

## RETHINKING PROGRESS: INTEGRATING INNOVATION POLICY FOR SUSTAINABLE FUTURES

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**Abstract:** *In the context of the pressing challenges posed by global issues such as climate change, resource depletion, and social inequality, there is a growing recognition of the need for innovative approaches within policy frameworks. The paper explores the intersection of innovation policy and sustainable development, aiming to uncover new avenues for fostering socio-economic and environmental sustainability. By examining the case of the Czech Republic, this study provides a nuanced understanding of how the country strategically shifted from smart specialisation strategies (S3) to a more advanced mission-oriented approach (S4). The introduction of missions within the S3 serves as a relevant example that illustrates the Czech Republic's commitment to addressing current challenges and aligning with global goals such as the European Green Deal and the UN Sustainable Development Goals.*

**Key words:** *innovation policy, STI policy, transformative innovation policy, sustainable development, sustainable development goals (SDGs), smart specialisation strategy (S3).*

### INTRODUCTION

The general discussion about the potential impact of scientific research on economic and social development intensified after the end of the Second World War. At this crucial point in history, innovation policy emerged, aimed at harnessing the benefits of scientific and technological progress and channelling them towards economic growth and

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general progress (Lundvall & Borrás, 2005). Later, unsuccessful market-oriented reforms, an insufficient contribution of foreign direct investment to economic growth and the consequences of the 2008-2009 global economic crisis, which showed that the market alone does not lead to long-term economic growth, have influenced the increasing importance of science, technology and innovation policies to increase productivity and sustainable economic growth (Padilla-Perez & Gaudin, 2014). This situation has been linked by many economists and researchers to the lack of ability and capacity to capitalise on technological opportunities, bringing innovation policy to the fore as an important factor for economic growth and international competitiveness (Lundvall & Borrás, 2005).

The need to tackle complex social, environmental and economic challenges has become particularly acute in recent years. This has been triggered by major geopolitical changes, increased economic tensions, the COVID-19 pandemic, an ageing population, climate issues and rapid technological advances that are impacting the private sphere and changing the dynamics of work and communication. This requires a change in the approach to innovation policy, but also systematic research that incorporates human and societal aspects to enable a robust and effective response. Ongoing discussions and initiatives in the field of innovation policy aim to reorient research and innovation activities to meet these challenges at EU level and beyond.

Considering this background, our paper examines the evolution of innovation policy, from its origins to current challenges and evolving objectives. The following section provides an insightful exploration of the evolution of the concept of innovation policy, ranging from its origins to current developments. The next section looks at the central role of science, technology and innovation (STI) in achieving the Sustainable Development Goals (SDGs). Finally, the third section illustrates the successful place-based innovation for sustainability from Smart specialisation strategy (S3) to Smart specialisation strategy for sustainability (S4) implemented in the Czech Republic, which is the best example of the shift towards sustainability in innovation strategies.

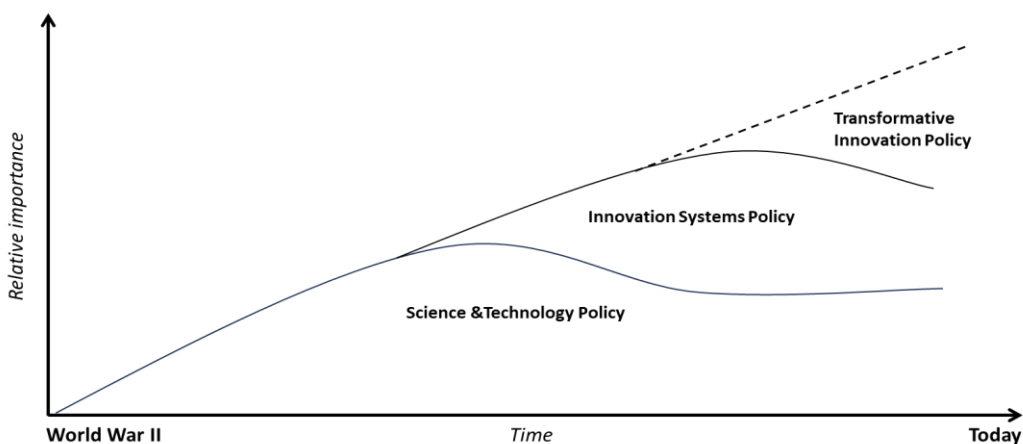
## INNOVATION POLICY – CONCEPT AND EVOLUTION

