

The transformative potential of COVID-19 recovery packages: A multi-level and multi-policy domain perspective

Matthias Weber & Bernhard Dachs (AIT Austrian Institute of Technology)

Sylvia Schwaag-Serger (Lund University)

Lennart Stenberg & Daniel Johanson (VINNOVA)

Paula Kivimaa, David Lazarevic, Jari Lukkarinen (SYKE)

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Abstract

The European Recovery and Resilience Packages (RRP), launched by the EC in 2020, pursue ambitious goals of strengthening Europe and Member States' ability to 'protect, prepare and transform' our economies, with a view to both overcoming the immediate consequences of the COVID-19 pandemic and making our economies more sustainable and resilient. With this paper we want to explore conceptually and empirically the 'transformativeness' of these RRP. This is a challenge because they need to be understood as being part of a multi-level, multi-domain policy approach.

The RRP point to policy ambitions beyond sustainability. We therefore draw on latest insights from research on transformative innovation policy and policy mixes, but complement these by elements of 'proactive' regime-building as additional category of transformative outcomes and by an explicit consideration of exnovation strategies.

The analytical framework developed draws thus on six main elements (strategic intent, destabilisation of existing paradigms and systems, formation and consolidation of new regime elements, simulation and mobilization of system innovation, generalization of system innovation, and changes in governance and policy mix) in order to study the transformativeness of RRP in interaction with national COVID measures and against the backdrop of existing policy strategies. The framework is applied to three advanced economies (Austria, Finland and Sweden).

The comparison of the developments in these three countries demonstrate the diversity of ways in which the RRP have been used and the importance of positioning them in relation to existing policy strategies and measures, and not only those specifically launched to overcome the consequences of the pandemic. Moreover, the RRP have triggered important structural and institutional changes and reforms, and in particular have ensured that these reforms are implemented according to plan.

1 Introduction

The recovery and resilience packages (RRP) have been launched in 2020 at the initiative of the European Commission with two aims: first, to address the immediate consequences of the COVID-19 pandemic; and second as triggers for transforming key socio-technical and innovation systems towards more sustainability and resilience. These multiple ambitions were also recognised by the EU Expert group on the Societal and Economic Impact of Research and Innovation (ESIR), which described the aim of the European Resilience and Recovery Package by using the notions of ‘protect-prepare-transform’ (ESIR, 2020): the need to **protect** the overall wellbeing of individuals during the crisis, the need to **prepare** for future pandemics and crises, and the need to **transform** the European economy and society towards more resilience against future crises.

The three target dimensions of this framework are complementary to each other, but in this paper we are particularly interested in the third, transformative dimension. More specifically, we explore **what characteristics would make the recovery packages ,transformative’, and which of these characteristics we can find in practice.** The analysis focusses on Austria, Finland and Sweden, three countries with high transformative ambitions, well-developed innovation systems and high levels of GDP.

Answering these questions is important for designing policy mixes for the post-COVID era, which are to be effective in creating and shaping systems able to address current overarching policy ambitions (e.g. in terms of the twin digital and green transition, etc.) and at the same time strengthen the resilience and preparedness with regard to future shocks of various sorts, from further pandemics to global conflicts. This is also particularly relevant in light of both the unique size and the clearly stated transformative ambitions of the packages.

The paper is structured as follows. We first give a brief overview of the theoretical foundations we draw upon, before presenting the main analytical questions we are asking to the three case example countries we are studying, namely Austria, Finland and Sweden. This is followed by a brief methodological section. The empirical section on the three cases fulfills for now mainly an illustrative purpose, namely to explore how our concept of ‘transformativeness’ can be applied to the European RRP measures in different countries, ending in a brief comparison of main differences. Main overarching insights are discussed in the conclusions.

2 Theoretical framework

For the theoretical framing of our transformativeness analysis, we draw on a range of theoretical building blocks. We refer first of all to current concepts of transformative innovation policy (TIP), but these need to be amended in order to take into account the different nature of the COVID-driven transformation as compared to the types of transformation – mainly sustainability transitions – that have underpinned much of the recent work on TIP. The amendments refer first of all to the widened normative frame of reference, secondly the need to take additional mechanisms into account that drive transformation processes in relation to COVID.

Moreover, we draw on the basic notion of policy mixes, which is essential for capturing a) the interplay and joint effects of European, national and regional policies in relation to the COVID crisis, and b) the complementarities/synergies and potential contradictions between different policy areas. This raises important novel requirements with respect to governance and public sector capabilities and capacities.

