

# Shaping Future Together – 50 years of Fraunhofer ISI research for tomorrow

A shortened and slightly modified version of the speech given by Prof. Jakob Edler at the ceremony marking the 50th anniversary of Fraunhofer ISI on 15.09.2022.

Dear Guests, Partners, Friends and Employees of Fraunhofer ISI,

Heartfelt thanks to all of you who gave us such insightful and encouraging speeches. I did hope that we would only hear good things and your words made us, I won't deny it, proud and grateful. Proud and grateful that we have the privilege of working at this wonderful institution, Fraunhofer ISI, and contributing to all the things you have attributed to us.

I am – we are – deeply grateful to you, Ms. Drake, for your impressive keynote address. You highlighted the ambition that the European Union is developing; seeking to make the continent simultaneously more competitive and more capable of coming up with solutions. Especially in view of multiple crises, it is necessary to align innovation along concrete, Europe-wide problems.

At the same time, and this is even more important, your words also harbor great expectations, indeed, a mission: Fraunhofer ISI should continue to make a responsible contribution in the future as well as ensuring that we get through the crises of our time, and develop all dimensions of the economy and society in a sustainable way. That we “Shape Future Together”.

The words of praise are a mission. But, ladies and gentlemen, what does that mean? How do we want to continue to fulfill this mission in the future?

When I think about this question, first of all, it is important for me, especially today, to look back and reflect on the past. To bring to mind why we are even here at all, in what context we were founded, and how this foundation made us something exceptional, something special. Then I want to speculate on what this special character means today in light of three key challenges that lie ahead of us.

In the beginning, there was one man, a study, the “red bible”. The physicist Helmar Krupp conducted a study on behalf of the BMFT with the title “**The function of the Fraunhofer-Gesellschaft in the innovation system of the Federal Republic of Germany**”. As early as 1972, this study already dealt with the **innovation system**, a concept that was not established in innovation research until many years later. It was about the manifold **elements** of the system and how they interact. Everything was connected and interrelated, but also characterized by a detailed grasp of the **inner workings of these individual elements**.

This study was also influenced by the **spirit of the times**. Especially in Germany, but not only there, we were in the final stages of so-called **planning euphoria**. In academic circles and some political ones, there was the idea that a system could be comprehensively empirically documented, and then in an almost cybernetic way, adjusted by turning various knobs to influence the overall system in a deliberate and targeted manner.

At the heart of the analysis was **the multifaceted role of the Fraunhofer-Gesellschaft in the system**, which focused very strongly on its importance for the economy and competitiveness. The study culminated in a meticulously reasoned call for a Fraunhofer ISI, then still named the **Institute for Systems Technology and Innovation Research**. It was conceived as a new kind of institute: A paper institute without a technological mission, but with a social science mission at its core, advising policymakers and business. An institute to stick out in the family of technology institutes at Fraunhofer.

In spite of certain reservations within the Fraunhofer-Gesellschaft, there was sufficient political support for the idea. The study became the founding document of Fraunhofer ISI. And it was and has remained its normative orientation.

The way it was founded embedded a number of characteristics, which in their interplay constitute the special nature of Fraunhofer ISI:

First, there was a new functional expectation, **social science innovation system analysis**, which was already underpinned in 1972 by impressive broad-based **evidence** and conceptual innovations. These new impulses positioned Fraunhofer ISI as a type of **forward thinker**.

Second, Krupp, a physicist, became a leading **innovation researcher**. This made him a trend-setter for the **interdisciplinarity**, which formed part of the institute’s make-up right from the outset, and which was a prerequisite for Fraunhofer ISI always being able to address the

system level and dynamically relate the individual elements of the system to each other, despite all its partial, in-depth consideration of technologies, innovations, infrastructures, corporate strategies and policy measures.

Third, **integrated internationality**. Helmar Krupp had helped to set up an early international network of institutes, the so-called 6 Country Programme. Its activities were a self-defined give and take between researchers and persons from politics beyond the context of contract research.

Fourth, Fraunhofer ISI had institutional links to **broad technological expertise** through its foundation under the umbrella of the Fraunhofer-Gesellschaft. And, due to the **contract research** model at Fraunhofer, the institute was automatically required to work together with decision-makers from politics and business in a solution-oriented manner. An incredibly important mode of action and an immensely important mode of learning for us as well.

And fifth, Krupp gave us our broad **normative orientation**. Early on, he recognized the importance of innovation not only for economic competitiveness, but also the dangers of technology-driven growth, something we have documented at the entrance to the institute with a quotation from 1972: “We want to ensure our well-being and survival with technology, but at the same time we are putting an extreme burden on our future”.

All these principles, systems orientation, evidence-based approach, a broad understanding of interdisciplinarity, internationality, contract research and normative mission, are still firmly anchored in ISI's spirit. Their interplay constitutes the special character of Fraunhofer ISI.

### **What are the challenges facing this particular approach and the function of Fraunhofer ISI in the coming years?**

I want to talk about a threefold set of challenges that will shape our efforts in the years and decades ahead: increasing complexity due to intertwined transformations, the return of geopolitics, and the threat of social fragmentation.

First, and this is the most comprehensive issue: whether in politics, science, societal groups, or industry, we all seem to agree that the grand social challenges of our times require holistic, cross-system efforts more than ever before. We are convinced that science, research and technology can deliver key contributions to this by laying the foundations for many innovations.

