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Science policy advise in times of crisis

The poly-crisis: who perceives which crisis and how

Not all crises are the same[1] . There are the slow crises that gradually and unnoticed gain momentum, only to burst upon us with ferocity. The unstoppable global climate change is the most threatening example of this. The complexity of the processes involved makes it difficult to assess more precisely which phase we are currently in, since local and regional causes have global consequences and vice versa. The pandemic, on the other hand, is considered a rapid crisis, by which is meant that its occurrence came as a surprise to most. Then the events overtook each other. They ranged from the rapid genetic sequencing of the initially unknown virus to the first lock-downs; from the overloading of hospitals to the unprecedented speed of the production of the new mRNA vaccine; from closed borders to the wrangling in the coordination of the measures adopted at national and European level. Surprisingly fast was also the great growth of the opponents of vaccination, accompanied by scepticism about science and hostility towards experts.

The long-term effects of the pandemic are not only manifested in the group of those suffering from Long Covid, but have led to multiple changes in economic and social life. They range from the acute shortage of labour in the service sector to the problems many young people have in giving meaning and content to their lives. The health sector continues to be under great stress and calls for deep reforms. Many of the economic negative effects could be cushioned with government support, at least in the western industrialised countries, but high inflation rates and energy prices are destroying hopes for a quick economic recovery. Now the Russian war in Ukraine with its knock-on effects is not only overshadowing the energy supply in Austria and Europe, but has blown up the geopolitical order that has prevailed until now.

Even if the spread of the SARS-CoV-2 virus and its many mutations is officially downgraded to endemic - i.e. society must learn to live with it - it remains undisputed that a next pandemic is very likely. It falls into the category of *'known unknown'* risks, i.e. events whose occurrence is known, but not when. There are many such risks. So there is no need to fear the next 'black swan', a rare event that comes with consequences of grave proportions. What we are experiencing now is rather an accumulation of interconnected crises that are

[1] There are numerous typologies of crises, some of which overlap with those of risks. For a comprehensive overview, see the report published by SAPEA, *Strategic Crisis Management in the EU. Evidence Review Report No.11, 22 November 2022*

linked by the complex dynamics of networks. Their respective causes and effects cascade into one another. The economic, social, health and political consequences are intertwined. What happens in far-flung places around the world has an immediate local impact.

This accumulation of crises is referred to as a poly-crisis, a hierarchy of crises that is difficult to grasp, distributed geographically on different levels and across social groups, triggering further unexpected events and processes. The poly-crisis is overshadowed and intensified by the increase in geopolitical tensions, which gives rise to fears of the disintegration of the previous global order into mutually isolated blocs. This does not necessarily mean the end of globalisation, but regionalisation into geopolitical blocs also means defensive retreat behind newly built walls. Scientific exchange is restricted and necessary scientific cooperation is partially discontinued in the face of the plethora of global challenges. Even a fragmentation of technical standards in the *high-tech* and IT sector can no longer be ruled out.

In December 2022, the heads of *Austria*'s science and research organisations were surveyed by *Austria Innovativ* on the 'exceptional year' 2022 and on their plans for the research year 2023 (Austria Innovativ, 2022). Without exception, all respondents were satisfied with the past year. Thanks to the three-year funding agreement with the federal government, the organisations included in the group of central research funding institutions finally have the planning security that is so important for them. Additional acquisition of funds through the Austrian Future Fund enabled the expansion of projects and new cooperations. The RTI Pact for 2024-2026 mentioned in the budget brings additional budget increases. Some of the respondents emphasised that the spirit of research was not discouraged by the crises. Domestic companies know how to use the crisis to further expand their performance. Special financing or the particularly successful acquisition of additional funds round off the picture, with a few exceptions. The worried voices remain quiet. Overall, confidence in the increase of their own performance and in the realisation of the strategy development processes in the coming year prevails. No wonder that 2022 was also a very good year for science and research for the responsible Federal Minister, in which a large number of successful initiatives were launched. *Tu felix Austria,* one is tempted to say, in the hope that the review in 2023 will be similarly positive.

The diagnosis of whether and in which crisis we are and the reaction to it can therefore be very different. Even if the representatives of Austrian science and research organisations are confident and believe they are well prepared for the crisis, the instability of the geopolitical and economic situation clouds the view. Instability stands for changes over which one usually has little influence. Many already experience any kind of change and the need for change as a crisis. The effects of technological disruption do not only hit the companies that were too slow in competition, reacted wrongly or not at all. They spill over into other parts of the economic system and affect different layers of society in different ways. Every innovation has its winners and losers. But the growing social inequalities express themselves in discontent and can easily erupt in social unrest.

