ETH zürich

Colloquium Science, Technology and Policy Autumn Semester

2022

A Collection of Reports
Written by MSc STP Students

ISTP

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This collection contains reports about the ISTP Colloquia talks in the Autumn Semester 2022 authored by our Master's students. Find out more about the ISTP Colloquia series: ***www.istp.ethz.ch/events/colloquia***

1

Global guidance to mitigate malnutrition

by Johanna Ribas
based on an ISTP Colloquium talk by Dr. Allison Daniel

Dr. Allison Daniel is a consultant at World Health Organization working on the guideline for prevention and treatment of wasting. In this colloquia, she presented the problem of child's malnutrition in the form of wasting and the work that WHO is doing to design a global guidance to mitigate it.

Our guest speaker started by introducing the concept of wasting. Wasting is a form of malnutrition that over 45 million children are suffering around the world. It is characterized by a loss of body weight in relation to height, which increases a child's risk of infection and death and decreases their ability to learn. Unfortunately, the number of children who suffer from it is increasing due to the COVID-19 pandemic, climate change and conflict.

In view of this concerning situation, in 2019 the Principals of the UN agencies issued a joint statement calling for a greater action to prevent and treat wasting in children. As a result, a Global Action Plan framework (GAP) was

developed and WHO took the role in it of reviewing the science and examining programmatic experience to produce a comprehensive guideline on the prevention and treatment of wasting.

An essential element of the GAP for wasting is to update and develop normative guidance and tools to support governments on the prevention and treatment of child wasting in all contexts.

This guideline is designed around 4 focus areas:

› Growth faltering in Infants below 6 months

› Moderate wasting in infants and children 6 months and older

› Severe wasting & oedema in infants and children 6 months and older

› Prevention of wasting

As the speaker outlined, developing a guideline is a very tedious work and it is done in many steps that include establishing the Guideline Development Group (GDG),

scoping of the guideline, set potential questions, systematic reviews for all questions and make recommendations from the evidence.

To evaluate the guideline, it is necessary to measure the effects of certain interventions. For example, the GDG measures the impact of a certain intervention on health equity or the feasibility for a country to scale it up. Another crucial aspect is to assess the cost-effectiveness of using certain resources and analysing the desirable and undesirable effects of interventions.

Once there is a guideline, it must go through multiple systematic reviews. In the case of GAP, there were 16 quantitative systematic reviews, 4 qualitative systematic reviews and 3 resource use and cost-effectiveness reviews.

The problem becomes very complex because there are many levels to be addressed. All the standard effective reviews are put together to make judgements for each domain and conclude with some recommendations which can be strong or conditional. A strong recommendation is given when there is confidence that the desirable effects clearly outweigh the undesirable effects.

However, most of the recommendations end up being conditional because even if the desirable effects probably outweigh the undesirable effects, the GDG is not confident about these trade-offs in all situations. These recommendations can change as new evidence comes in.

An example of one of these guidelines is the WHO guideline on the dairy protein content in RUTF (Ready to Use Therapeutic Food), which is the main treatment to reduce wasting. WHO evaluated if they could reduce the content of milk in it to make it less costly but still recover the kids. The conditional recommendation was to keep at least 50% of protein coming from dairy products.

Finally, the wasting guideline will also be released with operational guidance which tells experts how to deliver interventions. This provides the 'how to' guidance for different contexts.

To end with the speech, the guest speaker encouraged us to have a look at the Global Action Plan for Child Wasting website which contains insightful information on how countries are addressing the wasting issue around the world.

We sincerely thank Dr. Allison Daniel for providing us with this insightful information.

2

Digitalisation, daily life, and climate change

by Bea Movido
based on an ISTP Colloquium talk by Prof. Dr. Charlie Wilson

Dr. Charlie Wilson is a Professor of Energy and Climate Change at the Environmental Change Insti-tute of the University of Oxford. In his colloquium talk, he shared his insights on the relationship be-tween digitalisation and climate change. He highlighted several opportunities and risks through which digital technologies can align with or undermine the climate agenda, then elaborated on how we can use this knowledge to achieve an ideal future scenario.

