

Governing-by-the numbers – Résumé after one and a half years

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1. Introduction (Along came COVID¹)

At the end of 2019, when the contribution “Governing-by-the-numbers/Statistical governance” [1] was intended to initiate a reflection and discussion on the www.officialstatistics.com discussion platform on the future of official statistics in a digital and globalised society, it could not yet be foreseen how much the world would change in 2020. Eighteen months later, the COVID pandemic has taught us painfully how urgent the availability of reliable statistical information is.

At the same time, however, we had to take note of three facts that do not leave us untouched as professional statisticians:

Firstly, there was – at least in the first months – a lack of statistical expertise and influence in the collection of data, its processing and communication, with the result that the pandemic seemed to be accompanied by an infodemic. *“All data are created; data never simply exist. Before March 2020, the country had no shortage of pandemic-preparation plans. Many stressed the importance of data-driven decision making. Yet these plans largely assumed that detailed and reliable data would simply... exist. They were less concerned with how those data would actually be made [2].”*

Secondly, it became very visible how incomplete statistical literacy is among the population. Basic knowl-

edge and skills for understanding facts, such as the dynamics of exponential growth, or the assessment and framing of risks seem to have been insufficiently taught.

Thirdly, the acceptance and authority of official statistics seems to have lost influence. In a society with almost infinite amounts of data and possibilities to exploit them, there is a danger of fragmentation of statistical information with the consequence that there is no longer a common language for public discourse [3,4].

The COVID Pandemic is a magnifying glass through which to view the interplay between science, statistics and society, which has already led to sometimes steady, sometimes abrupt developments in all areas of statistics over the past two centuries.

From this point of view, it is of course particularly exciting to look back at the published articles and contributions to the discussion.

2. Governing and governance

2.1. The value chain and the co-production of statistics and society

In the opening contribution (‘Governing-by-the-numbers Reflections on the future of official statistics in a digital and globalised society’) [1], a distinction between data and facts was introduced, in order to better consider and name different phases of the value chain from raw material to knowledge with relevance for decisions and public discourse.

Contributions

The theme of “Data for Policy” was reflected in con-

¹A tribute to the title “Along came Betty” (B. Golson), Art Blakey and the Jazz Messengers, Album “Moanin” (1958, <https://en.wikipedia.org/wiki/Moanin%27>).

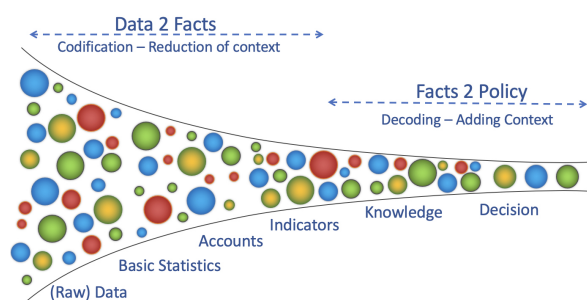


Fig. 1. The statistical value chain.

tributions in the Statistical Journal (Volumes 35, 36 and 37) from authors representing different stages and perspectives in this value chain. Basically, the following clusters of manuscripts can be identified:

- Professional insiders of official statistics (data2facts)
 - * Rancourt, Eric. 2019. ‘The Scientific Approach as a Transparency Enabler Throughout the Data Life-cycle’ [5]
 - * Alleva, Giorgio, Emanuele Baldacci, and Pietro Demetrio Falorsi. 2021. ‘Methodological, technological and design challenges in the new multisource statistics ecosystem’ [6]
 - * Cook, Len. 2020. ‘Evidence, accountability and legitimacy: The oversight of child welfare services’ [7]
- Addressing indicators at the interface between production and use
 - * Lehtonen, Markku. 2019. ‘The multiple faces of trust in statistics and indicators: A case for healthy mistrust and distrust’ [8]
 - * Radermacher, Walter J. 2021. ‘Guidelines on indicator methodology: A mission impossible?’ [9]
 - * Kenett, Ron S., and Filomena Maggino. 2021. ‘Techniques for analyzing and presenting official statistics indicators’ [10]
- Addressing the use of statistics and the relationship between statistics and (civil) society (facts2policy)
 - * Umbach, Gaby. 2020. ‘Of Numbers, Narratives and Challenges: Data as Evidence in 21st Century Policy-making’ [11]
 - * Bartl, Walter, and Christian Papilloud. 2020. ‘Measuring “equivalent living conditions”? The use of indicators in German federal spatial planning’ [12]
 - * Prutsch, Markus J. 2020. ‘Science, numbers and politics in a “post-truth” world’ [13]