The relative stability and predictability that characterised politics, the economy and society, which until recently was considered an indispensable feature, at least in Western liberal democracies, is based on the fulfilment of the promise to continue to provide prosperity and well-being for the population. The prerequisite for this was sustained economic growth, driven and enhanced by science and technology. The fulfilment of this promise has become

uncertain for various reasons. The younger generation is confronted with the seemingly unstoppable damage caused by unchecked exploitation of natural resources by the current economic system. They have legitimate doubts that they will achieve the same level of prosperity as their parents' generation. If their demands seem excessive to the older generation and the chosen forms of protest too radical, it remains the privilege of the youth to hold up a mirror to their parents and accuse them of failures.

Policymakers are thus faced with a multitude of challenges that require a break with practised patterns of behaviour and a change of *mind-set.* In times of crises and widespread volatility, crisis management is required that involves more than reacting quickly to unexpected events, as indispensable as this ability is. It is a crisis management that is based on foresight into an uncertain future and requires a comprehensive set of measures as strategic preparation for the crisis[2] . Given the uncertainty of the future, options are needed that make statements about '*what happens if...'* and that are sufficiently trustworthy to encourage action.

In the times of the pandemic, policymakers have learned to expand the advisory tools at their disposal. It has opened the circle beyond existing institutions through *ad hoc* advisory groups and sought different opinions. Diversity is beneficial because it brings new points of view to uncertain situations through different assumptions, showing that there is never just one right answer for the one right question. However, this diversity, when subjected to the logic of media attention, has also contributed to public confusion.

How does science policy in times of crisis differ from the time before? Has there ever been a crisis-free time? Learning from the pandemic is far from over and what can be learned from it cannot be easily transferred to the next crisis. Nevertheless, it is obvious that in times of crisis, the reckless continuation, a *business as usual,* fades into the background. It does not disappear, because continuity is still in demand. Not everything changes and not everything changes at the same time. Not all changes are to be welcomed and not all go in the same direction. It is important to differentiate and to strengthen the willingness to support change wherever it is going in the right direction. In times of crisis, fear also increases. It discourages people, who then either fall into a passive attitude or give free rein to their aggressiveness. This makes it all the more important for politics to convey calm and deliberation without creating the illusion that it has everything under control. Even more, it must be able to communicate this.

Dealing with crises requires the ability to assess the impact of external crises on Austria as early as possible in order to make appropriate preparations for protection, mitigation or prevention. If there are further disruptions of supply chains and global bottlenecks in the race to produce electronic chips and indispensable chemicals for the manufacture of medicines, what does this mean for Austria and what should be done? Is it already possible to say whether the crisis in energy supply will slow down or accelerate the transition to renewable energies, and if the latter, how quickly? What long-term strategies are necessary to ensure security, sustainability and technological 'sovereignty' in Austria? Which of the

[2] A comprehensive report by the Group of Chief Scientific Advisors, "Strategic Crisis Management in the EU. Improving EU crisis prevention, preparedness, response and resilience". Scientific Opinion No. 13, 22 November 2022. Although the report deals with strengthening crisis management in the EU, much of it is relevant to nation-state crisis management.

many officially stated 'emergencies' must be addressed first and how? It is not only about the undisputed care emergency in the health sector. Emergencies have also increased in other areas, whether it is the shortage of skilled workers or the lack of personnel in other service sectors. They signal an obvious need for reform, but how is this to be addressed if political consensus on the characteristics, urgency and feasibility of reform has yet to be established?

If politics has to act differently in times of crises than before, then political counselling must also take this situation into account. It must become counselling for times of crisis.

Science policy advice for times of crisis

The need for additional legitimisation of politically imposed measures always grows when they have to be taken quickly, are unusual and/or unpopular and their hoped-for effect is not yet foreseeable. Therefore, the call for scientific advice was heard very early on during the pandemic. *Ad hoc* advisory bodies were set up in almost all countries to cover a plethora of emerging issues in addition to the WHO and other existing institutions. Science suddenly became the focus of public and political interest. The initially often repeated phrase *"follow the science"* was meant to signal to the population that the government was following the advice of science and taking the right measures. What sounded plausible proved difficult to implement.

It soon became apparent that there are neither clear rules nor procedures on how to translate scientific recommendations into policy measures. Based on the best available knowledge, science can make predictions with the help of mathematical models and other proven methods, which are only valid within specific ranges of probabilities. Moreover, they are dependent on the assumptions made and especially on the quality and quantity of available data. Hence, the conclusions and recommendations drawn from them are only valid under certain conditions. It is not the role nor the task of science to make political decisions. It can only suggest options for action. Which of these are taken up is the responsibility and competence of the political decision-makers.

This division of labour between science and politics remains valid, but it requires a subtle and trusting interplay that must also be communicated to the public. An important difference is that science is very good at dealing with uncertainty, while the public and politics crave for certainty. This can lead to mutual misunderstandings and false expectations, which during the pandemic led to an increase in scepticism or turning away from science and widespread hostility towards experts. In times of crisis, it will continue to be necessary to take unpopular or unusual measures. Policymakers and those who advise them should therefore draw the right conclusions from the past years.