A widened normative frame of reference: beyond sustainability

The COVID-19 crisis has triggered a **re-thinking of the purposes of innovation policy, and also of transformative innovation policy**. Not only does a new generation of innovation policy need to address the transformation of socio-technical systems, but it must also take into consideration the need for resilience and preparedness with regard to future crisis, and thus dispose of a high-level of responsiveness to fast-changing circumstances. Neither is an innovation systems-inspired perspective appropriate from this angle, nor a sustainability transition policy framework as developed over the past ten years.

Assessing the effects of the recovery packages thus requires first revisiting our conceptual apparatus. First of all, we suggest **adopting a wider normative frame of reference** which is given by the „protect – prepare – transform” goals and their political specifications. While it is obvious that the immediate ‘protective’ responses to the COVID crisis are important, they are mainly short-term in nature. Both ‘prepare’ and ‘transform’ require longer-term systemic changes. This implies that the well-established normative orientation towards sustainability transitions needs to be amended by an additional dimension stressing the political ambition of enhancing systemic resilience and preparedness to crisis.

What we derive from these considerations is the necessity to analyse the **‘strategic intent’** underpinning the recovery measures in general and the RRP specifically, as a first elements of ‘transformativeness’, and that this strategic intent is geared towards a combination of sustainability and resilience goals.

TIP and “enhanced” transformative outcomes

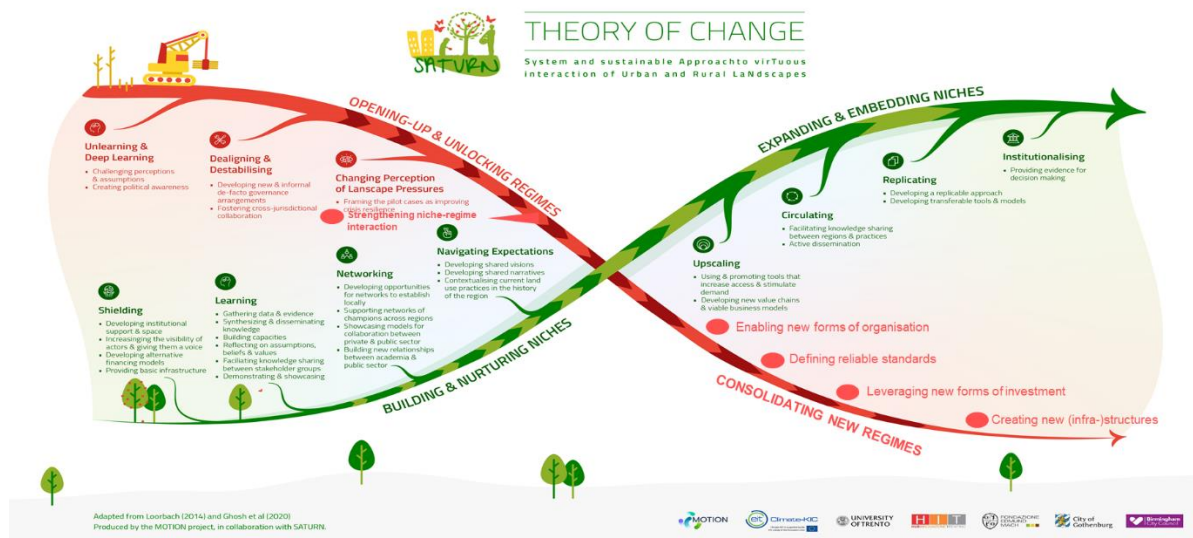
The work on Transformative Innovation Policy is an important source of inspiration. More specifically, the transformative dimension is addressed by drawing on insights from recent research and on **transformative outcomes**, looking at parallel processes of i) building, nurturing and experimentation with innovations in niches, ii) expanding and mainstreaming these niches, and iii) destabilising dominant regimes. These are the established features of a particular approach to transformative innovation policy, emphasizing the importance of fostering a set of twelve transformative outcomes along these three dimensions (Ghosh et al 2021).

