computer scientists to the notion that *‘applying data science to demography is not just another deep learning architecture; rather it raises questions relating to social implications, biases and power dynamics.’* How can it therefore be used for good?
- IUSSP’s role is to demand ‘a seat at the table’ in debates over data quality and use.
- Is IUSSP contributing to a situation in which the Global South is being made ‘dependent on the Global North for data for insights into their actions and activities?’
- If IUSSP defines itself and communicates predominantly by its commitment to the quality of demographic data, it follows that it will find it hard to include in its debates, workshops or trainings those people who have not – for various reasons – been able to access the required level of training in demographic methods. But this is a political choice: IUSSP could define a more inclusive mission, for example, involving use of the highest quality *available* data or the highest quality *available* techniques.

³ Chen, W. and Quan-Haase, A. 2020, ‘Big data ethics and politics: Toward new understandings’, *Social Science Computer Review* 38:1: 3-9.

Box 5 Disempowering the Global South

Several interviewees commented on the existence of a power imbalance in data revolution activity:

‘Well-funded entities in the Global North are basically (using data science) telling people in the Global South what their answers are, and saying “here’s a turnkey solution which we designed and developed using your data and which tells you the answers you want to know” and maybe that is useful and helpful but fundamentally it disempowers and marginalises knowledge and insight from the Global South...’

The concern is that, particularly in the pressure to produce SDG-monitoring metrics, countries might elect to use the results of modelling exercises (produced in the global North) as a substitute for data collection; and that there might be insufficient capacity at a local level to challenge the results produced.

‘(African researchers) need to think more about what we can get from our digital traces... We come up with ideas (for using digital technologies in social science research) that we think are interesting and novel, but when we look these up online, we find out that they’ve already been done a long time ago by people based in the UK, US or Germany. We need to continue working on this issue in Africa, knowing that our digital traces are useful.’

‘Now that ... this is happening, the digital... revolution ... well, you need to work on the other part and empower people all over the world, not only in developed countries, to be able to actually take advantage of the data revolution. Because if not, if you say you keep training people and not giving them the tools, then that’s just an academic exercise.’

These issues resonate with IUSSP’s mission to build the capacity of population researchers from the Global South: *‘the longer term political and institutional implications (of this) is something that demographers are very highly attuned to...’* suggesting a role for the Union in using its credibility and weight in international fora to highlight the issue.

Another interviewee problematised data gathering in communities in the Global South without deeper engagement over the use of the data to those communities (though this is by no means unique to demography).

‘I think what is happening also is that ... you go to the community, you get the data, you analyse... But you don’t go back to the community and say “...listen, I did this research. This is what my findings are. What do you want to do with it? How can these help nurture your community and bring it forward?”’

The consequence is, once again, the potential to reinforce unequal power dynamics and marginalise communities, particularly their more vulnerable members.

Practical suggestions

- Future CRVS panels should take into account language and geographical distribution and sex distribution of its members.
- IUSSP should consider possibilities for the feedback of research findings to communities where it works:

'I think that one of the things ... is how do you engage with the community leaders to actually motivate them to have ... [to] use this data. You're not doing this just for yourself. So I think that this power, this balance, this engagement with the communities, with the people, I think that this is really critical, that's what I would do.'

5. Theme 3: IUSSP's offer and reach

IUSSP is widely acknowledged as the premier organisation of international demographers – interviewees praised its stellar reputation for scientific credibility, its members' expertise and the technical excellence of its training courses, seminars and panels (*'IUSSP offers high quality workshops that are worth attending'*). They spoke favourably of the Union's ability to convene high-level experts from diverse communities (demographers, data scientists, policy-makers), and the connections forged as a result. Moreover, it was felt that IUSSP could add value to discussions about the evolving data ecosystem that lack a statistical or demographical perspective. Interviewees felt that IUSSP was integral in exposing demographers to global debates and providing opportunities for their intervention:

'What IUSSP was able to facilitate was for the demographers to insert themselves into those conversations [about SDG monitoring], which wouldn't have happened otherwise.'