This includes better communicating to society how science 'works' as an open-ended process, how it functions and with what methods. Basic research is inherently uncertain because you don't know if and what will come out of it. But without basic research, there is no new knowledge, which often comes to market only years later in the form of new technologies or mRNA vaccines.

All scientific knowledge is therefore temporary - what we know today will be supplemented or replaced by more and better knowledge tomorrow. This is contrasted by the insistence of the public, but also the expectations on the part of politicians, to receive unambiguous 'yes' or 'no' answers from science. However, these can only be given by referring to specific conditions under which they apply. Such differentiated answers are not popular with either the media or politicians, especially when it comes to measures that, although based on scientific findings, are the sole responsibility of politicians. The task of science is to empirically substantiate and explain facts and to point out options derived from them. The institutionalised form of this division of labour between science and politics should not only be clear and accepted by those involved, but should also be recognised by the media and communicated to society.

From evidence-based to evidence-oriented policies[3]

In times of crisis, there is growing pressure on policymakers to base their decisions on evidence. While it is recognised that exceptional situations sometimes require exceptional measures, these measures should be as efficient and accurate as possible, i.e. based on a sufficiently precise analysis of the situation and the right means-to-purpose ratio. But what is evidence and how does one recognise it? Who recognises it as evidence when it comes to distinguishing an '*evidence-based policy'* from a *'policy-based evidence',* i.e. from a policy that finds its matching and legitimising evidence only afterwards?

The term 'evidence-based' comes from the field of health care and was proposed by the Scottish doctor Archie Cochrane, who in his book '*Efficiency and Effectiveness: Random Reflection on Health Services'* (Cochrane, 1972) called for randomised trials to form the basis of all medical treatments. In 1993, the organisation named after him, *Cochrane*, was founded, an international network in which researchers, health professionals and patients maintain a database with a central register of randomised controlled trials. Cochrane analyses are evidence-based research and meta-studies of the highest quality, with randomised controlled trials at their core. They provide the evidence and thus the basis for all decisions made in the health sector. *RCTs, randomised clinical trials,* are the only accepted standard today for examining treatment effects for their efficacy and side effects. They are the indispensable prerequisite for the approval of new drugs and treatment methods, which are reviewed and certified by government agencies in compliance with rigorously regulated procedures.

No policy measure can meet this high standard of evidence.
In fact, it is impossible to conduct controlled experiments in other areas of society[4] . While there are limited opportunities for 'quasi-experiments' that retrospectively allow the effectiveness of interventions in a group or territory to be compared with an (involuntary) control group, this is compounded by another compelling reason. As the pharmaceutical industry repeatedly points out, randomised clinical trials that meet the quality standards of

[3] evidence-informed' or 'evidence-oriented'.
[4] Among the few exceptions are the controlled experiments of poverty reduction measures conducted by Esther Duflo and Abhijit Banerjee. Together with Michael Kremer, they were awarded the 2019 Nobel Prize in Economics for this work.

Cochrane analyses and meta-studies require a great deal of time and financial resources. If similar standards of evidence were applied to politics, it would lead to a complete paralysis.

Nevertheless, it would be wrong to abandon the demand for evidence for political decisions. Increasingly complex issues and contexts require more and more support from scientific methods and procedures. Scientifically supported evidence lends additional legitimacy to political decisions. Under certain conditions, it allows politics to maintain the trust of the population or to regain lost trust. However, it must not create new hype that would only raise false expectations of security and certainty. Evidence is not an absolute. Its statements arise from the specific context of the questions asked and methods used, because only in this way can the efficiency and effectiveness of measures be assessed both for the past and for the future.

This is especially true for predictions derived from mathematical models and quantitative *fore-sight* methods, i.e. looking into the future and providing answers to the question '*what if?* Models are made under certain assumptions and the reliability of their statements is equally dependent on the availability and quality of 'real world' data. More importantly, however, is how adequate they are for the purpose for which they are created, true to the phrase 'all models are wrong, but some are useful'.

So what is taken as 'evidence' for policy action cannot be answered unambiguously in advance, just as there is no one 'right' model or answer. The change in language reflects this insight. Instead of '*evidence-based',* the term *'evidence-oriented' is gaining ground*, which is commonly used in English as *'evidence-informed'* or *'evidence-oriented'*. Bringing in the diversity of different perspectives is also worthwhile here. The desire for more evidence-based policy is understandable and justified. It is therefore more honest and probably more sensible to ask policy-makers to be more *evidence-oriented* or *evidence-informed*. Evidence must not become a political fig leaf, but must be carefully weighed in every case.