In its essence, innovation policy aims to formulate and implement strategies that optimise the positive impact of research and innovation activities and foster an environment that is conducive to ground-breaking discoveries, technological breakthroughs, sustainable economic growth, and social well-being. However, the nature of the influence of innovation processes and systems has changed over time and gained different contexts. The consideration of innovation policy in a historical context has received increased attention in recent scholarly discourse, particularly due to the burgeoning discourse on the third frame of transformative innovation policy in recent years (Chataway et al., 2017; Diercks et al., 2019; Schot & Steinmueller, 2018; Fagerberg, 2018; Haddad et al., 2022). There is a general consensus in the research community that the development of innovation policy can be viewed through three paradigms: Science and technology policy, Innovation systems policy, and Transformative innovation policy (Diercks et al., 2019; Schot & Steinmueller, 2018). Each framework has its own focus and priorities.

This view of the development of innovation policy through paradigms has its roots in Kuhn's theory of paradigm shifts. According to Kuhn, a paradigm shift occurs when an established paradigm, defined as a comprehensive set of shared beliefs, values, techniques and more within a particular community, undergoes a significant change because it no longer effectively serves the exploration of a particular aspect of nature for which the paradigm previously provided guidance (Kuhn, 1962). Nevertheless, it is important to emphasise a difference from Kuhn's theory, in which implication typically suggests the obsolescence of the prior paradigm. Contrarily, in the context of the emerging paradigms of innovation policy, it is essential to note that the introduction of a new paradigm does not mean that its predecessor is obsolete. Rather, it signifies an improvement or progress that demonstrates that the previous paradigms are still relevant, even if the focus and objectives have shifted. This is particularly emphasised by recent developments and a new policy paradigm that is referred to as transformative innovation policy or transformative change. This emerging policy paradigm can be seen as an overlay, but not a complete replacement, for the previous two policy paradigms (Diercks et al., 2019) (see Fig. 1).

To compare and analyse different innovation policy paradigms, Diercks et al. (2019) have employed an analytical framework grounded in two central dimensions: 1) policy agenda and 2) understanding of the innovation process. They identify a dichotomy between an economic and a societal policy agenda. The distinction between an economic policy agenda and societal policy agenda lies in their objectives and scope. An economic policy agenda focuses primarily on economic competitiveness, growth and job creation and emphasises the positive impact of innovation. Conversely, a societal policy agenda encompasses both the positive and negative consequences of innovation and extends its objectives to national prestige, strategic priorities and societal challenges such as climate change or inequality. It spans various policy areas beyond the economy and includes areas such as the environment, energy, health and agriculture.

Figure. 1. Consecutive policy paradigms layered upon but not fully replacing each other



Source: Diercks et al. (2019)

Diercks et al. (2019) also emphasised distinction between a narrow and a broad interpretation of the innovation process. As advocated by Rothwell and Zegveld (1985), innovation is seen strictly as the commercialisation of technological change. In a broader understanding, as formulated by Van de Ven (1999), innovation is defined as a comprehensive process of developing and realising new ideas. These definitions differ considerably and reveal different assumptions about the nature of innovation. Understanding the innovation process can be approached from three angles:

1) identifying the actors actively involved, 2) recognising the contributing activities, and 3) recognising the different types of innovation, which include different approaches to learning and forms of knowledge.

A narrow understanding of innovation characterizes it as the "commercialization of scientific endeavours" primarily involving academia and industry. A broad understanding suggests the necessity of recognizing a diverse array of contributors, moving beyond the exclusive emphasis on the "triple helix" of universities, industry, and government (Etzkowitz and Leydesdorff, 2000) and advocates for direct involvement with a broader spectrum of "social partners" (Steward, 2012).