'It has [made] sure that there are demographers in the room who would not otherwise have been invited and who can avert some of the more optimistic or naïve approaches to problem-solving.'

It has also fostered the uptake of new data and methods among classic demographers:

'IUSSP's work really contributed to exposure, I would say, of stalwarts of demography to newer methods and getting them excited about them.'

'IUSSP was very important, especially early on, in bringing in data scientists to work with demographers/sociologists.'

Interviewees who had attended the 2019 December Expert Group Meeting on advances in data collection methodologies spoke of the opportunity it afforded for data scientists to network with demographers and practitioners they would not normally connect with. While one interviewee thought the modality was *'a bit old school with presentations and not much follow up'*, others felt that such opportunities for this type of dialogue were rare.

'There was a lot of audience ... that I don't normally interface with ... more on the demography side but also on the practice side.'

Other positive points that emerged included: IUSSP supports not just individuals but engages with institutions, which is vital to ensuring the sustainability of its initiatives; the Union provides support and encouragement to young researchers; it affords networking opportunities; it seeks partnerships and collaborations which is ‘what makes things happen’.

‘So as far as I’m concerned, the events that they’ve organised (some of them I’ve co-organised and some of them I’ve just participated in) have been very helpful to connect me more to the domain experts.’

At the same time, many interviewees argued that IUSSP could be engaging in debates over data use more effectively (*‘We’re not tapping the full reservoir, the full potential of the membership and the IUSSP capacity’*), and that it needs to be more strategic about its objectives and how to reach them. There was a sense that the Union is preaching to the already converted and that an inability to articulate its particular offering vis a vis the data revolution rendered it difficult to engage with stakeholders beyond its most immediate allies (e.g. academics and ‘quasi-academics’). Part of this difficulty was perceived to relate to the lack of a clear mission – per the earlier discussion of the evolving nature of demography as a field.

‘It’s not just about IUSSP making the effort, but there is something around clarifying their offer to ensure that others consider IUSSP as they think about “who they need in the tent”.’

‘Bringing demographers up to speed on how to use big data and to allow them to start intervening in those debates is important, but they need to be more targeted. IUSSP should really be saying “what is our strategic ability here?”’

One interviewee raised a perception that IUSSP was unable to express its mission in positive terms – i.e. to go beyond only stressing the limitations of data and provide insights as to what can be done with them, or *‘how do we turn the data that we’ve got into something sensible?’* (Box 6). This view was not universally shared – another interviewee argued that IUSSP’s insistence on the ‘correct’ use of data (and on data limitations) could provoke valuable and necessary conversations:

‘In some ways, our role is perceived to be the stick in the mud, the person who puts the brakes on things, but it often provides a very useful frame for rethinking about what is the role and function of data.’

More specific challenges also arose:

IUSSP was said to be *‘stuck in its ways’*, dominated by gatekeepers who are wedded to traditional methods, publish in top demography journals, and express scepticism of data science. This not only puts them at risk of becoming obsolete (*‘The freight train of big data can’t be stopped by saying nihilistically you can’t use them, they aren’t a basis for making policy’*) but also precluded new methods from gaining acceptance. Similarly, several interviewees commented that IUSSP was not doing enough to reach out to young people (see Section 9).

Box 6 IUSSP's message

Demographers expressed an ongoing frustration that messages about data quality were not getting through to the data science community. They felt that building the brand of IUSSP as the go-to organisation for rigorous input on data issues would give IUSSP members a sense that they have a right to a 'seat at the table', helping steer debates about data quality. However, this type of contribution was often perceived as defensive.

'I have definitely had in some of my interactions a sort of defensive tone [relating to strictures about what shouldn't be done] ... That may be exactly what everyone needs to hear, but they need to hear it in a way which is "and here's how we can work with you to solve those concerns".'