However, we also argue that the **perspective on transformative outcomes needs to be widened**. We argue that it needs to be widened with regard to the deliberate formation of novel regime elements as complementary to the destabilization of existing regime elements. These novel regime elements are particularly important for addressing the preparedness- and resilience-enhancing dimensions of transformation processes in the aftermath of the COVID pandemic. Contrary to the established three types of transformative outcomes, the **creation and consolidation of novel regime elements** may well be introduced in a top-down manner rather than emerging from the expansion of niche innovations, which is usually described as the dominant mechanism for triggering regime change in the TIP literature. Figure 1 shows how this widened set of transformative outcomes can be positioned within a TIP-inspired theory of change and thus complement the existing twelve transformative outcomes by four additional ones: i) enabling new form of organization, ii) defining novel standards, regulations and other forms of institutions, iii) leveraging new forms of investment and resources, iv) creating new (infra-)structures.

Yet another aspect that is not fully covered in the prevailing TIP framework is the acknowledgement of finding ‘ways out’ for those actors that will be negatively affected by the transformative measures of a recovery and resilience packages. Some authors refer to this as explicit **exnovation strategies** (Kropp 2015; Dreher et al. 2016). We suggest that this aspect is considered part of the unlocking of regimes branch. It goes beyond unlearning, as it may require not only changes in thinking and awareness, but also structural changes in the organisations affected. It thus connects with one of the transformative outcomes associated with the formation and consolidation of a new regime, namely the enabling of new forms of organisation.

We derive from these considerations that there are four further aspects to be considered in the assessment of the ‘transformativeness’ of recovery packages, namely the extent to which they address i) **experimentation** with and mobilization of (system) innovations in niches, ii) **generalization/expanding** of these new (technological and non-technological) solutions, iii) **destabilization/opening up** of existing paradigms and systems – including considerations regarding compensation/exnovation, and iv) **formation/consolidation** of novel more sustainable and resilient regime elements.

Figure 1: An enhanced theory of change and transformative outcomes



Source: adapted from Brodnik and Witte (2020)

Governance and policy mix

Cutting across the aforementioned elements of transformativeness, it is also necessary to look at the governance structures and processes associated with the **European recovery and resilience packages and the actual embedding of these packages in a wider policy mix**. The European packages alone will not bring about the transformative and resilience/preparedness-enhancing changes reflected in the strategic intent but need to be complemented by other policy measures at national or even regional levels. In addition, suitable governance structures and processes need to be in place in order ensure the coordination and alignment requirements of these policy mixes.

In other words, governance aspects are of great importance for assessing the transformativeness of the European recovery and resilience packages. In particular, the EU recovery packages in Europe requires coordination between national and European policy levels. The theoretical framework must

comprise **the joint effect of both EU and national measures in conjunction**, seen against the backdrop of other already existing and planned policies at European, national and - where suitable – regional levels.

As a starting point of such a comprehensive policy mix perspective we draw on Rogge and Reichardt (2016) who propose **three main elements of a policy mix**: i) policy strategies, ii) mix of policy instruments, and iii) policy processes. All three elements together need to be consistent, coherent, credible and comprehensive in order to be effective, with comprehensiveness referring to both a multi-level and multi-domain policy perspective.

What we derive from these considerations is that the transformativeness assessment of the EU recovery and resilience packages also depends on whether the governance of the policy strategies, the mix of instruments and the policy processes are in line with the transformative ambitions or not. In other words, we need to analyse whether the EU recovery and resilience packages have possibly led to the creation of novel (or the activation of existing) governance elements in this very special situation, or not.

3 Analytical framework

In order to assess the 'transformativeness' of the European recovery and resilience packages, we draw on six main dimensions:

1. **Strategic Intent**, in terms of the 'revealed thinking' in public administration when developing the packages (it is still too early really analyse impacts). This includes, for instance, also the extent to which national and European packages were conceived as being part of an integrated strategy that is at the core of overarching transformative policy ambitions. Moreover, it implies that the packages should not be seen in isolation but as firmly embedded in the portfolio of existing policies, as transformations can occur in different ways and needs different types of stimuli from the public sector.
2. **Destabilisation of existing paradigms and systems**, i.e. the role of the recovery packages as important triggers of significant reforms governance and policy frameworks; an element foreseen in the European RRP. This comprises the building of new and the unlearning of old capabilities and skills in the public sector; an issue that is prone to strong path-dependencies and lock-ins, but also the facilitation of exnovation processes.
3. **Formation and consolidation of new regime elements**, i.e. whether the recovery and resilience packages have triggered the formation and consolidation of novel elements to the institutional, organizational and cognitive models that guide and frame the operation of socio-technical systems; elements that contribute to strengthening their sustainability and resilience.
4. **Stimulation and mobilisation of system innovation**, i.e. the combination of experimentation/piloting and the mobilisation of new market/demand creating forces. This dimension requires involving a wide range of actors and stakeholders in collective learning processes (e.g. regulatory sandboxes).
5. **Generalisation of innovations** (both technological and non-technological) through scaling, replication and institutionalization of novel solutions. This dimension addresses also the complementarity of large-scale public investment in new solutions, including investments in infrastructures, human capabilities and organisational capacities. This is also the dimension for which sectoral policies (e.g. regulation, public procurement) play a decisive role.