### **First paradigm: Science and technology policy**

The first paradigm of innovation policy emphasises the central role of science and technology as the engine of economic growth. It positions innovation as a central force driving economic progress, with scientific knowledge and technological achievements serving as catalysts for growth, job creation and the overall improvement of living standards. This paradigm prioritises investment in research and development as the most important tool for developing innovative products, services and processes that promote industrial growth and global competitiveness. It is assumed that innovation driven by scientific research contributes significantly to long-term growth and opens up numerous business opportunities (Schot, 2018).

The emergence of the first innovation policy paradigm can be traced back to the period after the Second World War, particularly in the United States. The Manhattan Project, which focused on the development of the US nuclear programme, underlined the value of scientific input to public policy. In 1944, President Roosevelt commissioned Vannevar Bush to write a report, "Science: The Endless Frontier," outlining the contribution of science to the military and the implications for future government funding of science. This document became a cornerstone of American science and technology policy and paved the way for increased investment in science. In the post-war period, substantial investments were made in research, leading to the establishment of the National Science Foundation in 1950, which was tasked with supporting basic scientific research.

The Bush Report is often associated with the emergence of the first paradigm of innovation policy, but also with the linear model of innovation, which assumes that the process of knowledge generation and application begins with basic, often government-funded research, and then leads through applied research and development to final production, diffusion and societal benefit. Even though this direct link was not clearly stated in the Bush Report and has subsequently become the subject of criticism and adjustment (Edgerton, 2004), it is important in the context of the prevailing science policy narrative. However, it has been criticised for not analysing societal challenges in depth, for its limited applicability in less developed countries and for being essentially based on a linear model of innovation. This criticism served as an incentive for the development of alternative approaches with the aim of overcoming the above-mentioned weaknesses.

### **Second paradigm: Innovation systems policy**

The second paradigm “Innovation systems policy” abandons the exclusively science-led approach, while emphasising the importance of institutional linkages and entrepreneurship in strengthening the absorption capacities and application of knowledge, as well as the role of application and transdisciplinarity in the production of knowledge (Schot & Steinmueller, 2018). This paradigm recognises entrepreneurship as a key factor in promoting innovation and economic development (Schot & Steinmueller, 2018). It emphasises policies that support entrepreneurship, including the creation and growth of new businesses. Entrepreneurship is seen as a means of introducing new ideas, products and processes to the market, leading to more competition and innovation (Schot & Steinmueller, 2018).

Innovation systems policy emphasises the importance of the national innovation system and stresses that innovations arise from the cooperation of different actors within a broader national framework. It emphasises the influence of institutions, policies and networks on the outcomes of innovation. It corresponds to the interactive model of innovation or the national innovation system model, where knowledge is generated through the joint engagement of different actors at national, level (Freeman, 1995; Lundvall, 1992). This approach recognises the crucial role of interactive learning and the development of skills for effective knowledge acquisition.

The second paradigm focuses on improving the absorptive capacity of both the business sector and institutions to utilise and apply the knowledge generated by innovation more efficiently. As Cohen and Levinthal (1990) explain, absorptive capacity measures an organisation's ability to assimilate and use new information and resources. It refers to an organisation's ability to identify, adapt, transform and effectively use external knowledge, research and best practise. Essentially, it measures the speed with which an organisation can adopt and apply knowledge, be it scientific, technological or from other sources outside its boundaries.

Innovation systems policy emphasises the need for better cooperation and coordination between the various actors within the national innovation system. The aim is to avoid system failures and improve innovation outcomes. This model particularly emphasises the role of the responsible ministries in dealing with system failures and in creating more effective cooperation mechanisms. Innovation systems policy recognises the context-specific nature of innovation systems and acknowledges that these systems vary across regions and countries. It emphasises the importance of understanding and exploiting the characteristics and strengths of each innovation system, considering local conditions and needs. While the concept of National Innovation Systems (NIS) is mainly applied in industrialised countries, its implementation in developing countries requires specific adaptations. For example, the focus should be placed more on capacities than on resources, knowledge should be recognised as a key driver of economic development and the supporting role of institutions and organisations in promoting innovation should be emphasised more strongly (Carayannis et al., 2012).