A new Council for Research, Science, Innovation and Technology Development

The background for the following considerations is the establishment of the new Council for Research and Technology Development provided for in the draft Federal Act on the Establishment of a Research, Science, Innovation and Technology Development Council (FREG, 2022). The desire to reorganise the RTI advisory structure goes back several years and was anchored in the government programme 2017-2022. This was prompted by the intention to merge the three councils existing at the time - the Council for Research and Technology Development (RFTE), the Austrian Council of Science and Humanities (ÖWR) and the ERA Council Forum Austria - into a new advisory body to the federal government. In the course of an informal consultation process, BM Heinz Faßmann asked the ERA Council for proposals, which it submitted in August 2018 as its recommendations on the future of RTI advisory structures in Austria.

Much has changed in the world in the five years since then. Some of the problems that have arisen since then directly affect the RTI sector and require both quick and targeted action as well as long-term strategies and foresight. Only under these conditions will it be possible to guarantee security, sustainability and technological sovereignty in Europe and in Austria. The

new advisory body must be equipped for such and other requirements. The law creates the framework and the structural conditions for this. The concrete contents can, of course, only be determined by the new body itself, as well as its mode of operation and ideas about lived practice.

In the following, the ERA Council's recommendations from August 2018 are compared with today's requirements to see what still holds or where possible gaps exist.

The reorganisation of the councils was included in the recommendations of the OECD report initiated by the ERA Council (OECD, 2018). They envisage the creation of a new council with the objective "...primarily in providing independent advice, monitoring and assessment, an adapted version of the RFTE (with some change in scope, for instance regarding societal challenges, and modus operandi, for instance using working groups) might be considered...". The first recommendation of the ERA Council followed on seamlessly from this. All aspects of the Austrian RTI system should be the subject of consultation by the new body in a systemic manner. From the ERA Council's point of view, the future RTI strategy was probably the most important document of Austrian research and innovation policy in the coming years. Therefore, it recommended using the expertise of a new advisory structure with regard to the preparation and monitoring of the new RTI strategy. The new council should be set up in a timely manner so that it can make a decisive, advisory contribution to the preparation of the federal government's future RTI strategy.

- From today's perspective, these recommendations remain fully valid. The new Council is in a unique position to implement and support a systemic and 'whole-of-governance' approach. It is obvious that sectoral measures and sectoral policies alone are not sufficient to adequately address the major challenges such as climate change, sustainability and the circular economy. This requires the creation of an atmosphere of trust in which informal discussions can take place with individual departments as well as multi-laterally.

- Experiences from the pandemic have exposed widespread silo thinking and action. Lack of coordination mechanisms led to suboptimal results and serious failures. An example of this is the initiative to create an independent national medical data centre (nationale Medizindatenstelle), which points to a number of measures needed to address the national data problem. It has remained unanswered to date.

- A systemic and holistic approach is needed to ensure coordination between decisions taken at EU level and their implementation in national policies. The individual ministries are differently involved in EU RTI strategies and decisions and affected by their implementation. This leads to the loss of valuable synergies.

- In order to transform a holistic perspective into lived practice, it is necessary to consider the connectivity of the activities of the new council to those of the ministries more strongly than before. This is in no way intended to limit the new council's ability to set its own active impulses or define new topics. However, it is important to respond more to the acute need for consultation on the part of the ministries, which calls for new forms of consultation.

- Similarly, the formats with which the Council and ministries each work and communicate (or not) with each other must receive greater attention. This includes a better coupling between the administrative processes taking place in the ministries and the process monitoring by the Council, as well as improved coordination in terms of timing.

- Since the draft law does not foresee the previously highly ritualised meetings between RFTE and the representatives of the ministries, this opens up the opportunity for new formats. They should be characterised by mutual openness with valuable feedback. Some formats need their own spaces and opportunities to enable an informal exchange in a trusting atmosphere, an offer that should be used by all ministries if possible.

- RTI monitoring, which the new Council will continue to carry out in accordance with FREG, takes on additional significance with the recently produced version of Monitor 2.0. The expansion to include the sub-area "green transition" and the cross-cutting theme "sovereignty" demonstrates the power of this toolkit. New possibilities for linking and standardising data sets involving the agencies and the departments are emerging, which can make RTI monitoring a central component of digitalisation and its use in administration and society.

In its second recommendation, the ERA Council envisaged establishing the new Council as a joint advisory body of the federal government with a decisive role of the Federal Chancellor. The ministries traditionally involved in RTI should be encouraged to cooperate closely with the ministries responsible for sectoral policies in advisory services and implementation, thus strengthening the 'whole-of-governance' approach.

- The recommendation of the ERA Council to establish the new Council directly under the leadership of the Federal Chancellor is reflected in the draft law in a weakened form. § Section 4, para. 2 FREG provides that "the member proposed by the Federal Chancellor in agreement with the Vice-Chancellor" shall be entrusted with chairing the Council.

- The recommendation of the ERA Council was to organise a meeting of the new Council once or twice a year with the active participation of the Federal Chancellor. This proposal, which was discussed under the name "Innovation Summit", could now be realised with active shaping by the new Council.