What is digitalisation?

Digitalisation refers to the collection, exchange, storage, and analysis of data in a cheap, quick, and connective manner. But being a general purpose technology, it is difficult to isolate its effects. As more and more digital technologies become embedded into all aspects of our lives, we must learn to consider its future impact on society and our environment.

Opportunities and risks for digitalisation

Dr. Wilson's research focuses on the intersection of digitalisation and climate change mitigation. He elucidated upon the opportunities and risks associated with the interplay of the two.

One way digitalisation can help with climate change is through the substitution of physical activities for digital activities – examples being working from home and videoconferencing. These essentially lead to less travel, thereby reducing a participant's carbon footprint. Digitalisation also unlocks access to services, replacing the need to own physical goods. Coordination of surplus supply with real-time de-mand is streamlined through digital platforms such as those for ridesharing, peer-to-peer carsharing, and shared ride-hailing. Moreover, there are also platforms that facilitate the exchange of physical goods to avoid waste. The prevalence of smart technologies has been steadily growing as these are used to better control and manage resource use. Lastly, resources are integrated into optimized sys-tems through digitalisation

– this leads to more flexible storage and demand.

Despite these advantages, digitalisation also presents considerable risks that may undermine its po-tential for positive influence on climate change mitigation. For one, it can cause a rebound effect whereby consumption is increased as an activity becomes easier or cheaper, like with e-commerce fast fashion and autonomous vehicles. Increasing digitalisation may also intensify new forms of activi-ties which otherwise would not be as energy hungry, as is the case with Bitcoin mining. There is the added risk that environments become further contaminated due to mining and e-waste directly linked to digital technologies. Looking at it through broader perspective, digitalisation has the power to un-dermine human agency through manipulation, exploitation, and polarization. It might also displace and divide societies by worsening inequalities of access and opportunity.

Future pathways

There is still much uncertainty surrounding the possible implications of digitalisation for energy, materi-als, and carbon emissions. This would largely depend on the design, use, and regulation of the digital technologies we develop. But we must take care so as not to overstep planetary boundaries nor un-dermine human agency and social equity. Directed digitalisation for public purpose is necessary to be able to move towards a more desirable future pathway.
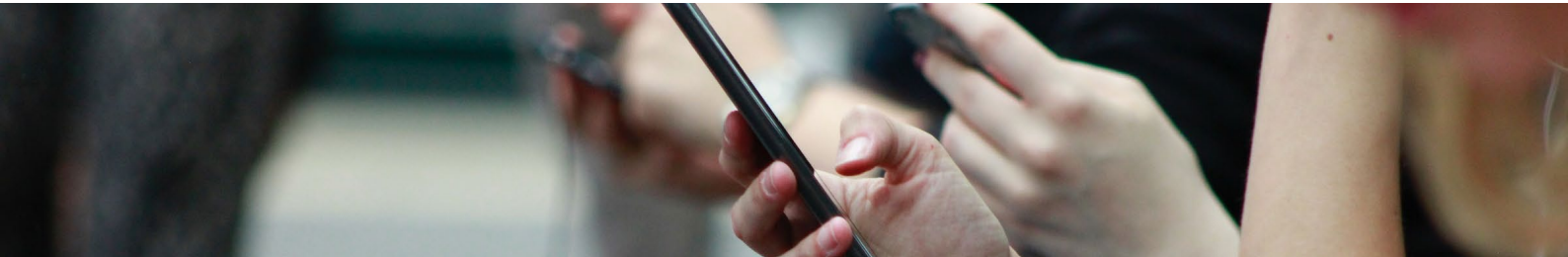
The Institute of Science, Technology and Policy thanks Dr. Charlie Wilson for his engaging and thought-provoking presentation.