### **Third paradigm: Transformative innovation policy**

The third innovation policy paradigm, also referred to as transformative innovation policy, has arisen to confront social and environmental challenges at a more fundamental level. It has been prompted by global challenges and emerging priorities in recent times. It has emerged in response to the limitations of previous framings in addressing sustainability, poverty and unequal income distribution. It calls for a thorough examination of the role of science, technology and innovation in achieving social and environmental goals and argues for transformative changes in socio-technical systems to achieve these goals. As outlined by Schot and Steinmueller (2018), four

processes have contributed to the emergence of the third paradigm of innovation policy:

- **The SDGs:** The origin of the third innovation policy paradigm can be linked to the introduction of the United Nations SDGs in 2015. These goals encompass endeavours to eradicate poverty, reduce inequality, promote sustainable consumption and production, and address climate change, among other objectives. The SDGs signify a broader acknowledgment of the need for transformative change to achieve sustainable and inclusive societies.
- **Emphasis on addressing social needs:** Transformative innovation policy represents a change of approach that shifts the focus of science and technology policy towards meeting social needs. This represents a departure from previous paradigms, which primarily emphasised economic growth and technological progress. The aim is to address social and environmental challenges at a deeper level by questioning existing assumptions and values. It also recognises that innovation should be guided by social and environmental goals and actively contribute to systemic change within socio-technical systems.
- **Experimentation and learning:** The third paradigm emphasises the importance of experimentation, social learning, public discourse and negotiation within the innovation process. It advocates inclusive and participatory approaches that allow for different perspectives, divergent opinions and conflicting worldviews. This paradigm recognises that achieving transformative change requires continuous reflection, adaptation and exploration of alternative pathways.
- **Engagement in science and technology policy:** The third paradigm goes beyond traditional science and technology policy and requires active participation in science and technology policy. This engagement aims to challenge existing systems and values and drive systemic change in socio-technical systems. It involves the creation of spaces for deliberation, public discourse and negotiation involving a range of stakeholders, including policy makers, industry, civil society groups and users.



## **THE CONTRIBUTION OF STI TO THE ATTAINMENT OF SUSTAINABLE DEVELOPMENT GOALS.**

The 2030 Agenda for Sustainable Development was adopted by the United Nations in 2015 with the aim to serve as a comprehensive action plan for the well-being of people, the planet and prosperity. At the core of the agenda are 17 SDGs and 169 targets that follow on from the previous eight Millennium Development Goals and focus on all three dimensions of sustainable development: economic, social and environmental (United Nations, 2015). The concept of this “triple bottom line” was introduced by John Elkington in the mid-1990s and it expands the traditional focus on financial outcomes by including social and environmental dimensions. It also introduces the need to develop partnerships among businesses and other stakeholders to achieve sustainable development (Mariani, et al., 2022).

In the context of the UN 2030 Agenda, innovation is recognised as a crucial driver for achieving sustainable development. Although technological innovation is an important aspect, the agenda emphasises a broader understanding of innovation that encompasses social, economic, and environmental dimensions. The innovation is explicitly included in in SDG 9, which emphasises the need for building resilient infrastructure, promoting inclusive and sustainable industrialisation and stimulating innovation. Moreover, innovation is mentioned in other targets of the Agenda 2030 such as:

*“8.2 Achieve higher levels of economic productivity through diversification, technological upgrading and innovation, including through a focus on high-value added and labour-intensive sectors.*

*8.3 Promote development-oriented policies that support productive activities, decent job creation, entrepreneurship, creativity and innovation, and encourage the formalization and growth of micro-, small- and medium-sized enterprises, including through access to financial services.*

*9.5 Enhance scientific research, upgrade the technological capabilities of industrial sectors in all countries, in particular developing countries, including, by 2030, encouraging*

*innovation and substantially increasing the number of research and development workers per 1 million people and public and private research and development spending.*

*9.b Support domestic technology development, research and innovation in developing countries, including by ensuring a conducive policy environment for, inter alia, industrial diversification and value addition to commodities.*

*17.8 Fully operationalize the technology bank and science, technology and innovation capacity-building mechanism for least developed countries by 2017 and enhance the use of enabling technology, in particular information and communications technology” (United Nations, 2015).*

An integral part of the 2030 Agenda is the Addis Ababa Action Agenda (AAAA) which provides a roadmap for mobilising resources and fostering partnerships to support the implementation of sustainable development initiatives worldwide. The AAAA underlines that the generation, advancement, and widespread adoption of innovations, technologies, and expertise, encompassing the exchange of technology under agreed-upon terms, play a substantial role in propelling both economic expansion and the pursuit of sustainable development. It puts emphasis on the following activities related to science, technology and innovation (STI):

