acatech IMPULSE
Executive Summary

Resilience as Economic and Innovation Policy Goal

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The SARS-CoV-2 pandemic has brought a new perspective to the innovation policy debate, which in recent times has focused mainly on structural change and technological sovereignty. The pandemic has highlighted the fact that it is also necessary to guarantee the **resilience** of economic structures in order to secure long-term **value creation and employment** and ensure that Germany and the European Union are **able to keep functioning during a crisis**.

Published in three volumes, this study addresses the **resilience of value networks and supply chains** (Volume I), as well as providing in-depth case studies of the **healthcare industries** (Volume II) and the **automotive industry** (Volume III).

Resilience is a key **enabler of self-reliance** in a world currently facing **three crises** with very different timescales, in the shape of the pandemic, simmering trade disputes and climate change.

There is one **fundamental error** that must be avoided in this context. Resilience has been debated before, during past crises. However, the importance attached to resilience invariably diminished markedly once the crisis was over, when **other priorities moved back up the policy agenda**. In many cases, this happened **before there was time to learn lessons from the crisis** and **take the measures** needed to make the relevant structures more resilient.

This **must not happen this time round** – decision-makers in government, science, and industry must **make the most of the current momentum**.

Crisis management teams, crisis plans, and accelerated processes must be established and rehearsed as soon as possible. **Continuous risk management** must become an inherent part of individual responsibility, permanently anchored in the decision-making structures of businesses, public authorities, and government, and thus also in **employees' minds**. This will also involve carrying out a critical review of **incentive structures** that make resilience initiatives unattractive to policymakers and businesses.

Volume I – Resilience as Economic and Innovation Policy Goal

The background discussions for these acatech IMPULSES identified a number of **general** supply chain and value network **resilience strategies** that can be pursued by government and industry (see Figure 1).

The **current pandemic** provided the **starting point** for **formulating general strategies** for strengthening resilience against **all kinds of crises**. The following general findings are examined in depth in the first volume:

1. While the SARS-CoV-2 pandemic has starkly exposed certain **weaknesses** with regard to resilience, it has also highlighted **huge potential for agility and innovation** within industry, the public authorities, and government. The ideas and experience needed to **develop resilience strategies** already exist – the next step is to create the conditions to enable their **systematic implementation**.

2. The **next crisis is unlikely to be another pandemic** and will therefore affect various industries and areas of society in different ways. Consequently, **resilience initiatives** should have a **broader conceptual approach** than is often the case today.

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Figure 1: Cross-sectoral priority areas (source: authors' own illustration)

3. **Resilience** involves an **ongoing process** rather than a one-off effort. It does not aim to completely prevent all the negative impacts of a crisis. It means **making preparations** so that it is possible to **keep functioning during a crisis** and **recover rapidly** once it is over. The aim should be to create **a new state that is better than before** ("recover and re-imagine" rather than simply returning to the status quo).

4. The **main responsibility** for a business's resilience lies with **the business itself**. But resilience is not just in a business's own interest – it is also part of its **responsibility towards society and its employees**. **Government** can and must help businesses to strengthen their resilience, first and foremost by **creating favourable framework conditions**.

5. **Technological sovereignty** should **not** be confused with **autarky**. On the contrary, non-European actors should be actively recruited for projects within European regulations. Accordingly, discussions about promoting the **growth of globally competitive ecosystems** in strategic technology fields should aim to increase resilience by **diversifying** the global supplier landscape and strengthening Europe's own position on the global market.

6. Due to the **significant additional costs**, it only makes sense to **build up European production capacity that is independent of the market** in order to guarantee the supply of goods and services in a limited number of **basic public service areas**. Accordingly, the State should only introduce strict **resilience regulations** where this is essential for it to keep functioning or provide basic public services in crisis situations.

Volume II – Resilienz der Gesundheitsindustrien: Qualität und Versorgungssicherheit in komplexen Wertschöpfungsnetzwerken

Reliable healthcare provision even during times of crisis and the **strong healthcare industries** needed to make this possible are clearly in the interests of both policymakers and the public. It should therefore be a policy goal to strengthen resilience by securing and **expanding value creation** in these key industries, especially in the case of new, highly innovative **medical devices** and **therapeutic approaches**.

The **challenges** associated with strengthening resilience in the healthcare industries include **structural factors** (cost structures, rigid regulatory environment, reimbursement system) that are conducive to the emergence of vulnerabilities in the supply and production chains for certain supply-critical products. **Inadequate infrastructure** and **complex regulations** have hitherto prevented the more extensive use of health data.

In the long term, close coordination and cooperation between government, science, and industry could help to achieve significant progress in strengthening the **resilience of supply chains and value networks against all types of shocks** in the priority areas identified in Figure 2.

This would in turn strengthen the resilience of the healthcare system as a whole. A series of recommendations based on the lessons learnt from the current pandemic – also encompassing **wider aspects** such as **public communication** – were published in early 2021 in the acatech IMPULSE *The Resilience and Performance of the Healthcare System in Times of Crisis*.