6. **Changes in governance and policy mix**, i.e. whether and to what extent the recovery packages have triggered changes in the structures and processes of strategically orientating, designing and implementing policy measures in a more coherent, resilient and transformative manner. Here, matters of relationships between and mutual influences of European and national packages, of policy coordination and coherence are of particular interest.

4 Methods

This paper draws on ongoing research activities at AIT, SYKE, Lund University and VINNOVA, where a set of national studies of national and European recovery packages on the cases of Austria, Finland and Sweden have been conducted, i.e. countries that are quite similar in terms of size, but also in terms of their innovation performance in various rankings. One of the consequences is that the financial weight of the European RRFs may not be as significant as in some southern or eastern European countries, but they are nevertheless important complements to the national measures and – as we will see in more detail in the full paper – governance lever.

In methodological terms, the respective contributions draw on a combination of desk research (in particular of the various measures and packages), semi-structured interviews with key actors involved in the preparation of national and European recovery packages (in particular regarding the shaping and governance of recovery packages), and joint workshops among these four organisations (in particular regarding the interpretation and comparison of the respective findings). Data collection has been organized in a harmonized manner to enable comparative analysis, covering a wide range of aspects.

5 Assessing the ‘transformativeness’ of European Recovery and Resilience Packages in Austria, Sweden and Finland

5.1 The European RRF and national Recovery and Resilience Plans

As a response to the challenges from the COVID-19 pandemic, the European Commission (2021) established the Recovery and Resilience Facility (RRF) in February 2021. The ambitious plan of the RRF is to mitigate the economic and social impacts of the pandemic and, at the same time, spur Europe’s transition towards climate neutrality and digitalization. RRF will allocate a total of 723.8 bn EUR over the period 2021–2026.

To receive funding from the RRF, European governments have to submit national Recovery and Resilience Plans (RRPs) which are assessed and approved by the European Commission (EU, 2021). The RRFs have to meet, amongst others, the following objectives: first, they have to consist of monetary investments and reforms. Investments include tangible capital, human capital, natural capital, but also intangible assets such as R&D, data, intellectual property and skills. Reforms may include new legislation, institutions, strategies, etc. Second, the RRFs should not include investments which create financial burdens to the national budgets beyond 2026. Third, the RRFs should allocate at least 37% of their budgets to climate action, and at least 20% to investments that support digital transformation. Fourth, the RRF will only support measures that respect the “do no significant harm” principle which means that investments or reforms must not do harm to any of the six environmental objectives laid out in the regulation establishing the RRF. Moreover, payments from the RRF are tied to the achievement of milestones and reforms as promised in the national RRFs.

So far, the European Commission has approved 22 RRP. Italy (132 investments and 58 reforms, supported by €122.6 billion in loans and 69 bn. EUR in grants) and Spain (112 investments and 102 reforms, 69.5 bn EUR in grants) applied for the largest funding, followed by France and Greece (€7.8 bn EUR in grants and 12.7 bn EUR in loans). Only the Netherlands have not submitted a RRP to the European Commission.

5.2 Austria

Austria's Federal government submitted its national RRP to the EC by end of April 2021 (BMF, 2021), and the EC accepted Austria's proposal on July 13, 2021, based on a very positive evaluation by the European Commission. Evidence from interviews conducted for this study indicates that Austria's RRP was mainly the result of the inputs of the public administration, less by external experts. There was a public consultation, but it seems it yielded only little additional inputs. The time pressure under which the plans had to be prepared may have been one reason for the limited involvement of other experts and stakeholders as well as for the restricted consultation within public administration.

Austria's RRP proposes projects worth of 4.5 bn EUR. The main investments of the plan are investments in eco-friendly mobility, in particular investments in railroad infrastructure (542.6 Mio EUR or 12.1% of total), broadband investments (891.3 Mio EUR or 19.8%), and measures to promote the ecological transformation of businesses (504 Mio EUR or 11.2%). A second important component, besides investments, are reforms. The Austrian RRP contains 25 different reforms, compared to 34 investment measures. The focus of investments is clearly on physical capital investments, less on intangible investments and skills.