3

Digital Nudging – Too much or not enough?

by Christian Rolli
based on an ISTP Colloquium talk by Prof. Dr. Verena Zimmermann

On the contrary to bans or regulations, nudging follows a different approach, where people are not limited in their choice, but supported to take the "wise" decision. In her talk, Prof. Dr. Vere-na Zimmermann presented examples for nudging in human centered security and privacy solu-tions.

Summary of the talk

Many people are overwhelmed and underestimate privacy issues in the constantly growing digi-tal world, which is getting more and more complex. To increase security and privacy solutions effectively, digital nudging could be an option.

Some simple solutions could be highlighting the 'decline' instead of 'accept' button for the cookie policies in order to better protect people's privacy. But the nudging becomes more com-plex when it comes for example to password security. Here the person has to actually create a password. Hence this person needs to know what makes a good password and then implement these aspects. Therefore, a hybrid nudge could be a more effective solution.

A hybrid nudge combines a nudge (e.g., colored bar for password strength) with an information (e.g., information box what should be included in a strong password). This hybrid nudge has shown a much higher impact on password security, than a simple nudge or just the information alone.

Nevertheless, there are still some challenges when looking at the example of the password security. In a second study that was conducted two weeks after the hybrid nudge, people were falling back to their old patterns without the nudge. This shows that it is also important to focus on long term effects to have a more sustainable learning curve.

Additionally, it is important to be aware, that there is also an ethical question when it comes to nudging. Who decides what is the "wise" decision that people should be guided

towards? And from which point on is it manipulation of people?

Therefore, we should follow some guidelines for ethical nudging like:

› Respect for persons

› Beneficence (nudging for good)

› Social responsibility

› Justice

› Scientific Integrity

Further, nudges should be transparent. If people are not aware of the nudge, this results in a manipulation effect which should be avoided. This also helps to identify unintended side-effects and mismatches. A hybrid nudge presents one example of creating more transparency through providing the information together with the nudge.

This brings us back to the question in the beginning:

"Digital Nudging – Too much or not enough?"

I would like to thank Prof. Dr. Verena Zimmermann for her interesting elaboration on digital nudges, both on pro and contra perspective, and giving us a better understanding of the ethical and technical points of view to find an answer to this question.

4

Harmonizing international commitments with domestic policymaking: the role of two-level connectors in climate negotiations

by Paul Fäth
based on an ISTP Colloquium talk by Prof. Dr. Karin Ingold and Dr. Marlene Kammerer
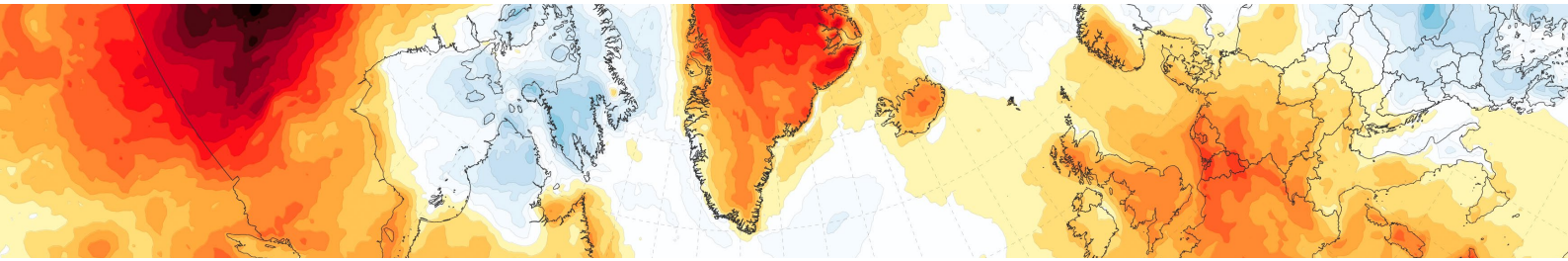
With the Paris Agreement international policymakers committed to keep global warming below 2°C, however, a gap between promised and implemented actions can be observed. To understand potential causes of this gap, we had the pleasure of listening to Prof. Dr. Karin Ingold and Dr. Marlene Kammerer who examined the influences of two-level connectors.