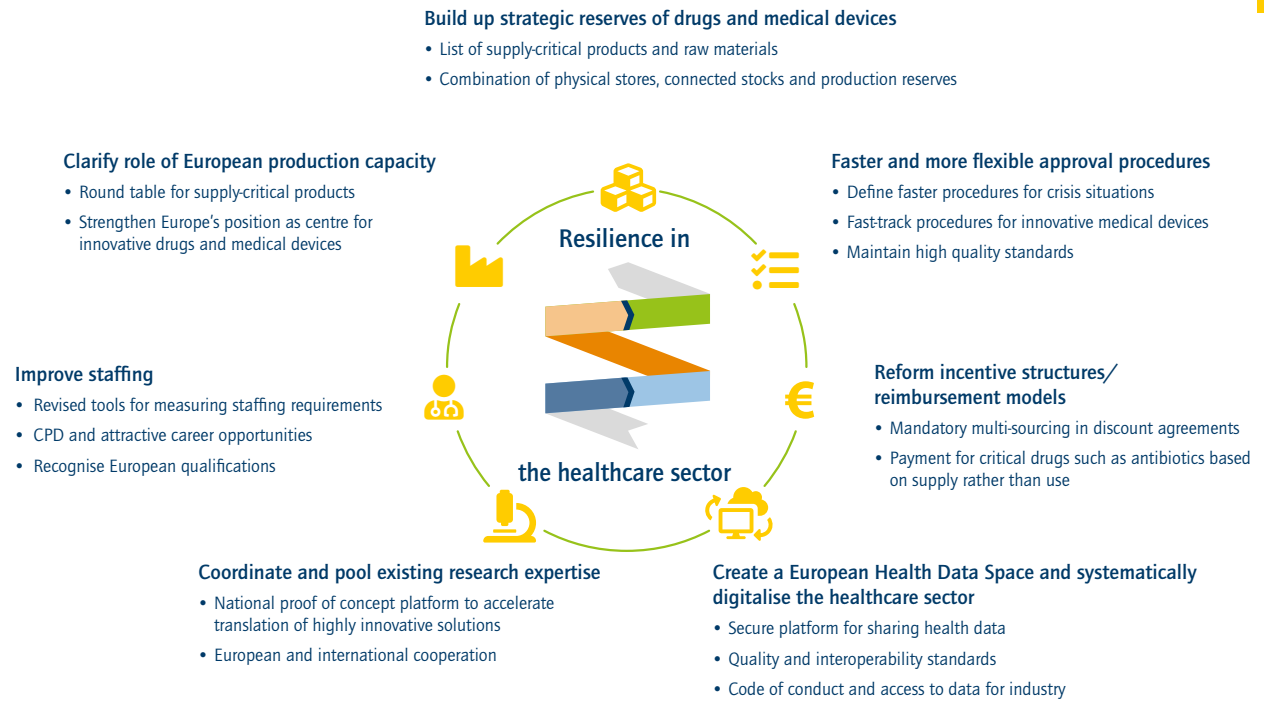

Figure 2: Priority areas in the healthcare sector (source: authors' own illustration)

The following **key messages** encapsulate the main insights from the discussions with experts on the **resilience of the healthcare industries.** These are explored in depth in Volume II:

7. Since **staffing and production capacity in the healthcare system** cannot simply be increased overnight when a crisis strikes, adequate **buffers should be** permanently **maintained** within the system. Once the **critical products** have been identified, government, science, and industry should draw up **options for implementing** intelligent **reserves of the relevant goods and production capacity**.

8. Stringent quality assurance and certification regulations place **tight constraints** on the **flexibility and responsiveness** of the healthcare industries in times of crisis. The pragmatic cooperation between private companies and public authorities during the pandemic has foregrounded **opportunities** to simplify and speed up certain procedures **without compromising safety**.

9. **Problematic dependencies** on a handful of mainly Asian producers exist for certain **supply-critical drugs and medical devices**. These dependencies make supply chains vulnerable to shocks and can create supply shortages even outside of crisis situations. **Changes to the incentive and reimbursement systems** could support supplier **diversification** and potentially also enable the development of **self-sustaining production capacity** in Europe.

10. The innovative use of **health data** offers not only systemic resilience benefits but also concrete patient benefits and value creation opportunities. **Better framework conditions and European infrastructures** such as GAIA-X should be implemented in this area as soon as possible, not least to **prevent dependence** on suppliers from other markets. High **cybersecurity** standards are therefore particularly critical in the healthcare sector.

Volume III – Resilienz der Fahrzeugindustrie: Zwischen globalen Strukturen und lokalen Herausforderungen

The extensive **changes** required to **strengthen the resilience** of **automotive industry** value networks and supply chains in the face of both long-term structural change and the immediate crisis call for **close cooperation** and a new culture of sharing information among the different market players and with science and policymakers.