- * Diaz-Bone, Rainer, and Kenneth Horvath. 2021. ‘Official Statistics, Big Data and Civil Society. Introducing the Approach of “economics of Convention” for Understanding the Rise of New Data Worlds and Their Implications’ [14]
 - * König, Ariane et al. 2021. ‘Can Citizen Science Complement Official Data Sources that Serve as Evidence-base for Policies and Practice to Improve Water Quality?’ [15]
 - * Carranza-Torres, Javier Andrés. 2021. ‘How can traditional statistical relationships be redefined through citizen to government partnerships?’ [16]
- Finally, there was a number of contributions dedicated to the topic by means of a historical contemplation and contextualisation.
 - * Pullinger, John. 2020. ‘Trust in Official Statistics and Why It Matters’ [17]
 - * Habermann, Hermann, and Thomas Louis. 2020. ‘Can the fundamental principles of official statistics and the political process co-exist?’ [18]
 - * Prévost, Jean-Guy. 2020. ‘Past, present and future of Canadian statistics’ [19]
 - * Bodin, Jean-Louis. 2020. ‘A view on 50 years of life of the ISI: With a focus on ISI relations with official statistics’ [20]
 - The articles appeared in different issues of this journal between December 2019 and June 2021, with specific introductions and editorials
 - * Radermacher, Walter J. 2020. ‘Governing by the numbers’ [21]
 - * Radermacher, W.J. 2020. ‘Governing by the numbers – editorial’ [22]
 - * Radermacher, Walter J. 2021. ‘Governing by the numbers’ [23]

2.2. Discussion platforms and other main topics of the journal in this period

*Why-should-there-still-be-need-elaborate-official-statistics-future?*²

This discussion was introduced with the following five statements:

In the long run, trust in official statistics can only be maintained based on a continual striving for the best quality, with leadership based on profound knowledge

²<https://officialstatistics.com/news-blog/why-should-there-still-be-need-elaborate-official-statistics-future>.

of the business and with customer orientation as the supreme orientation. This implies that statistical products must meet the expectations of users in their design, production and communication.

Official statistics will be under attack either by discussions on trust or by competition from statistics produced with lower quality. For official statisticians to be needed in the future, they have to be more than just data engineers. They must know the DNA of their business and use their capital (especially their know-how and internationally agreed methodological standards) to develop a market-oriented strategy. Official statistics has to be policy-relevant without being driven by politics.

Civil society should be more closely involved in official statistics, be it through participation in indicator design processes, through crowd-sourcing of data or as a partner in communication.

The power of numbers will increase dynamically with new data sources and technologies, which calls for an informational governance at both national and international level. Official statistics can and must claim a decisive role in this governance. A global organisation of professional statisticians anchored in civil society should develop a suitable indicator to measure and monitor the independence and integrity of statistics in individual countries.

There is a lack of scientific research, suitable textbooks and qualified training courses for official statistics. A scientifically founded, conceptual operationalisation of statistical processes, be it in data collection, national accounts or the generation of indicators, requires more than the knowledge of specific statistical methods or data sciences. Rather, aspects from other fields, such as sociology, historical, or legal disciplines have to be taken on board. There are many different strands of science contributing to research on processes of quantification and the impact of quantification within social contexts.

Comments

Overall, following the publication of these statements, there was only limited initial discussion on these issues on the discussion platform. To a considerable extent, this may have been due to the fact that the COVID pandemic has focused the attention of the readership very strongly on this topic. On the one hand, the contributions to the discussion raised few critical controversies. On the other hand, however, they indicated in various topics that these should be further explored. The comments on the statements can be summarised as follows:

The need for a mapping of future information de-

mand was supported. Such foresight should counteract the false assumption that the current system, which has emerged from socio-technical changes, would be suitable to lead us into the future.

In order to ensure compliance with statistical standards, reference is made to the example of civil aviation and to greater self-responsibility on the part of the statistical profession. As far as the use of data for policy is concerned, there is a call for more research and development to increase the exploitation of raw data through sense-making and policy-relevant methods.

Greater involvement of civil society and citizens is welcomed in principle, but with a need for clarification regarding practical implementation.

With regard to literacy, a need for improvement in general statistics education is shared in the expressed opinions, whereas the need for improved training for professional statisticians (textbooks etc.) is seen sceptically from an economic point of view in light of the high degree of fragmentation of the market.

Obviously, for many of the issues raised, it is important to clarify who (and what) a statistician actually is. Similarly fundamental is the reference to the quality of the information produced and provided by official statistics.