- Formulating policies that encourage creation of new technologies, stimulate research, and support innovation in developing nations.
- Promoting knowledge-sharing and fostering cooperation and partnerships among stakeholders, such as governments, businesses, academia, and civil society.
- Integrating STI strategies into national plans of sustainable development to enhance knowledge transfer and cooperation.
- Acknowledging the crucial role of public funding and policies in supporting R&D.
- Advocating for open access to research in publicly funded projects where applicable.
- Establishing innovation funds as needed, through open and competitive processes, to support innovative enterprises, especially during the phase of R&D.

- Providing support for the R&D of vaccines and medicines, together with preventive measures and treatments, particularly those affecting developing countries disproportionately.
- Increasing investment in STEM education, while enhancing technical, vocational, and tertiary education and training, with a focus on ensuring equal access for women (UN General Assembly, 2015).

STI encompasses three interconnected yet distinct domains: 1) science as systematic exploration of knowledge, focusing on understanding the natural and social systems; 2) technology which implies applying knowledge for specific purposes and 3) innovation which entails introducing novel approaches to producing, services, leveraging new technology, business models, or methods of economic and social organizations. Science, technology and innovation play a crucial role in achieving sustainable development on a national and global level. However, it is very challenging to embrace and reconsider fresh approaches to STI policy that consider the specific challenges associated with achieving the SDGs.

Incorporating the SDGs as guiding principles of STI activities introduces a sense of directionality into the conventional approach of STI policymaking. Developing STI policies aligned with the SDGs involves clearly articulating the existing national and regional policy frameworks. Moreover, it might require adaptation of the legal framework and organisational structure of institutions involved in STI activities. Since the SDGs are a global challenge, there is a need to complement national with international perspectives on cooperation (UNIDO and United Nations Inter-Agency Task Team on STI for the SDGs, 2022).

According to Sachs et al. (2019), there are six transformations which contribute to the achievement of SDGs: 1) education, gender and inequality; 2) health, well-being and demography; 3) energy decarbonisation and sustainable industry; 4) sustainable food, land, water and oceans; 5) sustainable cities and communities; and 6) digital revolution for sustainable development. Each of these pathways represent an area for public policy intervention and investments.

A group of authors has proposed the following strategies to harness the potential of STI policies in realizing the SDGs: 1) Setting up a Technology Facilitation Mechanism (TFM)

that includes a technology bank to implement the 2030 Agenda; 2) Embracing novel models to encourage innovations for global public goods and improve their accessibility; 3) Embedding STI cooperation into approaches aimed at achieving the SDGs (Chaturvedi, Rahman & Srinivas, 2019). To contribute to sustainable development, STI policies should include strategies that create an environment stimulating for technological advancements, scientific research, and innovative solutions to address global challenges. This means policy alignment, capacity building, increasing expenditure on R&D, open innovation models and more.