Several of the demographers we interviewed recognised this tendency and offered some more positive messaging:

- *'Sure, let's try this new technique, but let's make sure that we learn from what we already have so we don't lose the ability to interpret old data as well.'*
- *'Hang on, before you use those data, think about these issues... and here's a community of people who can help.'*
- *'What you're producing is interesting, but can they inform policy debates with a degree of rigour and robustness?'*
- *'What are the longer-term political, ethical and institutional implications of how you are collecting, analysing and using data?'*
- *'Maybe you need to have a demographer on hand who can act as a sounding board for what can be done, why and how.'*

While demography is a small community, there was a sense among interviewees that IUSSP could do more to articulate a common (positive) view of what demographers can bring to the table. This would involve purposively pulling together a pool of people and ensuring they talk to each other, not just about technical aspects of data quality but about the sociology of data. It would not be limited to demographers and data scientists but would involve outreach to other disciplines with similar interests, such as geographers.

'I still think that there's a way to go for other sciences to recognize that demographers are not only tables or censuses, that we have expertise, and that that expertise could be valuable to what they are studying.'

One interviewee noted that it is important that the message also reaches donors – bearing in mind that not all funders have the technically sophisticated understanding of demography that the Hewlett Foundation had in setting up this IUSSP programme.

It was widely noted that IUSSP's contributions to debates are facilitated by individuals, and this individualistic approach may comprise its ability to brand itself.

'I do worry about the extent to which there has been profile-building of the IUSSP as an entity, I think people are grateful for the activities conducted and the work done, and people have benefited from them, but I'm not sure it's hugely built the brand of the IUSSP.'

Finally, some interviewees perceived that many IUSSP members might not be well equipped to engage in highly political and/or policy-oriented processes.

'It's hard for IUSSP to find a home in a highly political environment.'

'There's a need for people in IUSSP who have policy and political bones with the capacity to frame debates, advocate for their perspective and express strong opinions.'

Fundamental questions/suggestions

- IUSSP could strengthen its brand by beginning to engage more as a network with some political debates – such as around the issue of data marginalisation in the Global South – inviting in young demographers and people from other disciplines.
- How can demographers' contributions be perceived as valuable, and as constructive (rather than defensive) in debates around the data revolution?

Practical questions/suggestions

- How can IUSSP's membership engage effectively in political and policy debates?
- To remain relevant and at the forefront of debates, IUSSP needs to respond more, and more quickly, to current events with a data angle. This means thinking strategically about where demography insights could be useful, joining the debates where they happen and encouraging younger members to engage actively.

6. Theme 4: Communications and outreach

The question 'what could IUSSP do more of or do better in future?' drew several linked responses. Several interviewees asserted that the Union could do more to build and maintain its brand within a rapidly changing global context. An effective strategy rests on good communications; it was widely felt that more could be done to improve the communication of research results, particularly to policy-makers:

'The demographic community is so closed... it is not using all possible communications tools to package these very interesting data and findings for (different audiences).'

'Not everybody understands statistics or demography, so we have to speak in the language which everyone can understand.'

'...you can be the best researcher in the world, but if your results are not reaching policy-makers... zero... the results of your research have to reach the policy-makers to be translated into programming.'

Practical suggestions for greater engagement (not only with young people) were holding mini hackathons and data challenges, bringing together small working groups and developing a stronger social media presence. Other suggestions included packaging data for diverse audiences, using multiple media (blogs, podcasts, videos, visual presentations) to give demography a greater reach and ensure demographers remain at the forefront of debates.

'[IUSSP has] fantastic findings, they do a [great job of organising], I think on the packaging side, it would be good also to do it for the normal citizens.'

'There is need for 'packaging [data] ... in a way that the policy-maker understands what the demographers wants to say... we are not doing research for the sake of research, we're doing it with an objective.'

'There needs to be more entrepreneurialism by IUSSP to say "could we continue some of the careful work we've been doing but could we also have greater impact by having better general messaging and reaching a broader audience than just academic or quasi-academic demographers?"'

'I think more could be done in terms of publications, multimedia initiatives that could be more broadly engaged to excite people around data science.'

'In the expert group meeting I was thinking wow, what we really should have done is brought in a few people from high schools, undergrad teaching institutions, terminal masters' degree institutions, get them involved to come up with ideas of what outputs we could generate that could be incorporated into a high school curriculum or masters' curriculum – things that would be appetite whetting ... I'm trying to articulate things that aren't expensive but with a bit of extra effort could have broader reach and uptake.'