Technological innovations are usually generated by industry. But they only evolve their added value for society, their transformative effect – and this is often underestimated – in the interplay with adjustments in the behavior and attitudes of individuals, society and the corresponding institutional frameworks.

And of course, and this is something we are increasingly aware of, many innovations are triggered by changes in social behaviors and routines as well as by the articulation of new needs.

At the same time, there have been recent renewed calls for the state to once again play a more active and guiding role. The current transformation policies, for which the government recently created an additional overarching framework in its Alliance for Transformation, broaden this aspiration to shape the future.

Given the perceived urgency of the challenges, their scale and growing complexity, this increased aspiration for shaping the future also results in truly interdisciplinary work becoming ever more important for cross-system analyses.

And this maxim of broad interdisciplinarity does not just apply to politically and socially desired transformations. It also applies to the relevance of disruptive technologies that will foreseeably cut through all these transformations and radically change our lives. Important examples include artificial intelligence and autonomous systems. The potentials and risks are huge. The researchers driving these technologies must increasingly address systemic and ethical issues that go far beyond their core expertise.

Fraunhofer ISI, in turn, can only really understand the massive systemic changes that these technologies will cause in cooperation with leading **technology** researchers. We are therefore extremely lucky to have developed an integrated research program together with the Fraunhofer Institute for Optronics, System Technologies and Image Exploitation IOSB, which forms the basis for a joint new building for the two institutes here in Karlsruhe that was formally approved this year.

A second bundle of challenges results from the return of **geopolitics**: the diverse ambitions to shape transformations must consider the changing geopolitical situation and the constraints on action that result from this. At the same time, these transformation efforts also have an influence on geopolitics. The capacity for innovation and transformation has always been the

subject of nationally defined competitiveness, of competition between nations. Well before the terrible Russian war of aggression in Ukraine, concerns had already increased about our technological ability to act, defined individually, nationally or ideally on a European level.

The confidence in open markets and in secure interdependence through a global division of labor has diminished. System competition and technology sovereignty are now considered the latest concepts.

However, their fundamental, long-term significance has not yet been comprehensively understood. As a result, they harbor a highly disruptive, counterproductive potential, despite their productive intentions. The state, businesses and the supporting research community are asking themselves new questions or addressing old questions with new urgency:

How do we uphold our technological performance when international partners break away? How does the German model react if the openness of markets diminishes? We are already feeling the effects of this in our work.

This means that innovation research must address geopolitical dangers and new opportunities in a new way, and implicitly also the question of our system's resilience.

In future, therefore, we must keep a much closer eye on other systems and their developments. That is why we have decided to cooperate even more closely with institutes that focus on analyzing geopolitical developments.

And we will develop even stronger strategic collaborations with institutions in selected countries outside the EU. For instance, we have signed a Memorandum of Understanding with Seoul National University that not only aims at promoting scientific cooperation, but at establishing a permanent binational forum for research, politics and business. Another binational initiative with the United Kingdom is under consideration. We cannot simply continue with business as usual in such changing times.

The third set of challenges results from the **risk of further social fragmentation** accompanying the various transformations. On the one hand, this is reflected in a growing disparity in the distribution of income and wealth, and, on the other hand, in the fact that different sections of the population are affected to different degrees by the negative consequences of crises and transformations, not only within countries, but also internationally.

In addition, we are witnessing the growing fragmentation of discourse in society as a whole. We can also observe the growing mutual isolation of different echo chambers. Both aspects together have potentially huge implications for the success and widespread acceptance of transformations.

And, in the process, the value of scientific evidence, its standing, is increasingly coming under open attack. The relativization and fundamental questioning of scientific expertise, the sometimes cynical or at least thoughtless attack on scientific expertise for political purposes is increasingly becoming a problem for the legitimization of the state's ability to act **and** for our role as a research community. And, my own personal observation is that these reactions could be seen during Corona or regarding the question of a total gas embargo this spring, even among high-ranking representatives of parties firmly anchored in the democratic spectrum.

Of course, science can and must be criticized. And of course we as researchers have to separate our own individual normative preferences from the production of evidence, and explain the nature of scientific evidence again and again, in other words, that it can, in principle, be revised.

But there is great danger here in the interaction between the fragmentation of discourse and the decline of social cohesion. The danger that we as societies will become increasingly incapable of talking and arguing about problems and their solutions in an informed, constructive and respectful way that is based on facts. And that, in doing so, we will also lose the value of science – of evidence.

This threefold set of problems, intertwined transformations, the shadow of geopolitics, and the dangers of social fragmentation, do indeed present a challenge to all of us.

We can neither capitulate to complexity, nor can we assume that we can simply plan and/or politically steer transformations in the spirit of the 1970s – regardless of how hard we try to remain evidence-based. At the same time, however, it is clear that we need to become more ambitious again compared to the last decades in terms of analysis and policy design.

What we need more than ever before is detailed knowledge of how systems – energy, mobility, healthcare – function and the sectors embedded in them, and how they interact; a thorough understanding of technological and social innovations as well as of the preferences and behavioral patterns of actors in the system. Finally, we require in-depth analysis with regard to

the possibilities and limits of governance, the steering and shaping of innovation and transformation, especially with regard to the role of the state vis-à-vis the market. And we need to make a much greater effort to explain the essence of our work and the nature of our findings in the broader discourse.

I am convinced that we at Fraunhofer ISI are in a particularly good position to manage and combine these different requirements. And that we can further develop our capabilities and principles so that the institute will continue to be an excellent analyst, forward thinker and active contributor.

**I would like to thank you all very much for your attention.**