Other discussion platforms and topics

In the Statistical Journal of the IAOS, a new topic is regularly put on the agenda and a discussion platform is opened in each case,³ which in the last eighteen months have ranged from the Sustainable Development Goals to population censuses, COVID and the misuse of statistics. These topics are closely related to the one in focus here, so that suggestions are created on one side, which are reflected in articles on one of the other sides.⁴ The following section summarises five topics where further research, development and discussion in the official statistics community seems desirable: the relationship between data and statistical policy; the scientific approach; misuse and misconduct; innovativeness, relevance and strengths; literacy.

3. Continuation of the topic

With the contributions of the last months, the theme ‘data4policy’ has been opened but by no means closed.

³<https://officialstatistics.com/discussion-platform>.

⁴See for example “Artificial intelligence and the role of ethics” [24]. Ammicht Quinn R. Artificial intelligence and the role of ethics. *Statistical Journal of the IAOS*. 2021; 37: 75–7.

Much remains to be done to ensure that research, scientific discussion and the application of innovations in official statistics can keep pace with the speed of the current change in the ecosystems of data, information and statistics. The fact that this involves new data sources and their use, new processes, methods and procedures, is obvious and already the dominant topic in the current discussion as well as the subject of manifold developments and international cooperation. However, this focus on the technical-methodological aspects and on data driven processes alone is not sufficient in the current phase of a major transformation. We can learn from the history of official statistics that the driving forces for progress and change have always been particularly potent when they are fuelled simultaneously from science (methods), statistics (data) and society (information needs). Official statistics should therefore gear its strategy for the coming years to the information needs that are already being articulated. These are not necessarily congruent with the previous fields of work and therefore a new, innovative approach as well as an extension of budget, competencies etc. are necessary. Some of the questions that have been raised in the discussion forums and that are of fundamental importance need to be answered, on which we will concentrate in the following.

3.1. Data policy – One ring to rule them all?

Digitisation of society, the economy, the education and health sectors has been a high priority in national and international politics for some time, so for example in the European Union: *“The success of Europe’s digital transformation will depend on establishing effective rules to ensure trustworthy technologies, and to give businesses the confidence and means to digitise.”*⁵

Besides the business sector, it is also about supporting *“decision-makers at the local, state and national levels as they accelerate the responsible re-use and opening of data for the benefit of society and the equitable spread of economic opportunity.”*⁶ *“Rooted in the notion of an information commons, it begins from the premise that data collected from the public, often using public funds or publicly funded infrastructure, should also belong to the public or, at the very least, be made broadly accessible to those pursuing public-interest goals.”* For the objective of Open Data, eight

key principles are developed that record what belongs to a successful policy, starting with the data via insights to the actions [25].

The World Bank has dedicated its World Development Report 2021 [26] to the topic ‘Data for Better Lives’ with the aim of providing a blueprint on how to harness the power of data for development. When data is seen as force for the public good,⁷ the view narrows however from the very broad panorama of data with its countless pathways of possible uses to the concrete reality of (official) statistics (which as such is still complex).

This illustrates that there is a relationship between a data policy on the one hand and a statistics policy on the other: *“The blueprint for building an integrated national data system is a national data strategy, which is a country’s plan for capturing greater economic and social value from data in line with the principles of a social contract for data. By contrast, the blueprint for building a national statistical system is a national statistical development strategy, which focuses on official statistics [26].”* Clarifying the relationship between data and statistics is strategically important for the (official) statistics community if it does not want to run the risk of its specific concerns being lost in the general effort to promote and regulate data markets.

In January 2017, six months after the Brexit referendum and at the beginning of Donald Trump’s presidency, William Davies published a widely acclaimed article *“How statistics lost their power – and why we should fear what comes next”* [27]. In it, he expresses his concerns that nothing less than the end of a statistical era has arrived, with serious consequences for public discourse, trust in experts as well as politics, and with options for populist politicians to use this for their purposes. With ubiquitous amounts of data and almost infinite possibilities of use, informational ecosystems are fundamentally changing; statistical logic is being replaced by data logic. *“With the authority of statistics waning, and nothing stepping into the public sphere to replace it, people can live in whatever imagined community they feel most aligned to and willing to believe in. Where statistics can be used to correct faulty claims about the economy or society or population, in an age of data analytics there are few mechanisms to prevent people from giving way to their instinctive reactions or emotional prejudices [27].”*

⁵<https://digital-strategy.ec.europa.eu/en/policies/strategy-data>.

⁶<https://opendatapolicylab.org/>.

⁷https://openknowledge.worldbank.org/bitstream/handle/10986/35218/9781464816000_Ch02.pdf.