Practical suggestions

- Make available more IUSSP resources, particularly training courses, in Spanish as well as English to increase uptake in Latin American and the Caribbean.
- Hire a dedicated communications person to focus on communicating findings and outreach.
- Cultivate the informal relationships that would enable demographers to share their findings
- Provide rapid responses to current issues with a data quality angle, e.g. Covid-19, racial inequalities or others.

7. Theme 5: Partnerships and networks

IUSSP balances two roles. It builds relationships between individuals; inviting non-demographers to take part in trainings or workshops and then engaging them and helping them build their networks within the community of demographers. It also supports the whole network, encouraging demographers to share their findings and to maintain a keen sense of quality. There was a general feeling that the Union should expand two types of membership. The first was students (see Section 9), where IUSSP could do more to understand their distinctive needs for information, training, networking and career development. The second was non-demographers

from disciplines with a particular interest in data such as data scientists (see Section 7) but also human geographers and others from fields of environment, migration, health, etc. It was suggested that IUSSP do more to connect proactively with those professional groups and invite their members to workshops, trainings and webinars.

'IUSSP (could do more) to go into the hardcore computer science venues... people who are in machine learning are open to finding fun projects... events at computer science venues like Socioinformatics or Webscience...are fantastic events but you're preaching to the half converted... there might be an opportunity to push it a bit further to the ... not yet converted to see if there is a new community hanging out there.'

Partnerships are a critical theme that emerged in many interviews, mostly as an area which IUSSP could leverage further. One interviewee praised IUSSP for the partnerships it has developed: *'they are not doing this on their own, they are partnering... and for me, partnerships and collaborations are (what) will make things happen.'* This observation was not limited to panel members or workshop attendees – students at the summer training institutes also reported productive collaborations with fellow attendees.

However, by and large, interviewees pointed to untapped potential in forming partnerships beyond immediate allies, and particularly with engaging substantively with influential organisations in the data revolution space such as PARIS21, SDSN and GPSDD.

'The whole data revolution workstream has needed to build bridges with other practitioners and disciplines and really speak not just within the discipline of demography but with others. My own experience with the workstream is that it hasn't been doing enough of that. The expert meeting was great, ... but it was preaching to the converted. We should be doing more here, reaching out much, much further.'

'For this workstream [IUSSP] could do more to engage a broader cross section not just of demographers and population scientists but people from other disciplines.'

'I think [IUSSP] could reach out more actively to people they would like to work with.'

Our interviewees spoke of developing specific institutional partnerships for specific purposes: with journal editors to talk about data sharing; with organisations that have actual development programmes to become more embedded as experts in human data and data quality; and with organisations who can broker relationships with NSOs and other statistical organisations. One interviewee suggested IUSSP could offer its services as an impartial provider of methodological expertise; acting as an intermediary between statistical offices interested in acquiring and using new forms of data and private companies who provide them.

Fundamental questions/suggestions

- Review partnerships and engagements to identify institutions and champions for future work who can help broker partnerships (e.g. with NSOs).
- Partnership should be a core element of IUSSP's strategy – i.e. *'bury ourselves in bigger initiatives'* (e.g. GRID3, part of UNFPA or others)

thereby *[using] bigger and more effective organisations*’ to advance a common agenda.

- Build new partnerships with organisations with development programmes (e.g. GIZ, IDRC) which could be linked to a broader mission grounded in the science and careful ethical human rights framing for which IUSSP is known.
- Engage with other stakeholders aiming to contribute to the data revolution – e.g. in the big data field, big questions around legal identity and its connection to population registers, the ethics/human rights potential around mobility data.