- Such a science, research and innovation summit could take place for the first time in 2023. This would publicly express the political support of the federal government, led by the Federal Chancellor and the Vice-Chancellor, for the new advisory body. The tasks of the new council, namely "to prepare Austria in the best possible way for the challenges of the 21st century in the areas of research, science, innovation and technology development as well as the development and opening up of the arts" could be communicated to the public by means of concrete projects and examples.

- In addition, an "Innovation Summit 2023" offers the opportunity to establish itself as a national and European forum for the exchange of ideas on common concerns in the

RTI sector. The close interconnection between national and European research and innovation strategies and agendas could make an important contribution to creating synergies between sectoral interests.

- Ultimately, the success of an advisory body is measured by its lived experience. An annual "innovation summit" also offers the opportunity to take stock of the situation on an interim basis and to establish the broadest possible consensus among the RTI community and the ministries on common goals and approaches. In this way, a further signal could be given for "strengthening the awareness of research and the knowledge of science, innovation and technology development as well as development and the opening up of the arts in civil society" (§ 2, para. 7 FREG).

- An annual informal exchange in a personal meeting with the Federal Chancellor and Vice-Chancellor remains desirable.

Recommendation 3 of the ERA Council concerned the increasing complexity of tasks, which should be met with flexibility. There is no doubt that the professional and structural challenges of society are increasing. The issues for the new Council are also becoming more complex and require the specialist participation of experts and target groups. The ERA Council therefore recommended providing for the possibility of setting up temporary working groups on specific topics. In addition, each member of the federal government should remain free to seek ad-hoc advice from experts on issues relevant to their department in order to prepare flexible and timely advice for political decisions.

- The recommendation of the ERA Council was adopted in § 4 (9) FREG: "For individual items of its deliberation, the Council Assembly may call in further respondents and experts in an advisory capacity. The establishment of special temporary and thematically limited committees by the council should be sought...".

- The establishment of such working groups is one format among others to adequately address the growing complexity of the problems. In the RFTE's practice so far, many studies have been commissioned to serve as a basis for the Council's work. It turns out - this is not a peculiarity of the studies commissioned by the RFTE, but concerns the vast majority of such studies in Europe - that although they contain a precise description and analysis of the problem, they usually refrain from further proposals for concrete implementation paths or steps in a transformation process.

- Here, a digression is in order to compare with the working methods of the US-influenced think tanks. They emerged in the 1940s and were strongly influenced by the mathematical-quantitative methods of *operations research*. The aim was to develop an analytical basis for management decisions. At first, the focus was on military decisions and their implementation. The think tanks that emerged after the end of the Second World War extended the analyses and methods to economic problems and organisational consulting. Thus, an ecosystem of networked but also competing analysts and institutions emerged that were located between industry, state administration and research institutions. They functioned as idea providers, but also as 'change agents' who advised and accompanied reform and change processes

both in companies and in the administration with concrete proposals and specifications in many kinds of transition processes.

- The think tanks established in Europe on the US model never succeeded in achieving the same impact as in the USA, as neither the nationally shaped environment of the administration nor the industrial structure make this possible. Adopting the US model would be doomed to failure. Nevertheless, a predominantly internationally operating system of consultants and advisors has established itself in the business community, offering concrete know-how for the restructuring of companies.

- It is worthwhile to think about how the knowledge and the ability to accompany necessary reforms and restructuring in concrete terms could be adapted and used for similar processes in the public sector. Prerequisites for this are the political will and support for reform processes, good knowledge of administrative logic and its internal practices, as well as the necessary analytical knowledge and experience in the concrete accompaniment of reform and transformation processes.

The fourth recommendation of the ERA Council resulted from its tasks in bringing together European expertise with the strategies and perspectives of Austrian RTI policy. The ERA Council recommended maintaining the focus on the European Research Area and providing for a strong European dimension in the tasks and composition of the newly constituted body. Austria's development in the European Research Area should be one of the focal points of the new Council's deliberations.

- "Europe" is and remains the most important point of reference and impetus if we are to succeed in achieving the goals and tasks set out in § 1, para. 2 and "preparing Austria for the challenges of the 21st century" (§ 1, para.1 FREG).

- In view of the endeavour to ensure security in a comprehensive sense in the European member states in the future, the focus must be expanded beyond the European Research Area from today's perspective. Newly added agendas include cyber security and European defence research, for which the European Defence Fund (EDF) provides funding.

- The comprehensive challenges we face today can only be met through pan-European coordination and interaction between national and European levels. The arc spans from energy supply to interrupted supply and food chains; from European defence to national and European data security; from technological sovereignty to a coordinated industrial policy. In fact, all areas of public life are affected.