After a year in a state of pandemic emergency, it is time to return to the discussion initiated by William Davies. It is necessary to ask the fundamental question, whether we need official statistics as the backbone of democratic decision-making, and if so, what their tasks are and how they should be financed and anchored in the political system. The public infrastructure that provides society, politics and the economy with elementary facts is official statistics. Facts on the basis of which momentous political decisions are made are based on international methodological standards (e.g., consumer price index for Central Banks' monetary policy). Official statistics must perform their tasks with great efficiency and continuity; they work with long lead times, industrial production lines, international standards and democratically decided work programmes. In this way, internationally, nationally, and temporally consistent indicators of high quality are provided.

Let us use the example of transport: data strategies aim at promoting and regulating individual (data) mobility. In addition, there is public rail transport with data and statistics, which must also be made fit for the future. This requires investments, because new areas are to be established on which modern high-speed trains are to run. Individual data use alone can be inefficient and ineffective. In the 1960s, we thought that promoting individual transport was the best option. Today we know that this one-sidedness has led us into congested cities and roads because rail expansion was not pushed with enough verve. If the infrastructure of public statistics is not modernised, geared to new technologies (high-speed statistics) and new terrains are not opened up (COVID-19, biodiversity, ...), there will be parallel infrastructures in both the public and private sectors that will develop their own standards. Or, more precisely: We will have an outdated, unattractive public (data) railway with multiple rail widths (partly public, partly private) and incompatible industry standards; a setback for trust, transparency, and public discourse.

To prevent such a situation, the integration of a country's different producers under one roof into a well-coordinated statistical system is crucial. Roles must be assigned, responsibilities defined, so that citizens can rely on the highest quality standards being met. To make it easy for users to obtain information, a certificate should be introduced that provides trustworthy information about the quality profile of an information product. Certification requires a neutral and trustworthy institution that sets and verifies quality standards.

In connection with the World Development Report 2021, the World Bank has also designed a new Sta-

tistical Performance Index, being of interest in this context,⁸ which identifies five key pillars regarding statistical data usage and production in modern societies (see Fig. 2).

This approach provides a structure that can inspire the further development of existing frameworks of international standards and quality codes.

In this context, it will be crucial for statistical strategies on the one hand to clarify the commonalities with general data strategies, but on the other hand also to emphasise the special features and political importance of the public infrastructure called official statistics.⁹

All too often, an attitude that focuses purely on the use of data is presented as a *passé-partout* for all processes, industries and value chains, without their specific characteristics actually being adequately represented in this way. Against this background, language and terminology used gain special importance, so that it seems appropriate to avoid ambiguities in the use of 'data' and 'statistics'. It may also be worth arguing against simplistic narratives of data use for all sorts of purposes ('data-driven' decisions, policies, etc.), which generate false expectations that are detrimental to statistics.

3.2. *The scientific approach: STEM¹⁰ or SHAPE¹¹?*

In 1924 John Maynard Keynes sketched the "ideal type" of an economist in the following way: "*The master-economist must possess a rare combination of gifts. He must be mathematician, historian, statesman, philosopher – in some degree. He must understand symbols and speak in words. He must contemplate the particular in terms of the general and touch abstract and concrete in the same flight of thought. He must study the present in the light of the past for the purposes of the future.*"¹²

This well-known quotation leads us to the question of what actually qualifies a statistician, and even more specifically a professional in official statistics. The an-

⁸<https://www.worldbank.org/en/programs/statistical-performance-indicators>.

⁹As expressed, for example, in the RSS Data Manifesto <https://rss.org.uk/RSS/media/File-library/Policy/2019/9522-RSS-Data-Manifesto.pdf>.

¹⁰STEM: Science, Technology, Engineering, Mathematics <https://www.census.gov/newsroom/press-releases/2014/cb14-130.html>.

¹¹SHAPE: Social Sciences, Humanities, Arts for People, Economy <https://thisisshape.org.uk/>.

¹²<https://economicsociology.org/2015/03/01/who-is-an-economist-here-is-keynes-answer/>.