Practical questions/suggestions

- Build a stronger institutional relationship with SDSN to bring demography into the bigger international agenda.
- Partner more deeply with NSOs. One interviewee advanced her suggestions on how this could be taken forward. She suggested identifying ‘low-hanging fruit’ – NSOs with greater openness and willingness to take up new data sources and methods for partnership (e.g. in South Africa, Brazil, Mexico): *‘I think the demographers should take the first step to go to the NSOs and have an offer of partnership on how they can assess the NSO analytics maybe, or results of the census’*. She suggested that it would be helpful to have *‘another group in the room’* playing a brokering role in forging partnerships between demographers and official statisticians – e.g. academics, or better still PARIS21, owing to the *‘great relationships’* it maintains with NSOs. Finally, she underscored the limited resources available to NSOs and suggested that IUSSP should *‘start small’* with proof of concept to demonstrate how data can be easily generated with new technology. Such methods could then be scaled up, if effective.

Our interviewees placed stress on relationships between data scientists and demographers, given that brokering such partnerships is a key element of IUSSP activity. Both demographers and data scientists felt that IUSSP had made pivotal contributions to the burgeoning field of digital demography, by fostering interdisciplinary collaboration between demographers/sociologists and data scientists, and by arranging for the training of demographers in new computational methods.

‘IUSSP was very important, especially in the early stage ... essentially lowering the barrier of bringing people together from different fields ... IUSSP is very well-known to demographers and sociologists... But also served a sort of neutral place that was highly perceived also by computer scientists who wanted us to enter the field of population. And so it was really instrumental in getting started and facilitating the organisation of all of these activities that wouldn’t have happened otherwise.’

‘Sociologists have to go out of way to get training in resources on computational science. IUSSP’s workshop at PAA was super helpful in that respect.’

The 2019 Summer School in Cape Town stood out for the intensive training it provided on the use of data science tools in demographic research, and for the follow-on training it has spawned (see Section 8).

The interviewees were clear that each discipline brings different but potentially complementary skills and knowledge to bear on the application of big data to population issues.

'Demographers know what the question is but don't have the skills to marshal the modern data and methods. Computer scientists have the skills but don't know what to apply them to.'

It was emphasised that demographers' role was often one of quality control in the face of the rapid emergence of myriad new data sources that threaten to supplant traditional data gathering:

'The role of demographers is to say, "slow down, don't run too fast, let's check that we understand the uncertainties and limitations of what we are trying to do.'"

Data scientists noted their new understandings of the challenges facing demographers working in low- and middle-income countries and emphasised the contribution they could make, in these situations, to fostering an understanding of new data sources and their challenges, and to bringing additional analytical tools to the study of demography: '[Classical demographers] ... are not as open as they should be ... Most of the time, as a demographer, it's imperfect data. Digital data is also imperfect ... but we are not able to accept that very easily. So new data or the fear [that demographers have] of computational science is really something that IUSSP ... should strongly think about...'

Our interviewees cautioned that effective collaboration required data scientists' deep engagement with the aims of demography and demographers' openness to the approaches and methods of data science.

'[Collaboration] requires a data scientist to know what the demographers' goals are very innately ... otherwise, you just have the hammer and you're just trying to treat everything as a nail.'

'You can't just say, "Okay, let's link demography and computational sciences. Just because we want to..." It takes time, you need someone to take a leap of faith from one side to the other, re-learn a bunch of stuff and then see if they can cut it, they can do something and then perhaps fail, and then go back... But it's not going to happen overnight. That's what we realised, and it took us two or three years before we started hitting our stride in terms of research collaboration... otherwise the one side just feels like a tool... [and] you ask silly questions in terms of your research because you don't know what's possible and what's feasible.'

Its possibilities notwithstanding, several interviewees expressed concerns about the merger of data science and demography, and how this could be made more productive. One interviewer pointed to fundamental tensions arising from disparate approaches (*'Data scientists see data as this sort of deus ex machina: data just exists, it miraculously arrives and can be harvested and harnessed'*). The risk, in his view, was of ignoring established scientific traditions and acquired knowledge within demography but also the political and institutional implications of how data is gathered and analysed, and what it means.

Others felt that within IUSSP, digital demography was not given the credence it deserved, and that the Union could draw on its status to strengthen the subfield's legitimacy.