- The abundance of cross-cutting issues that affect both the European and the Austrian RTI strategy continues to increase. They require continuous inclusion of the European dimension in the implementation of the Austrian RTI strategy. Many decisions are currently made at the European level that must be implemented in Austria, but also co-financed by Austria. In most cases, there is a lack of coordinating mechanisms and corresponding financial planning in the various ministries involved. Another example is the EU missions, in which Austria is actively involved, even if the sectoral interests and their participation are unequally represented.

The fifth recommendation of the ERA Council concerned the management of the New Council, whose members should be limited to a maximum of 15. In general, a trusting cooperation with the federal government should be sought. Furthermore, it is pointed out that an essential component for the future success of the new Council is the efficient and effective management structures of the new Council. The new secretariat to be established should promote cooperation between all ministries as well as communication and exchange between the new Council and the interested public.

- The draft law provides for a council of twelve members. The governance structure of the new council is expanded in the FREG by the introduction of a supervisory board, which is responsible for a number of activities.

- An essential organisational prerequisite is the support and close cooperation with the office that is also to be newly established. Its professional and staff composition must reflect the breadth and depth of the tasks and goals and be actively involved in all exchange relationships of the new council.

The recommendation of the ERA Council did not further address the continuation of the support of the Foundation Council (Stiftungsrat) under the RTD National Foundation Act by the new Council.

- The continuation of the support of the National Foundation by the new Council is explicitly provided for according to § 2, para. 2, item 7 of the FREG. Since the strategic importance of the National Foundation has increased significantly, the new Council is faced with the task of taking this into account in its recommendations to the Foundation Council. It would be conceivable, for example, to use the expert knowledge of its members not only to approve or reject projects, but also to propose improvements to the projects to be evaluated on a case-by-case basis according to the principle of "revise and resubmit". The prerequisite for such a procedure is close coordination with the Foundation Council and the deadlines to be met.

The recommendations of the ERA Council from 2018 and the present draft law 2022 show a number of similarities. However, the comparison also reveals requirements that have arisen from the changes that have occurred since then.

Further considerations on the future design of science policy advise

Every political system has the advice it deserves. This is how one could paraphrase an old saying. It refers to the fact whether the political system is prepared to take consultation seriously and to take up what is argumentatively convincing and points to a direction that serves the common good beyond the concerns of day-to-day politics. Conversely, each advisory body must decide how it intends to maintain its professional independence vis-à-vis politics. It must not become the mouthpiece of politics or even allow itself to be appropriated. Nevertheless, it needs sufficient sensitivity to respond to the need for advice, to sound it out, and even to

stimulate its articulation. This by no means excludes setting impulses oneself and drawing attention to developments of which the decision-makers are unaware or even unwelcome.

From my own experience as chair of the European Research Advisory Board, EURAB, the highest advisory body of the European Commission, from 2001 to 2005, I know the *advisory dilemma*: if the advisory body is too close to the issues of those being advised, it risks becoming blind to the issues. It fails in its task, because those being advised usually know better themselves, even if this knowledge remains implicit. However, if the advisory body insists too much on its independence or is not able to respond to the real need for advice, it risks choosing topics that are too far removed from what is useful or not feasible for those being advised.

So there is a fine line to tread between an offer that is not taken up and implemented and the need that sometimes has to be articulated before it can be met. The success of science policy advise requires mutual trust, which needs to be built up. Forms of informal exchange far from ritualised patterns of behaviour are suitable for this. If guidance is to be more than the formal delivery of recommendations, the limits and possibilities of implementation must be taken into account. The definition of agendas, topics and problems does not automatically result from the set goals and tasks, but only emerges through open discussion and priority setting. Since assumptions made and conditions can change rapidly, the advisory service must be able to react quickly and flexibly.

From my point of view, there are two topics that run transversally through all other tasks defined by the RTI strategy: the support of a national data strategy to optimise a public good-oriented use of data and the central anchoring of the interlinking of the national RTI strategy with the European one.

On the data situation: The new Council is in the privileged situation of having a versatile instrument in the form of Monitor 2.0, which allows it to support and further expand the Council's activities. The Monitor offers itself as a digital platform for the entire RTI community, which invites the establishment of multidimensional connections, alliances and networks that serve the exchange of information and new cooperations. In order to take advantage of these opportunities, the Monitor 2.0. must be carefully curated and further developed through continuous feedback with users.

The data available to Monitor 2.0. are central to the RTI sector. However, they only make up a small part of the amount of data that is scattered and partly inaccessible in the public sector in Austria - not to mention the private sector. In its "Recommendation for a national data strategy to optimise public good-oriented data use and evidence-based policy advice" of 24 November 2022, the RFTE addressed the most urgent measures to the federal government. These include the bundling of numerous initiatives for better data use and storage as well as the creation of the necessary structures, which must be coordinated at the highest political level within the framework of a national data strategy. It is also recommended to set up a dynamic 'data map' on which the strategic and efficient use of the growing resource 'data' is made visible and usable. Existing and new data infrastructures must be successively expanded and linked. At the neuralgic data nodes, there needs to be an expansion of positions for qualified experts and generally more well-trained specialist personnel in order to advance digitisation in Austria.