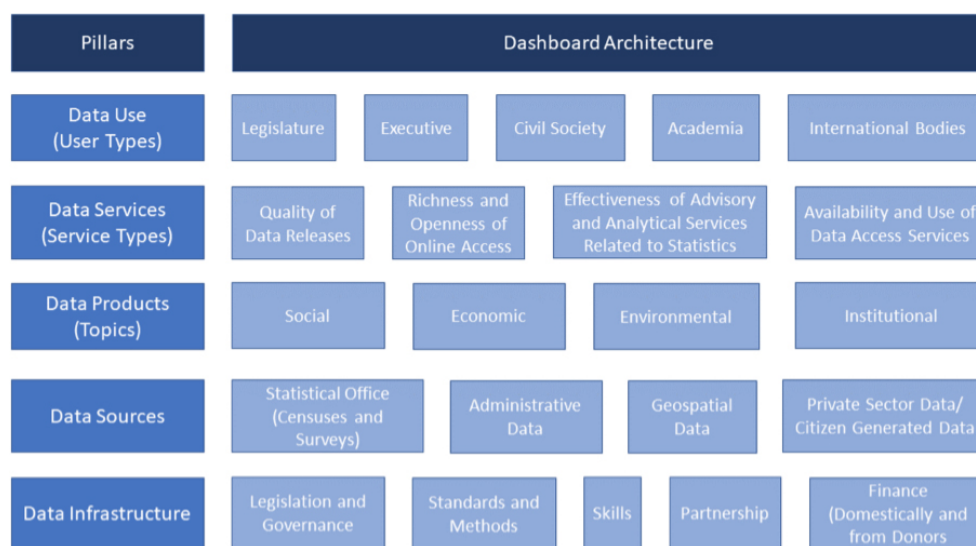


Fig. 2. The pillars and dimensions that construct the new SPI.¹⁵

swer to this question is unfortunately all too often truncated. This begins with the interpretation of what characterises statistics as a science. Statistics is seen as a part of the natural sciences (STEM), or more precisely of mathematics,¹³ and scientific attention is primarily focused on inferential, analytic statistics.¹⁴ In contrast, descriptive statistics with its methodological questions is in the background of scientific interest. An excerpt from an article on “science and statistics: the scientific basis of the census” in this journal may be suitable to illustrate this point of view: There “*seems to be a general consensus about the object of statistics as a science and nature of the statistical method. Any empirical science observes physical objects (people, animals, celestial objects, rocks, etc.) and their characteristics at a clearly delimited location and specific time [30].*”

This reduction to physical objects and their ‘measurement’ does not, of course, meet the typical target of observation in (official) statistics, as Theodore Porter [31], Heinz Grohmann [32] or Alain Desrosières [33] have

clearly pointed out in their works. Imagine, for example, approaching the well-known indicators of statistics, such as GDP or the Consumer Price Index, with such an inadequate scientific toolkit. Desrosières’ work is closely linked to the scientific movement of the so-called “economics of convention” (in French ‘*économie des conventions*’) [34]. Here, the name of this movement already contains the core of the message that statistics (at least in the field of social or economic phenomena) has to deal with facts that cannot be measured directly, such as a tree, but which first require a qualitative description (or as Grohmann put it “*theoretisches Konstrukt*”) and subsequently its translation into a corresponding statistical concept. The aim here is not to give preference to either a deductive or an inductive approach, but to iterate between these with corresponding learning cycles, as Box already expressed it in his 1976 reflection on statistics and science [35]. Included in the qualitative description of phenomena, may one like it or not, are conventions, questions of design, which are decisive for the later result of the statistics. Statistics are products of a complex sequence of process steps, some of which are not possible without interaction with the users of statistics and their questions and information needs. To make this clear in terminology, Desrosières distinguishes between ‘measurement’ (physical objects) and ‘quantification’ (social objects).

The choice of an adequate scientific approach, based on appropriate epistemology, has manifold consequences for the practice of statistics (both in research and application). In conclusion: only with a scientific approach that does justice to the complexity of statistics

¹³For example, the current panel structure of the European Research Council identifies statistics as a sub-field of mathematics https://erc.europa.eu/sites/default/files/document/file/ERC_Panel_structure_2021_2022.pdf.

¹⁴See for example [29]. He X, Lin X. Challenges and Opportunities in Statistics and Data Science: Ten Research Areas. *Harvard Data Science Review* [Internet] [Internet]. 2020 2021 Apr 08. Available from: <https://hdsr.mitpress.mit.edu/pub/da99kl2q>.

¹⁵Source [28]. Dang H-AH, Pullinger J, Serajuddin U, Stacy B. *Statistical Performance Indicators and Index – A New Tool to Measure Country Statistical Capacity*. Washington D.C.: World Bank Group; 2021.

and without cutting it down to specific disciplines (and their perspective of knowledge), can the questions and problems that are essential for the quality of statistics be addressed. Returning to the question raised in the title, it can therefore be concluded that the scientific roots of statistics are based in natural sciences (STEM), but that the professional profile of the statistician also includes scientific components from the social sciences (SHAPE).¹⁶