The more common view was that closer linkages were desirable but may be thwarted by practical constraints – these included structural impediments of undertaking interdisciplinary work in academic settings (for students and academics); different research cultures and publishing traditions (and venues); and much faster timelines for computer scientists, given the fast-moving nature of the field. The structure and funding of academic institutions makes interdisciplinarity particularly challenging: it is hard to find grants that cross two or more departments and even more difficult to manage them. The career paths that students can see for themselves similarly remain siloed.

‘It’s tricky, you have to find people with the right mindset and with the right positions who have the luxury of doing this type of work without having to worry about tenure evaluations, that sort of thing.’

At the same time, finding ways to bridge disciplines, particularly within universities, was highlighted as fundamental: *‘you need to train a student for interdisciplinarity. It’s not going to happen afterwards’*.

To date, IUSSP’s work on digital demography was felt to be very much the province of specific individuals – however, our interviews pointed towards broader ambitions to institutionalise the discipline through the training of junior scholars, both postdocs and university lecturers, and through academic exchanges.

‘My hope is that by getting [postdocs] engaged, they will be the next generation of people who will help with IUSSP ... And the same thing might happen [with] different institutions, whether it’s an institution with computer scientists or with demographers, so they’re bringing these people together ... forming a network and making sure that they know each other and they know what everybody else is doing. My hope is this would bring a community that self-sustains...’

The interviews collectively highlighted several questions that IUSSP may want to consider, both to advance the field of digital demography and consider the deeper issues involved in bringing together the two disciplines that may make the tension between them a productive one.

The experience of PERN which has existed since 2001 offers potentially useful insights into the initial challenges in bridging demography with geography and earth sciences, and growing acceptance of population and environmental studies. A long-time PERN member commented that at its inception, the network comprised

‘a very specific group of people that [came] together in conferences where we can have one or two sessions ... With this idea of interdisciplinarity between demographers and non-demographers in issues of population and environment. But we were really resisted on both sides... That is not the case now.’

She attributed this growing popularity, in part, to the expansion of remote sensing, and more broadly to a *‘a spatial turn in social sciences. You have maps everywhere, spatial data everywhere. And that is a common ground where everyone is uncomfortable.’* Having open data and open software was also important in stimulating widespread access (*‘I think that’s the huge part of why things are coming together at this point’*). The experiences of PERN also highlight that it often takes time and commitment for interdisciplinary networks to develop and thrive.

Fundamental questions/suggestions

- Should IUSSP be doing more to confer greater legitimacy upon the field of digital demography? If so, how?
- How could IUSSP foster research and engagement on the ethics of linking data from different sources or population mapping at such high resolution that people could be readily identified?
- More could be done to show how computer science can be used for good and to reflect on the ethical implications of such engagement:

‘As new types of data that digitalisation enables emerge, they’re throwing up that we need to figure out how we talk to Facebook: how do we engage as a discipline and as a field in a scientific and an ethical way? This area of IUSSP’s work should be really extended in leaps and bounds.’

Practical questions/suggestions

- Should IUSSP create a separate wing focused on data science?
- IUSSP could organise a side event at hardcore computer science venues focused on machine learning and AI where *‘people are open to finding fun projects’*. This would mark a departure from holding events at interdisciplinary computer science venues.
- Provide incentives for collaboration between demographers and data scientists (e.g. a journal special issue with digital demography as the theme).
- IUSSP has been successful at brokering connections between demographers and computer scientists. It could now use its reputation and convening power to foster more systematic connections with the private sector. *‘Several initiatives are linking researchers and people at private companies, including Facebook... but it’s ad hoc. More systematic engagement would be the next step in the evolution of these initiatives.’*

8. Theme 6: Training

IUSSP has invested heavily in the training of junior scholars (demographers and others) – in particular, through myriad workshops, the 2018 and 2019 two-week Summer Schools in Cape Town, and other smaller-scale initiatives. These included the CRVS Fellowship Programme which involves the intensive mentoring of a small cadre of eight young researchers interested in studying an aspect of CRVS, and the publication of their outputs in a special issue of *Genus*. According to one panel member, *‘I think that [will] be a success. [These are] the kind of people we should nurture, this is a kind of involvement and contribution which we should be having’*. The plan is for another eight scholars to be recruited in 2021 thereby building up research interest in the field.