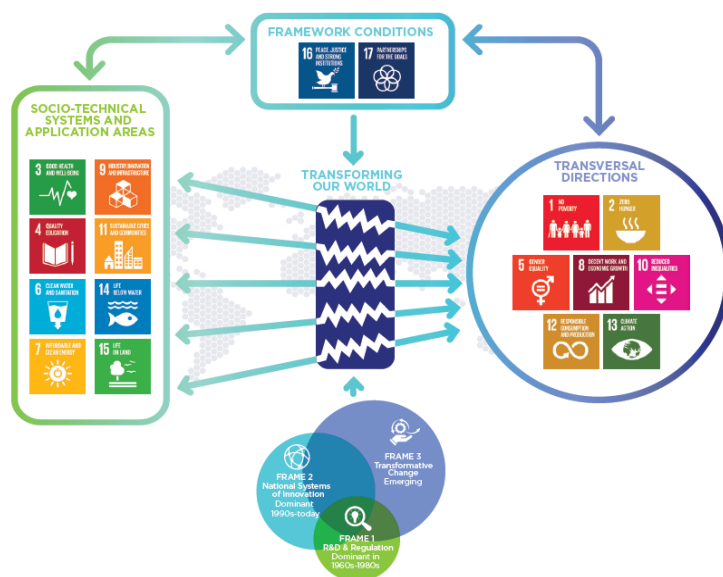
German Council for Sustainable Development emphasise the need of realigning of the innovation policy along the lines of the SDGs. This includes introducing the holistic understanding of innovation and increasing responsibility of all stakeholders involved (German Council for Sustainable Development, 2022). A profound and all-encompassing comprehension of innovation, firmly rooted in sustainability, is imperative for navigating the complex challenges of our time. This demands a multifaceted approach, encompassing technological advancements, social transformations, institutional reforms, and cultural shifts. To embark on this transformative journey, a clear and well-defined division of responsibility among various stakeholders is indispensable. Government bodies, businesses, research institutions, and the broader societal fabric must collaboratively shoulder the burden of responsibility. A proactive and dynamic stance, characterized by a genuine willingness to embrace change, is paramount in this endeavour. Openness to innovation, both in terms of ideas and methodologies, becomes a cornerstone for fostering creativity and discovering unconventional solutions.

From the perspective of a transformative innovation policy, the SDGs are not isolated targets or missions but interconnected elements that can be addressed through transformative processes. Rather than treating each goal separately, the idea is to focus on overarching transformation processes that can contribute to achieving multiple SDGs simultaneously (Schot et al., 2018). Considering a transformative perspective on STI policy, we can identify three categories of sustainable development goals:

- SDGs encompassing specific sociotechnical systems or broader application areas. For instance, health (SDG 3), education (SDG 4), clean water and sanitation (SDG 6).

- SDGs highlighting “transversal directions” or directionality. For example, 1 (No poverty), 2 (Zero hunger), 5 (Gender Equality), 8 (Decent work and economic growth), 10 (Reduced inequalities).
- SDGs concentrating on structural transformation within the framework conditions necessary for achieving overall transformation. This involves altering governance arrangements among the state, the market, civil society, and science. The last two SDGs, namely SDG 16 (Peace, Justice, and Strong Institutions) and SDG 17 (Partnerships for the SDGs), articulate this aspect (Figure 2).

Figure 2. Three types of SDGs and three frames of innovation



Source: Schot, Boni, Ramirez & Steward, 2018.

The SDGs present a distinctive chance for a profound shift in systems, merging both social and technical innovation. Merely refining existing systems won't suffice for achieving sustainability; it's imperative to recognize the intricate interplay and compromises among diverse goals. Viewing the SDGs not as a mere checklist but as a holistic comprehension of well-being encompassing economic, social, and ecological facets is crucial. In essence, tackling the SDGs necessitates a departure from a centralized approach, urging policies to redirect their attention towards the

fundamental transformation processes. If these processes unfold as intended, they inherently contribute to the realization of the SDGs.

## **DEVELOPMENT OF MISSION-ORIENTED RIS<sub>3</sub> PRIORITIES WITHIN STI ROADMAPS FOR SDGS: THE CASE OF THE CZECH REPUBLIC**

In the past decade, most European regions have adopted S<sub>3</sub>, directing European Structural Funds towards innovation and development. At the same time, in 2019, the European Commission prioritised sustainability in its long-term agenda through the European Green Deal and aims to achieve climate neutrality in the EU by 2050. Future policy initiatives are aligned with the UN SDGs and reflect an innovation-driven agenda for systemic solutions and job creation in the midst of the green and digital transitions. The current challenge for the EU is the effective implementation of this agenda (McCann & Soete, 2020).