3.3. *Misuse and misconduct, trust and integrity*

The term ‘statistics’ has the same linguistic roots as ‘state’. Since the Enlightenment, statistics has been closely married to the nation state, to democracies of various kinds and, unfortunately, also to dictatorships. Because of this nature of the relationship with politics, it is by no means a novelty for official statistics to have to face attempts to influence (and even manipulate) the results. In principle, it can be observed that this risk for influencing or manipulating increases with proximity to and relevance for political decisions (in accordance with ‘Goodhart’s Law’).¹⁷

In the transition that followed the fall of the Berlin Wall in 1989, official statistics of centrally planned economies also had to be transformed to become systems of market-oriented democracies. Against this background, it was necessary to take an analytical look at statistical governance in these states before the fall of communism¹⁸ in order to codify guidelines in professional and scientific standards on this basis. In 1991 the Conference of European Statisticians developed and adopted the Fundamental Principles of Official Statistics;¹⁹ in 1994, W. Seltzer presented an overview on “*various ways in which the professional integrity and credibility of statistical agencies can be undermined*” [38].

Although much has been achieved since then in terms of countering harmful influence, the issue itself has not been resolved: Misuse of statistics is an abuse of power [39]; manipulation of official statistics is corruption [40].

¹⁶For a more in-depth discussion of this topic, please refer to chapter 3.2 Epistemology – Theory of Knowledge in [36]. Radermacher WJ. Official Statistics 4.0 – Verified Facts for People in the 21st Century. Heidelberg: Springer Nature Switzerland AG; imprint Springer; 2020.

¹⁷<https://www.oxfordreference.com/view/10.1093/oi/authority.20110803095859655>.

¹⁸See for example [37]. von der Lippe P, editor The political role of official statistics in the former German Democratic Republic. ISI World Statistics Congress 2003; 2003; Berlin.

¹⁹<https://unstats.un.org/unsd/dnss/gp/fundprinciples.aspx>.

Over the past three decades, work to establish an independent statistical infrastructure in the public sector has been achieved mainly by making the principles of good statistics the norm in the public sector through laws and codes enshrined in them. However, this approach to statistical governance is now reaching its limits (or generates increasing marginal costs), for various reasons.

- An established institutional statistical infrastructure has a location in the structure and culture of each individual country’s administration. Due to the sovereignty of states over the governance of internal affairs, which includes public statistics, the possibilities of assessment or, if necessary, even of external influence by international institutions, which for their part are themselves also integrated into the respective administration, are limited.
- The strongly emphasised autonomy and qualitative responsibility of public statistics creates castles that have their strengths in defence but have weaknesses when it comes to agility, innovation and change. Depending on the circumstances, a further tightening of the legal requirements may therefore have to be paid for with increasingly undesirable side effects and a loss of flexibility.
- The articulation of concerns and warnings by professional statistical societies, be it on a national or international level, has so far to be based on evidence that was only anecdotal in character.
- Finally, the effectiveness of a legal codification approach depends above all on whether and to what extent the rule of law is respected and practiced in a country by its rulers, influential politicians and institutions.

As a conclusion, it will have to be considered whether and to what extent a complementary approach should be developed alongside the existing one, in which the aim is to assess the integrity and independence of statistics from a global perspective, comparable to the World Press Freedom Index,²⁰ the Academic Freedom Index²¹ or the OECD Public Integrity Maturity Model.²² In this way, a broader peer community and regular resonance with the public would be generated, a novel institutional design responding to “*the wider societal conditions of confidence and trust* [41].”

²⁰<https://rsf.org/en/ranking>.

²¹https://www.gppi.net/media/KinzelbachEtAl_2021_Free_Universities_AFI-2020.pdf.

²²<https://www.oecd.org/gov/ethics/public-integrity-maturity-models.htm>.

This diagnosis and the therapeutic route to be taken are well in line with an OECD approach to improving integrity in the public sector in general. In essence, the integrity and independence of statistics should be further strengthened, which means

- that a global monitoring system is installed,
- which regularly prepares a status report for all countries,
- which is independent from institutions at both national and international level.

Of course, it is of eminent importance in such a project that the highest possible quality standards of statistics are met. In this respect, it should be investigated with which of the already existing global platforms mentioned above²³ a fruitful cooperation and partnership can be entered into.

3.4. *Innovativeness, relevance and strength*

Given the urgency and stress of the current pandemic situation, it seems natural to focus the statistical issues of COVID on the decisions that are about to be taken. At this point, however, a broader perspective and longer horizon is advocated. Why does a more strategic and long-term view seem so essential right now, when we hardly have time for the most dramatic questions?