Countries develop their ambitious climate change mitigation policies at the international level, while the implementation of these policies takes place at the national level. Some countries are unable to harmonize their international targets with national actions, whereas others even exceed their goals. The difference between Parliamentarian or Presidential political systems or the difference between Corporatism and Pluralism could be theoretical reasons for the gap between international promises and national implementation. Analyzing the degree of harmonization between promises and implementations Prof. Dr. Karin Ingold and Dr. Marlene Kammerer have shown that the political framework is not sufficient to explain the hurdles in translating international climate mitigation policies into national changes.

They identified the importance of two-level connectors to harmonize international target. Two-level connectors are actors which are present at the international and domestic levels. This enables them to realize nationally determined contributions (NDCs).

Linking policy harmonization to two-level connectors

To prove their concept of the importance of two-level connectors for the harmonization of international climate policies, they developed four hypotheses. First, two-level connectors are more successful in harmonizing policies if they are popular. A popular two-level connector has several inbound links for cooperation. Second, two-level connectors are more successful in policy harmonization if they are active. An active two-level connector has several out-going collaboration links. Third, two-level connectors are more successful in policy harmonization if they are perceived as influential. To be seen as influential, a two-level connector must be highly regarded by other. Fourth, two-level connectors are more successful in policy harmonization if they are perceived as neutral. A neutral two-level connector is not part of a belief cluster or is on its periphery.

To measure the harmonization of climate change mitigation, a vertical policy harmonization index was developed. The hand-coded index is based on policy documents and NDCs. In addition, the main independent variables were developed using a survey that identifies two-level connectors and determines their popularity, activity and influence by counting incoming or outcoming cooperation ties.

Conclusion

The comparison of the four countries Germany, Switzerland, Sweden and Ireland shows that in countries which underperform in implementing their nationally determined contributions, i.e. countries with less harmony, two-level connectors are on average less or similarly popular and influential. These results are as expected. Further, in countries with less harmony, two-level connectors are on average less or similarly active. These results are partly as expected.

In countries which outperform their international climate targets, i.e. countries with more harmony, two-level actors are more popular and more influential. These results are as expected. Partly as expected, countries with more harmony are more active on average, however, this cannot be observed in Switzerland.

The current results are limited by the fact that only European countries are compared so far. Further limitations derive from the analysis of US and Indian connectors, as these actors have different characteristics Furthermore, the collection of data is dependent on collaborations and very costly, so that a large-scale analysis is not possible.

In conclusion the vertical policy harmonization index provides normative guidance on how well an international climate change mitigation policy is implemented at the domestic level. Moreover, it assists the understanding of two-level connectors and the manners in which they must act to minimize the policy gap between international commitments and national actions.
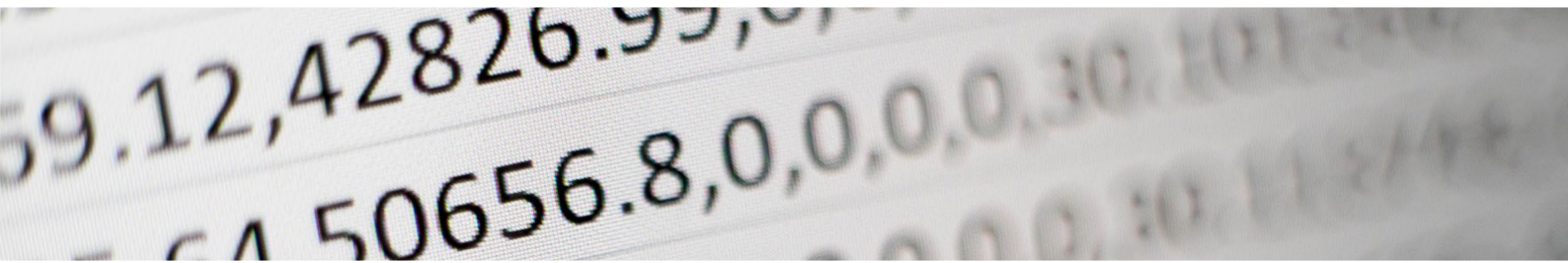
5