The Cape Town Summer School was cited as another initiative with spill-over effects – notably, with trainees having gone on to organise their own training courses in Anglophone and Francophone Africa:

‘In the year and a half since (the Summer School) I’ve used (the techniques I learned) a lot either in my own teaching or my research’

and I actually ended up co-hosting a version of the summer school this year so it's definitely been very useful.'

'I'm using the learning from the Summer School as I helped set up a voluntary group at my university that teaches people to use R for data analysis.'

'After attending the two weeks with a colleague ... we immediately started pushing and designing for a post-graduate degree in computational social science [at Stellenbosch University, and] we started investigating and formalising an undergraduate aspect of computational social science...'

'Toward the end of the summer institute I have spoken ... about [hosting a summer school] perhaps in Ghana because I had to travel all the way from Ghana to Cape Town but if we had a closer location then we could have more people participate at the same time with less resources...it's something we still want to do.'

'After the [summer training institute], we constituted a research team... We are four and we decided to work on some topics by using the techniques we learnt, the data science computations... to write some articles and also to [advance] some projects.'

Interviewees who attended the Summer School appreciated the mix of theoretical and practical challenges covered: *'The talks gave you a high-level perspective, the exercises and the group work allowed you to learn things together or to struggle through a problem together for a couple of hours to try to solve something.'* The focus on data ethics was also highlighted:

'The first session focused on ethics and that sort of stuff: it's now definitely in my mind when I'm planning a study.'

'It helped with a lot of questions that weren't clear to me about my PhD research, such as research ethics – I got very good feedback during that institute which I found very helpful in my PhD.'

Successes notwithstanding, the interviews also pointed to some challenges – these included difficulties in recruiting fellows from sub-Saharan Africa, in teaching new tools in short courses (e.g. R, Python), in establishing a balance between participants with different motivations (in the words of one participant, teaching people R versus encouraging people to 'go and push themselves') and in raising sufficient funds to implement training programmes on a large scale. Interviewees also highlighted a dearth of training opportunities in sub-Saharan Africa (*'this is the biggest challenge I can see... many people don't have the opportunity to learn'*).

Practical suggestions

- Provide summer training institutes in computational science / digital demography in different subregions regions of sub-Saharan Africa, collaborating with universities in North, East and West Africa, as well as in South Africa.

- Institute a mentorship programme to provide structured longer-term training to junior demographers in SSA interested in integrating demography and data science.
- Initiate user-friendly continuing education for practitioners to understand new data sources and data science techniques so they are able to navigate the new landscape.
- Support multipronged educational efforts around new data sources (e.g. for students, practitioners).
- Should IUSSP be trying to whet the appetites of younger students (high school, master's degrees)?

9. Theme 7: IUSSP and young people

We interviewed two graduate student members of IUSSP to understand their perspectives on the organisation and solicit their recommendations on how it might strengthen its appeal to junior scholars.

The students cited many of the same benefits as their senior colleagues. These included IUSSP's international reach: *'the thing I benefit most from is just to know what's going on [in] other places'*, given the US/North American focus of PAA. The high quality of IUSSP workshops – and the connections they helped to forge – was also cited, with one student noting that this had helped him to acquire training in computational methods that was not readily available in his sociology department: *'[The workshops] are one of the biggest benefits that I see.'* Students in particular valued the regular newsletters, specifically information regarding new research and job opportunities.

These benefits notwithstanding, the interviews also highlighted areas where the students felt IUSSP fell short: *'[given] what I'm paying and compared to other memberships where they have annual meetings or more interactive events, IUSSP is not as cost effective.'* Specific gaps included a lack of readily accessible information about IUSSP's membership (*'I only know the persons that I [already know] are part of IUSSP, I don't know other people'*) and of deeper support in navigating the research and funding landscape:

'It would be helpful if grad students and junior researchers could see more opportunities for them to apply for funding (even if start up) or to get involved in some of the larger projects ... so that [they] get familiar with this whole process and get better prepared for their later career, especially if going into academia.'