There are two important arguments for this:

Firstly, the most pressing risks identified by the World Economic Forum in the Global Risk Report 2021²⁴ lists a number of risks, which are perceived as present dangers or existential threats, with infectious diseases, climate action failure and biodiversity loss as the risks with the highest values in terms of their likelihood of occurrence and impact. Similar to this assessment from the economy is that of the scientific community, which call for action to reach net-zero emissions, reverse declines in biodiversity, and improve data-sharing to prepare for future health emergencies.²⁵

²³For the Academic Freedom Index, for example, a description of the methodology is available [42]. Pemstein D, Marquardt KL, Tzelgov E, Wang Y-t, Medzihorsky J, Krusell J, et al. Variable Analysis for Cross-National and Cross-Temporal Expert-Coded Data. V-Dem Institute DoPS, University of Gothenburg, editor. Gothenburg: University of Gothenburg; 2019. 34 p.

²⁴<https://www.weforum.org/reports/the-global-risks-report-2021>.

²⁵https://www.nationalacademies.org/news/2021/03/science-academies-of-g-7-nations-call-for-action-to-reach-net-zero-emissions-reverse-declines-in-biodiversity-and-improve-data-sharing-to-prepare-for-future-health-emergencies?utm_source=NASEM+News+and+Publications&utm_campaign=d66fc88610-What%27s_New_2021_04_05&utm_medium=email&utm_term=0_96101de015-d66fc88610-106625817&goal=0_96101de015-d66fc88610-106625817&mc_cid=d66fc88610&mc_eid=e5ef616d74.

The question is therefore to what extent it is possible to design the measures for exits from COVID in such a way that they do not take us back to a supposed normality *ex ante*, thereby missing the opportunity to make this normality more compatible with the global strategy of sustainable development.²⁶ This is of course not a statistical debate but a scientific or political one.

Secondly, it must be borne in mind that more substantial changes, extensions or accelerations of official statistics cannot be realised overnight. Official statistics are a kind of ocean liner whose course can only be changed with considerable advance planning and preparation. It is therefore time to look far ahead now in order to be able to adapt to the information needs of the future, two to five years from now.

Which statistics?

Let us approach the question of the future of official statistics in such a way that we unfold the trinity of statistical quality and start with the statistical programme, i.e. the

What: The traditional domains of economic and social statistics will be consulted, but in a way which will call into question their division into specialised domains. This is illustrated by the example of agricultural statistics. Whereas in the past the aim was to quantify farmers' production performance as quickly and accurately as possible, the aim will be to be able to cast statistical light on sustainable food production from the cradle to the grave, including agricultural production in connection with its inputs, outputs as well as its impact on biodiversity, water protection, etc., and international trade in agricultural goods. Let us approach the COVID exit with a second example, by asking ourselves what effects the financial support measures have not only on public finances, unemployment or inflation, but also on the conformity of industrial production and consumption with the goals of climate protection. In addition, however, it will also have to deal with areas which do not yet belong to the programme of official statistics or which will be given higher priority in it. Current examples of this are migration (development especially since 2015), health (current pandemic) and biodiversity (highly classified as a risk), for which new statistics or statistics with improved quality (speed, level of detail, representativeness, etc.) are needed.

How: The needs for the reform of statistical production processes are very clearly summarised in the

²⁶<https://sdgs.un.org/goals>.

Bucharest Memorandum of European Statistics of 2018,²⁷ which among other things states “*the variety of new data sources, computational paradigms and tools will require amendments to the statistical business architecture, processes, production models, IT infrastructures, methodological and quality frameworks, and the corresponding governance structures.*” In addition, it will also be a matter of official statistics increasingly acting not only as a producer of information but also as a service provider. Such services should have to do with available competencies, strengths and experiences: One could generally help manage the quality of statistics, even if they are produced outside the factory walls of official statistics. For example, statisticians could be helpful in the design of measurement concepts (especially surveys, such as a stratified random sampling of ecosystems and biodiversity) as well as in the use of imputation and estimation methods or in the application of national accounting to other subject matters. They could assist in improving communication and providing information. They could take over the role of a standard setter and certifier of statistical standards.

Who: The institutions of official statistics are involved in the public administration of their country (of the supranational or international level, respectively). They enjoy a status of professional independence that is more or less guaranteed by the respective state governance. What is much more important, first of all, is the commitment of official statistics to the basic principles of good public administration in terms of e.g. citizen participation, accountability, etc. What will be crucial in the near future, therefore, is to emphasise these strengths of a public institution through which trust can be strengthened and maintained. At the same time, networking with the scientific community and partnerships with other producers of statistics is to be further intensified, open data access is to be created for everyone and, at the same time, the confidentiality of individual data is to be safeguarded. Finally, there is an urgent need to invest more in the general education of understanding, skills and abilities to handle facts, graphics and maps. Only if the population (and of course the political scene in particular) is sufficiently aware of the differences in the quality of statistical information, if one is capable of distinguishing between fake and fact, then a basis of trust can grow and flourish.