Data structure the world – but who structures data? The case for research on data practices

by Yash Dubey
based on an ISTP Colloquium talk by Prof. Dr. Jale Tosun

In this talk, Professor Matthias Leese presented his work on data practices among security agencies in the EU. His work focused on the use of airline passenger PNR data to combat terrorism and crime. He began by highlighting the growing importance of data and the challenges that arise when data-driven solutions are translated to empirical reality. Finally, he utilized his work to highlight the most pertinent issues arising in practice, their implications, and the case for studying data practices.

Introduction

Data is increasingly being appreciated as an entity to replace oil as the central power of the world economy. Many successful companies such as Google and Amazon utilize data to run their businesses and make decisions. The universal assumption is that more data and algorithms are likely to inevitably lead to surplus value creation.

This has led to a reductionist view of data as the solution to all problems with the assumption that throwing data, machine learning or computing power at an issue is likely to solve it. This view is especially prevalent in security governance with attempts to model the social world or individual behaviors through data and carry out risk assessment and preventive interventions based on data analysis.

However, this view is detached from reality and warrants close attention to help understand how data actually come to matter.

Case Study: Utilization of air travel data to combat serious crime and terrorism.

In a brief overview of his research titled "Epistemic fusion: Passenger Information Units and the making of international security", Prof. Leese highlighted the

challenges of studying sensitive security data, triangulating data from related sources such as policy-making process, trainings and webinars, and creating analytical data from texts and interviews with stakeholders.

The study aims to understand challenges faced by Passenger Information Units attempting to utilize PNR data to combat serious crime and terrorism.

The study broadly considers 3 aspects of data; Data quality processes, Contextualized Modelling and Actionability.

Data Quality Processes

The study reveals that friction stems from different data quality specifications between businesses and security governance. Airlines have little incentive to ensure data quality. On the other hand, security agencies require reliable, high quality data to develop contextual models. Common issues include dummy passport numbers and fake or placeholder names for passengers. Completeness levels may also vary significantly across airlines and even within flights.

Contextualized Modelling

Security agencies utilize available data to build contextualized profiles and model traveler behavior. This process requires domain expertise in areas of international travel to answer questions such as the average luggage weights and demographic of passengers by time of booking. Consequently, most traveler profiles emerge through contributions from personnel involved in criminal investigations rather than from the data. This is often due to the aforementioned friction in flow of data and lack of adequate quality data for such modeling.

Actionability

The data in conjunction with the modeling is utilized to flag suspicious travelers on flights by utilizing PNR data and contextualized models.

The models tend to provide a large number of false positives. Operationally and legally, it is necessary to bring down the number of such "hits" per flight. This is done by calibrating the model with archival PNR data to be more specific and produce fewer hits. This calibration can be carried out by weighting the assigned scores or adding newer categories or modifying the threshold required to generate a hit. This process ,again, requires the contribution of domain experts.

Implications

The primary implications of the case study are that the flow of data often causes friction among systems as data practices may vary widely across applications and actors. These practices determine how data come to matter. Traditionally, data practices are not considered to be a

critical part of techno-solutionism. However, given the impact of such practices on the usability of data, empirical research is needed to capture the lifewords of those who interact with data on a daily basis along with tools that can explore data interactions. These endeavors will provide much needed insight into the differences between the imaginaries of high level policy and socio-technically mediated ways in which data actually come to matter

6

Farm-Level Economic Impacts of a Glyphosate Ban in Europe

by Vashita Nath
based on an ISTP Colloquium talk by Prof. Dr. Robert Finger

In the last colloquium of the semester, Prof. Dr. Robert Finger joined the session to speak about the farm-level economic impacts of a glyphosate ban in Europe. He is Professor of Agricultural Economics and Policy at the ETH Zurich (Associate Professor) and head of the Agricultural Economics and Policy Group. His research is positioned at the interface of agricultural sciences and economics to contribute to more resilient and sustainable agricultural and food systems and is mainly focused on farm-level decisions and their interrelation with the environment, markets, societies, and policies, mainly related to European agriculture. In this talk, Prof. Dr. Robert Finger gave a glimpse of his research, introducing the pesticide glyphosate and the political context surrounding it, concluding with the results of his synthesis of the existing evidence on potential economic impacts of a glyphosate ban in European agriculture.