We note too that both students had joined at IUSSP at their supervisors' behest – suggesting that IUSSP could do more to raise its profile among junior scholars.

Practical suggestions

The students' suggestions for IUSSP reflect their interest in accessing information more efficiently on research and funding possibilities, and accessible data. Ideas included:

- A Dropbox or database that collates funding opportunities for junior scholars; IUSSP members could input details of funding possibilities into this centralised repository (*'now, most of the time, you would just Google*

and then go through all possible resources in order to find an opportunity’).

- A data repository: *‘it would ... help people know who’s working on what, and if you want to collaborate with someone, do that, or you can share your data [which most demographers are very open to]’.* This has happened with Covid-19 data already, in a non-IUSSP initiative but per one interviewee, *‘I think there are many more cases where we could bring in mass knowledge to create better data’.* This need not be a high-tech platform; other low-tech solutions may be easier to implement: *‘perhaps just a Google sheet that is regularly updated that lists available data and where to access it’* or the collating of tweets from demographers posting about their work and where it can be found, or *‘as a start, adding a section to the newsletter to spotlight new data sets or new work that is available.’*
- Sponsorships for junior scholars to attend trainings, especially at international conferences.
- Holding workshops separately from major conferences.

We caution that we interviewed two students only, as obtaining their feedback was not a primary aim of this study. Given the importance of attracting and supporting new scholars within the field, IUSSP may want to undertake further canvassing of its junior membership.

10. Theme 8: What issues to work on

No doubt reflecting the diverse interests of its members and allies, our interviewees had a number of recommendations concerning areas that they thought IUSSP should work on moving forwards, which we group into specific topics, and ‘other issues’ and arrange in order, from narrower to broader:

Suggested topics

- Deepen work on CRVS – especially new techniques for intercensal population estimates.
- Produce quick estimates of Covid-19 prevalence linking population and epidemiological data (akin to interim GDP estimates which are revised as better data become available).
- Engage in debates around pandemic recovery.
- Focus on one specific SDG or theme such as ‘Leave no one behind’ and ask what data various disciplines can contribute, ensure this data is available and accessible, and interrogate how this can be consolidated and synthesised.

‘If I was in IUSSP’s shoes, I would think about ways in which they could take a slice of the world like urbanisation or climate refugees... it’s not obvious to me that the SDGs, particularly in an age of collapse of democratic institutions, the pandemic, climate, are really the defining framework for how many funders think about things... I would think about prominent and soon-to-be emergent policy domains or sectors in which there is a hugely important population angle.’

‘I do think they should also look beyond SDG monitoring to ask bold questions on contentious topics (gender, climate change....) with demographic causes and/or effects.’

Other issues

- Issues where demography could make an extremely specific contribution – e.g. sharing programme code, not just data.
- Work with journal editors to create a ‘pull’ on academia as one way of inserting demographic expertise on topics like data sharing.
- Convening journal editors to advance data sharing
- Interoperability.
- Broader (and more political/ethical) discussions about data ecosystem – including survey data, big data, administrative data.

11. Conclusion

Our assessment of the IUSSP’s programme leads us to the conclusion that it succeeded in meeting the spirit of the Hewlett Foundation grant with a high-quality set of discussions, panels, trainings and networking events. Both junior demographers and their more senior colleagues benefited from the range of activities, which is poised to have lasting impacts, particularly in the training of demographers in digital demography and the institutionalisation of this burgeoning discipline. However, at the same time, this programming also exposed the breadth and depth of work that still needs to be done to ensure that demography remains critical to work on data for sustainable development. This includes:

- Engaging with academia on ways to bridge demography and data science and thereby advance effective interdisciplinary collaboration;
- Building capacity for digital demography, particularly in lower-income countries and beyond the Anglosphere;
- Continuing to strengthen the voice of demography in global debates around data, with an emphasis on the political economy of new data sources and data science methods.
- Exploiting opportunities for demographers and digital demographers to engage with emergent policy domains that are critical to furthering sustainable development.



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