²⁷<https://ec.europa.eu/eurostat/documents/7330775/7339482/The+Bucharest+Memorandum+on+Trusted+Smart+Statistics+FINAL.pdf/59a1a348-a97c-4803-be45-6140af08e4d7>.

Example Ecosystems/Biodiversity: The various aspects described converge when it comes to statistical monitoring of changes in ecosystems and biodiversity. A very important step was recently completed with the adoption of the SEEA Ecosystem Accounting,²⁸ a corresponding UN statistical standard. However, the next step of implementation must now be taken quickly, which, given that this area does not belong to the core programme of official statistics, will raise a large number of methodological, budgetary, organisational, etc. issues, which will ultimately be decisive for the quality of the future results. Similar to the pandemic, it is imperative in this area that any implementation planning for this statistical reporting system must have the timeline in mind. Measured against this criterium, it will probably be advisable to proceed iteratively and to design a learning statistical system with increasing content coverage together with new partners from other disciplines and institutions as well as to acquire the necessary capacities and competences for this new ambitious new element of the work programme.

Which policy?

If there is data for policy, there should also be a policy for data (and statistics). In principle, policymakers must be expected to act quickly now and create the conditions for the statistical infrastructure to develop as described above in the coming months and years. It is essentially a matter of giving the status of generating evidence relevant to decision-making in the public sector the status that this has long since been given in the private sector. Staff and teams for current and future crises treatment will be composed of experts from a wide range of disciplines; statisticians must not be (further) missing in this context. The creation of trust, efficiency and effectiveness in the public information sector will only succeed with official statistics as a powerful actor.

Official statistics require an adequate policy framework because they embody a public infrastructure maintained by public institutions with a public mandate financed by taxpayers' money. Most countries have statistical governance, consisting of a body of laws, rules, principles, codifications, and work programmes. For official statistics to develop successfully, the preconditions in terms of finances, personnel, competences, organisation must be right.

Compliance with high quality standards goes beyond the statistical institutions' own sphere of influence. If

²⁸<https://seea.un.org/ecosystem-accounting>.

there is a lack of political attention and will to address this issue, public statistics will sooner or later fall behind and will no longer be able to meet the requirements. The ‘Tragedy of the Commons’ particularly affects public infrastructure. If bridges, roads, sewers (and public statistics) are not maintained for a certain period, it is hardly noticeable at first. In the long term, however, the resulting damage and repair costs are all the higher.

3.5. Literacy

For some years now, a resistance to evidence-based governance has been growing; scepticism towards all forms of experts does not stop at scientists or statisticians. Coupled with a lack of statistical literacy and the impression of being at the mercy of the representatives of a supposed technocratic regime, the counterposition is forming in which the existence of neutral facts is negated or relativised. The reduction of social and economic questions to numerical aggregates and averages no longer seems acceptable, unless the results come from one’s own calculations and correspond to the ‘truths’ that demagogues deliver about what is going on in society.

The fact that initiatives to improve data literacy are gaining momentum, supported not only by business but also by politics and science, is very welcome. Data literacy serves to promote maturity in a modern digitalised world and is important for all people – not just specialists. This education, like other education, is about several competence dimensions: Knowledge, skills, and values [43].

However, a broad, balanced, and situational approach is rarely found in practice. Rather, the focus seems to be on teaching technical skills of data science, mathematics, and IT, reminiscent of the do-it-yourself wave of the 1970s, in which screwing, repairing, and constructing by anyone was propagated, sometimes even in cases where a good craftsman would have done the job better and cheaper than an amateur. For the citizen, the entrepreneur, the teacher, the student who wants to understand and apply the indicators of public statistics, sophisticated skills of data science (e.g., own analysis of raw data, knowledge of algorithms) are just as irrelevant as in-depth knowledge in the mathematical field of stochastics.

Citizens should know enough about the informational product and its properties to be able to assess its quality regarding personal application goals and questions. This requires basic mathematical knowledge as well as experience in dealing with quantitative information;

knowledge of descriptive statistics and its application in the processes of economic and social statistics is required. What the consumer price index says (or doesn’t say) about inflation should be taught in school and adult education; everyone should understand the indicators of sustainable development. For advanced users, microdata are also available [3] as ‘public use files’ to experiment with their own statistical evaluations and gain experience.

The question for official statistics is whether and to what extent they can and want to be involved in this matter. However, with all sympathy for improving general literacy, the answer will depend on what free capacities and resources are available for that purpose.

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