Introduction to Glyphosate

Glyphosate was the most widely used pesticide globally, in the EU and in Switzerland, with the history of the pesticide stretching from 1950 when it was first synthesized to the present after its global use exploded in the 1990s. It was used most commonly for weed control, to terminate specific cover such as grassland, and to enable no-till farming. There were however, variations in the usage and applications among countries, even within Europe, often due to climatic conditions.

Discussion of Policy Context and Implications

The political discussion over banning glyphosate is complex because of how interconnected its applications are, and is dominated by the impacts on human health rather than the documented environmental hazards of glyphosate. This discussion was contextualized by an overview of the timeline of policy decisions on glyphosate and the factors that made the non-use of glyphosate more expensive. Because of its wide use, a ban on glyphosate has significant and heterogenous economic impacts, at

least in the short run. Furthermore, these economic considerations only complement other criteria such as health and environment, there would be possible negative environmental side-effects of a glyphosate ban such as on conservation agriculture. In the long run however, replacing glyphosate is more feasible, but would require policy support, such as in the form of technology development, strengthening advisory services or targeted incentives. Regardless of a glyphosate ban, a combination of push-pull policy instruments is required to reduce pesticide risk.

Hence, replacing glyphosate will require a bundle of measures, due to the often-reduced efficiency of substitutes and severe knowledge gaps regarding the economic implications of the ban. There are also underexplored aspects of the ban such as changes in labour requirements, market responses and long term developments. Moreover, there is a research gap, with a huge gradient of methodological 'depth' of the analyses conducted, lack of peer reviewed research and need for systematic analyses. Also key for both policy and on-farm decisions are an understanding of the health and environmental effects, the negative spillovers of pesticide use, and economic implications in other up- and down-stream industries.

The Shell case

The goal of this study was to review farm/field level economic impacts, so excluding health, environmental or up- and down-stream level impacts within European agriculture, so considering EU, UK and Switzerland. The sources included scientific peer-reviewed literature, non-peer reviewed literature (all languages) and a survey among a Europe-wide network of experts to identify national reports, hence picking up from 19 studies published between 2010 and 2022 in English, German, French, Danish and Swedish. Of these, ten were peer reviewed and nine were not (yet). Each study had multiple assessments and observations, and all the results were transformed into Euro per hectare for comparability.

Within peer-review studies, there is found to be a large range of monetary impact, with the potential absolute losses largest for high-value perennial crops such as fruits and grapevine, and lower absolute losses for arable crops. It was also found that if farmers switch from mulch tillage (with glyphosate) to ploughing (without glyphosate), the economic losses could increase by up to a factor of 2-3. There was large difference across methods, but peer reviewed reports were found to report lower negative economic impacts.

As such, there were severe knowledge gaps that led to less than satisfactory outcomes of the study with regards to labour and market responses, long term impacts, framing systems used, and countries covered. The heterogenous methods used across various studies/countries that also make it difficult to compare, such as modelling/bio-modelling approaches vs econometric approaches. Few countries and crops dominated the data, and perennial and special crops were rarely considered. There were also gaps in the comparison of relevant applications, with focus on pre-sowing and post-harvest weed control, while termination of temporary grassland and cover crops, or crop desiccation were rarely considered.

It was very insightful to hear about the farm-level economic impacts of a glyphosate ban in Europe, and the insider perspective on the review conducted. We would like to sincerely thank Prof. Dr. Robert Finger for his engaging presentation.

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