The recommendations of the RFTE are the result of a process that is summarised in the position paper "Data Excellence: Strategies for Austria". It was developed in cooperation with the Future Operations Panel and a large group of experts (Data Excellence: Strategies for Austria, 2022). In cooperation with a number of other institutions and the Austrian National Bank, position papers were produced that contain concrete proposals for the application of the Data Governance Act in Austria. The position paper was prepared in close coordination between Statistics Austria, the Austrian Institute of Economic Research Vienna (WIFO), the Complexity Science Hub Vienna (CSH), the Vienna Science, Research and Technology Fund (WWTF), the Institute for Advanced Studies (IHS) and the Oesterreichische Nationalbank (OeNB) (OENB, 2022). In the future, political action will not be possible without a solid and interoperable database. The federal government should therefore continue to be advised and supported in the creation and implementation of a national data strategy. The new Council can demonstrate the concrete benefits for policy from advice that is based on a well-connected and high-quality data basis.

It is up to the new body which instruments it chooses for consultation. The draft law mentions the 'independent preparation of analyses and recommendations'. The RFTE has regularly commissioned studies from external experts for the preparation of recommendations. An important instrument of the new Council will be communication with the public and constant contact with the media, as it is responsible for "strengthening the awareness of research and the knowledge of science, innovation, technology development and the development of the arts in civil society" (§ 2, para. 1, line 7 FREG). Here, additional important emphasis can be set to increase the understanding and a positively connoted view of the opportunities and potentials of the use and sharing of data in the public.

The second, more far-reaching consideration concerns the anchoring of the European dimension in all matters affecting the RTI strategy. There are numerous contacts with European partner organisations and with the institutions of the European Commission throughout the RTI system. They ensure that the relevant information is available in the Austrian RTI system. However, there is a lack of a body that could act as an active contact and advisor between the EU agendas scattered across the ministries, the science and research organisations, the agencies, industry and the scientific community, acting as an '*honest broker'.* The future Council has the opportunity to fill this gap and establish itself as a hub between the Austrian RTI system and the European one.

In order to support the implementation of measures adopted at European level in the Austrian RTI system, the Council must have the necessary personnel capacities and knowledge. When restructuring the office, it would be desirable to bring in the *know-how* and experience of people who have acquired this through their professional work in or with the European Commission. Another advantage would be that they could bring in their networks for the further development of cross-links.

At the European level, there are a number of initiatives such as 'Technological Sovereignty', whose relevance for Austria is obvious. Other recent examples are the recommendations of the European Council on *Knowledge Valorisation* (EU, 2021) or the initiative of the Alliance for an *Agreement on Reforming Research Assessment* founded in July 2022. In the meantime, a model for a changed and more inclusive evaluation system has been developed

and signed by more than 350 organisations. For example, the question arises as to whether or not this model should be included in the next performance agreements with Austrian universities.

The issue of scientific advice to policy is also receiving increased attention at the European level, as shown in a background paper for the meeting of the Competitiveness Council of EU Research Ministers on 2 December 2022 (EU, 2022). The group of 'Chief Scientific Advisors', which includes an Austrian, regularly publishes its carefully prepared *Scientific Opinions* based on the reports prepared by SAPEA. Their latest report on the current topic of "Strategic crisis management in the EU" contains concrete recommendations that are also significant for Austria. There is thus a multitude of complementary initiatives, the knowledge and reception of which benefits all involved and prevents reinventing the wheel.

Thankfully, the ERA Portal Austria operated by the BMBWF publishes all information relevant to the Austrian *RTI community on the* activities of the Commission and Member States in this area. In addition, most research agencies and organisations have their own channels to inform their members and target groups. What is missing is not access to information, but an active mediating role that, starting from an overall view, sets new impulses, initiates discussions and points out opportunities to be used.

Recently, the European level has been additionally overlaid by a series of international tensions that mark the end of the 'Open to the World' strategy which reigned supreme only a few years ago. Restrictions in international exchange and in the manifold forms of international cooperation are emerging in more and more areas. They are intended to guarantee the new requirements of multidimensional 'security' or to underpin the desired 'technological sovereignty'. The European Commission and its member states are increasingly challenged to take a position in the field of tension between the USA and China, which is associated with far-reaching consequences both for global competition for innovation and new technologies and for the science system and universities. How and what flexibility will be possible in these areas in the future without giving up deeply rooted principles such as university autonomy and the freedom of science is an open question. What is certain, however, is that Austria will not succeed in staying out of the escalating international tensions. The tightrope walk between clearly taken positions and their practical implementation is narrow and remains a major challenge.