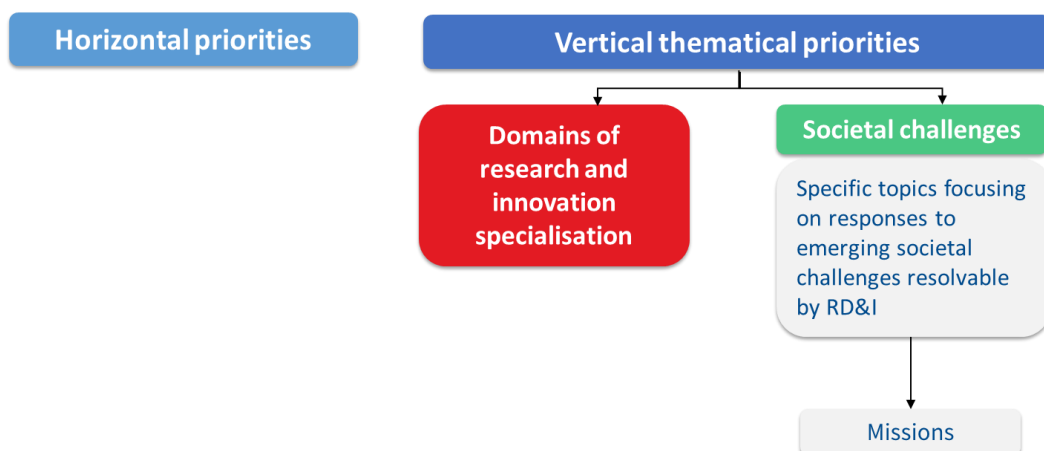
Shifting from the current policy model of S<sub>3</sub> to a more advanced approach for sustainable and inclusive growth, referred to as S<sub>4</sub>, would fundamentally alter the foundation of regional development strategies in Europe. To achieve this change, the relationship between setting policy priorities and developing responses to societal challenges needs to be consciously reorganised (McCann & Soete, 2020). The newly designed S<sub>4</sub> agenda for smart specialisation aims to structure incentives for innovation and business at local and sub-national levels. This strategic direction is essential to incentivise not only the private sector, but also civil society and the public sector to participate in the Green Deal. In addition, the S<sub>4</sub> Smart Specialisation framework, integrated into the context and focus of Cohesion Policy, is suited to drive progress towards achieving the objectives of the European Green Deal on different fronts and at all levels of local decision-making and institutional frameworks (McCann & Soete, 2020).

Aligned with the evolving EU research and innovation policy, the Czech Republic stands out as one of the most successful European countries in the transition from the S<sub>3</sub> to the S<sub>4</sub> approach. The recently adopted Czech RIS<sub>3</sub> strategy is evidence of this transition, as it includes the introduction of RIS<sub>3</sub> missions. These missions represent prioritised areas aimed at addressing societal challenges and are closely aligned with the principles of "mission-oriented innovation policy". This strategic development underlines the Czech

Republic's commitment to contribute effectively to the broader goals of sustainable and inclusive growth within the framework of the European Green Deal and the UN SDGs.

The missions within the Czech RIS3 Strategy are aligned with thematic priorities and positioned identically to domains of specialization (Figure 3). This represents a new addition to the implementation of the S3 in the Czech Republic. The missions serve as a means of effectively addressing societal challenges and play a crucial role in fulfilling commitments such as the SDGs, which the Czech Republic has taken on through its association with the UN. These missions respond to current megatrends and societal challenges that must be recognised and proactively addressed by every nation.

Figure 3. Czech National RIS3 Strategy priorities



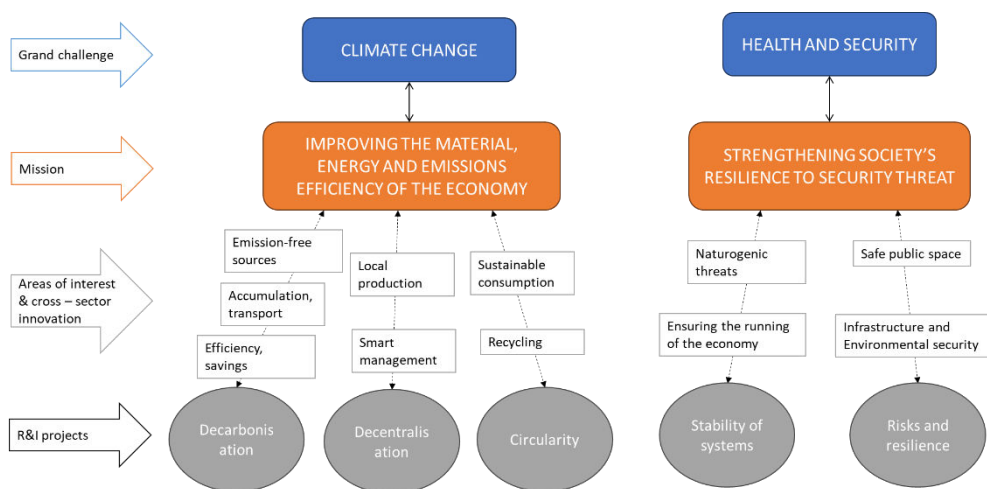
Source: authors based on: <https://www.ris3.cz/en/priorities/missions-and-societal-challenges>