In an industry characterised by globally fragmented value creation systems, greater supply chain transparency is a key requirement for greater resilience.

Figure 3 summarises the priority areas for strengthening resilience identified during the discussions. Volume III explores these areas in depth, with a focus on **batteries, microelectronics, and data**.

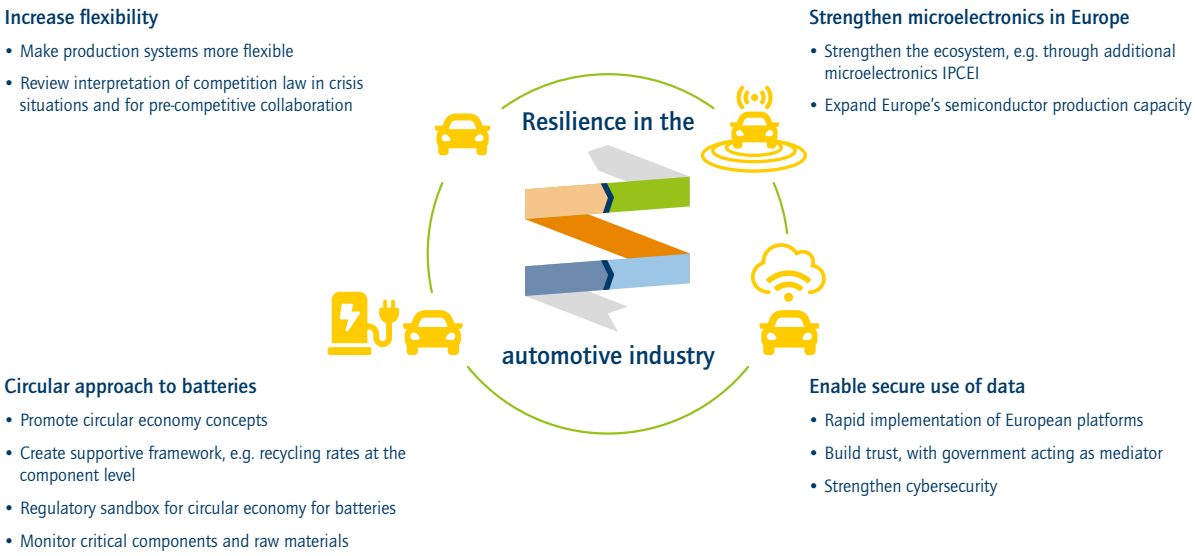

Figure 3: Priority areas for the automotive industry (source: authors' own illustration)

The discussions produced the following **key messages concerning the resilience of the automotive industry**:

11. **Reviewing** the extremely **restrictive standard interpretation of European competition law** and defining exemptions for **crisis situations** could improve the industry's ability to function in acute crises and facilitate **pre-competitive collaboration** on important strategic projects that permanently strengthen value network resilience.

12. Supply base **diversification** for **critical components** is key to ensuring the resilience of the German automotive industry, which is currently **heavily dependent** on Asian producers for **microelectronics** and **batteries**. In the medium to long term, other factors that can help to increase the resilience of value creation in strategic mobility sectors include **alternative materials research**, **substitution of scarce raw materials**, implementation of **circular economy principles**, and more generally the development of existing key automotive electronics technologies.

13. Policy support to **strengthen** Europe's **design, manufacturing** and – in the case of batteries – **recycling capability** should be maintained and increased. This will involve cooperating closely with industry to promote the **establishment of self-sustaining ecosystems**. Policymakers can provide support through regulatory sandboxes, IPCEIs, and research factories.

14. **Control of the data streams and software** in and around the vehicle is also strategically important for resilient business models. **Rapid implementation** of **GAIA-X** and the **Mobility Data Space** is thus vital to ensuring that these key value creation factors remain in European hands. The establishment of a **cross-company data space** across the **entire value chain** would make a significant contribution to strengthening resilience.

The study comprises three volumes:

Resilience as Economic and Innovation Policy Goal
(Concepts and general approaches for implementing resilience)

Resilienz der Gesundheitsindustrien: Qualität und Versorgungssicherheit in komplexen Wertschöpfungsnetzwerken
(Industry case study of principles discussed in Volume I)

Resilienz der Fahrzeugindustrie: Zwischen globalen Strukturen und lokalen Herausforderungen
(Industry case study of principles discussed in Volume I)

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Basic methodology

The acatech IMPULSES on the resilience of supply chains and value networks are based on a review of the current literature and on interviews with 86 experts from science, industry, and government. The interviews were conducted between July and November 2020. Depending on the interviewee's area of expertise and professional priorities, they focused either on general resilience principles or on challenges and solutions specific to the healthcare industries or automotive industry. In the interviews, the lessons learnt from the current SARS-CoV-2 pandemic provided a starting point for addressing the question of how to strengthen the general resilience of economic structures against all kinds of shocks..

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