Every crisis also brings opportunities

The coming years will be crucial to bring Austria well through the poly-crisis. The last decades have been characterised by economic growth and increasing prosperity, for whose dynamics the achievements of science, technology and innovation have acted as a reliable motor. The RTI system in Austria is well positioned. However, many of the assumptions for an unbroken continuation of this relatively stable period are currently being put to the test. Globalisation was driven by *off-shoring* of jobs to cheaper producing countries, now it is followed by *home-shoring* and *friend-shoring,* i.e. the back-shoring of industrial activities and their relocation to friendly countries. The disruption of supply chains, first caused by the pandemic, then by the war in Ukraine and increasing geopolitical tensions, reveal a level of dependency that cannot be sustained. In response, the quest for 'technological sovereignty'

is setting in at the European and national levels. In addition, the energy crisis triggered by the war in Ukraine is far from over, nor has the threat of recession been averted for the Eurozone in the coming year.

Whatever the various crisis scenarios may lead us to fear, every crisis opens up new opportunities. Recognising them, however, is not easy. We find ourselves in a paradoxical situation today. On the one hand, we rightly celebrate the amazing breakthroughs in basic research and the innovative achievements of the technosciences. Almost daily, the James Webb Space Telescope sends us magnificent images of the origin of the galaxies of our universe millions of light years back. The life sciences are achieving further successes in gene therapy interventions made possible by CRISPR or in the vaccination of individual tumour cells. We are all experiencing the acceleration with which digitalisation is changing the economy and penetrating all areas of life. Who would have thought recently that a ChatGPT or other generative AI would be able to 'paint' pictures to our specifications that never existed before or write a multitude of texts that are amazingly similar and orders of magnitude faster than those produced by humans?

Contrast this with the severe tests of social cohesion that Western societies are facing. We are witnessing how quickly it can test the fragility of liberal democracies. There is no doubt that social media and internet platforms, which are subject to little or no state regulation, have contributed to the polarisation and flooding of public space with hatred and malice. But in all Western societies, social inequalities have been growing for decades, increasing discontent with politics. Many state institutions have lost their capacity to provide adequate solutions to the problems they face, as their functions were intended to respond to the challenges of a different time. The pressure on state institutions to adapt to changing circumstances is enormous. If this is not possible, new institutions must be created.

There are good reasons to place hope for a way out of the crisis in further scientific and technological advances. But innovation cannot be limited to technological innovation. On the contrary. In the past, the technosciences and the innovations they brought with them had broad support in society. This was fuelled by the promise of a belief in progress that lasted as long as the increase in prosperity and well-being was reasonably sustained. The divergence between the dynamics of scientific and technological innovation on the one hand and the ability of social institutions to maintain social cohesion on the other began when the continuation of unrestrained economic growth without regard to the exploitation of the natural environment and social justice faltered. The belief in progress lost its momentum and became increasingly untrustworthy. The imagined 'contract' between science, technology and business, supported by the state as guarantor of economic growth, and society became fragile[5] .

A new 'contract' or, as some have called for, a new 'narrative', is not in sight. But perhaps the crisis is widening the field of vision. If sustainability is to become part of the solution to the problems of limited natural resources and a limited space on this planet for 8 billion people, every innovation must become sustainable. Its unintended consequences and long-

[5] In the "Science Barometer Austria 2022" conducted by the Austrian Academy of Sciences, 34% of respondents agreed with the statement "scientists are in cahoots with politics and business" and 44% found the influence of business on science to be "much/highly excessive". Klaus Taschwer, Der Standard, 21 December 2022.

term impacts must also be included as best as possible. Technological and social innovations are increasingly interdependent. By their very design, technological innovations must be embedded in the social context. They have an impact on society, but conversely, social organisations often make a decisive contribution to their acceptance and further development. In order to be sustainable, embedding must take place in the social context; in the organisations in which people work and in an environment in which they can live healthily.

This is not possible without standards and regulation. We are currently experiencing how much artificial intelligence is changing all areas of the economy and social coexistence and what challenges it brings for liberal democracies. We need forward-looking new legal norms and a legal system that does not hinder innovation and yet limits the power of international corporations, because only in this way will a prosperous social and democratic coexistence be possible.

So there is much to be done to seek out the opportunities that every crisis offers. We just have to dare to abandon worn-out habits of thought, invent new institutions and trust in the insight that came into the world with modern science: the future is open. Humanity has made enormous progress since then, but it has also caused much suffering. Every crisis brings with it the loss of control and reveals limits.
The experience that there are limitations makes us inventive. It is up to us to use the crisis - for the good of all.

The founding of the new Council comes at a time when much of what we used to take for granted is losing its validity and calls for new orientation. Times of crisis require more cohesion and the willingness to cooperate even where individual interests previously dominated. The structural framework of the new Council offers enough space and possibilities to overcome institutional boundaries and traditional demarcations, to cultivate new forms of informal communication and to create synergies. Science policy for times of crisis requires ingenuity, courage and a sense of practical implementation beyond what has been done before.
I wish you every success!

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