The first two RIS3 missions that have been introduced within this process are the following: 1) Improving the material, energy and emissions efficiency of the economy and 2) Strengthening society's resilience to security threats. The selection of the mission "Improving the material, energy and emissions efficiency of the economy" is in line with the prevailing trends in the use of energy and raw material resources. The aim of the actions in this mission is to actively contribute to steering the Czech economy towards the rational production and utilisation of raw materials and energy resources through science, technology and innovation. The focus is on optimising production processes

and reducing dependence on external sources of raw materials. The mission "Strengthening society's resilience to security threats" aims to identify possible solutions for adaptive responses to societal changes. In particular, it is about anticipating unforeseen events and gaining the ability to prevent them. After such events, the mission focuses on mitigating the consequences and restoring a better quality of conditions (Figure 4).

The implementation of STI Roadmaps by the Czech government, as part of the transition from S3 to S4 and the introduction of missions followed a systematic approach. The process begun with the definition of clear objectives and scope, focusing on selected SDGs that optimally overlap with national RIS3 priorities and the European Green Deal agenda, thus establishing crucial links to funding sources. A comprehensive assessment of the current situation was then undertaken by bringing together the results of the available analyses and matching them with needs and opportunities. This formed the background for proposing missions within the framework of RIS3.

Figure 4. National RIS3 missions in the Czech Republic



Source: authors based on: <https://www.ris3.cz/en/priorities/missions-and-societal-challenges>

The development phase included the formulation of a vision, goals and objectives, in particular the definition of missions within RIS3, each with the corresponding objectives



and indicators. These missions are strategically identified as areas in which the Czech Republic has significant potential and which require transformative change. To ensure the effectiveness of the entire process, a robust monitoring and evaluation system has been introduced, focusing on the ongoing assessment and updating of the plan. This comprehensive approach represents a deliberate and well-structured methodology to guide the Czech Republic's strategic transformation towards S4, with a focus on sustainability, innovation and societal development.

## CONCLUSION

Innovation policy represents a dynamic and adaptive force that seeks to harness the transformative power of innovation for the benefit of individuals, businesses and the broader community. Over time, innovation policy has transitioned from a narrow focus on industrial competitiveness to a broader and more inclusive framework that recognizes the transformative power of innovation across diverse sectors.

The innovation policy interventions can play a crucial role in opening new avenues towards sustainable development. These interventions encompass adaptive regulatory frameworks, incentive structures for green technologies, and collaborative platforms for knowledge sharing and capacity building. The synergy between STI and the SDGs is not merely theoretical; it is a tangible and evolving partnership that demands collaboration across borders, disciplines, and sectors.

The successful implementation of the shift from S3 to a more advanced and mission-oriented approach in the Czech Republic has been shown as a remarkable achievement. This strategic development, characterised by the integration of missions into S3 strategies, has demonstrated the country's commitment to promoting sustainable and inclusive growth. The introduction of two missions has created a focussed and dynamic framework that aligns with the European Green Deal and the national RIS3 priorities. Through this strategic shift, the Czech Republic has positioned itself at the forefront of innovation-led policies that prioritise not only economic development, but also societal resilience and the achievement of the SDGs. This successful example serves as a valuable reference for other regions and countries seeking to improve their innovation policies in line with the new EU Innovation policy and the current global challenges and goals.

The implications of this research extend to policymakers, practitioners, and scholars involved in shaping strategies for sustainable development. By illuminating innovative policy pathways, this study contributes to the ongoing discourse on how nations can align their innovation policies with the broader objectives of sustainability. Ultimately, our research advocates for a transformative approach to innovation policy, one that not only addresses immediate challenges but also propels societies toward a resilient and equitable future.

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