The Austrian RRP is firmly rooted in the policies and **strategic intents** of the Austrian government. The preparation of Austria's RRP certainly benefited from the fact that it could rely on a recent policy document, the joint programme (Regierungsprogramm) between the Conservative Party (ÖVP) and the Green party from January 2020 where the major goals of the government are laid out. Central strategic initiatives of the joint programme also appear in the RRP as reforms, including the "ökosoziale Steuerreform" (eco-social tax reform), the "Mobilitätsmasterplan 2030" (mobility master plan 2030), the introduction of a country-wide pass for public transport ("KlimaTicket Ö"), new legislation for renewable energy and heating or the "FTI-Strategie 2030" (strategy for research, technology, and innovation 2030). 14 of the 25 reforms of the RRP are also included in the joint programme. Moreover, the RRP also continues some long-term policy initiatives, such as broadband extension.

Measures targeted at the **destabilisation of existing regimes and systems** in the Austrian RRP are mainly found among the reforms. Some of these reforms are truly destabilizing (such as the ban on oil- and gas-based heating), while others operate through the **establishment of new regime elements**. Most important is the Renewable Expansion Act which provides a new framework for renewable energy generation, the introduction of a country-wide pass for public transport, and the – yet to be implemented - eco-social tax reform. In addition, we may also consider Quantum Austria (promotion of quantum sciences) and the establishment of the Austrian Institute of Precision Medicine as having the potential to alter the current science regime in medicine and electronics more generally. However, these latter two elements do not have a specific focus on sustainability (contrary to some of the aforementioned regime-destabilizing actions), but may open up new and more pathways to sustainability in the future.

Measures towards the **stimulation and mobilisation of (system) innovations** are mostly related to energy and recycling. Austria's participation in the Important Projects of Common European Interest

(IPCEI) on hydrogen may be seen as a contribution to stimulation of system innovation. Another are investments in empty bottle return systems which need a systemic approach and are also accompanied by new legislation.

Austria's RRP makes considerable efforts for the **generalisation of innovations**. Examples are the promotion of emission-free buses and accompanying infrastructure, the promotion of emission-free utility vehicles for businesses, or the investments to support ecological investments in companies. The most important measure that falls into this category are investments in gigabit-capable broadband networks as an example of infrastructure investments enabling the widespread uptake of new (digital) services. Austria spends considerably more money on broadband than the Finnish and the Swedish RRP.

It's difficult to observe changes in **governance and policy mix** due to the RRP in Austria given the high degree of interrelatedness of national policies and the RRP. However, an interesting **linkage between the RRP and national policies are milestones for RRP investments and reforms**. Payments from the EC to the Member States are tied to the accomplishment of these milestones. Thus, the RRP gives national policies which went into the RRP a new and more binding character by relating payments to the timely implementation of these (national) policies. Thus, the RRP has also a self-binding function for national policies and thus help avoid diluting it.

5.3 Finland

The Finnish RRP – titled Sustainable Growth Programme (SGP) – was submitted to the EC on 27 May 2021 and it was approved on 4 October 2021. The preparation process was organized as cross-ministerial process coordinated by the Ministry of Finance with all the other ministries contributing except the Ministry of Defense. In addition, wide public consultations and hearings were organized to gain inputs from the central business sectors, civil society as well as all 19 Finnish regions and Åland. According to civil servants active in preparation process, the broad-based feedback was considered important especially in terms of just transition implications and legitimation of the plan but their contributions to the finalized plan are difficult to measure, as they were organized at the early stages of the preparation.

The total funding of SGP is 2,075 bn€, and it is divided to four pillars. First pillar, *green transition* (822 M€, 40% of funding) is the strongest area of the plan with focus on energy system, transportation, building energy efficiency, circular economy and nature conservation. Second pillar, *digitalisation and digital economy* (217 M€, 10%) provides a broad variety of targeted actions especially on digital skills, systems and infrastructures. Third pillar, *raising the employment rate and skills levels* (636 M€, 31%) is the most mixed set of actions promoting the wide labor market renewal as well as directing competed funding to research, innovation and development infrastructures. Finally, *improving access to health and social services* (400 M€, 19%), is connected to one of the largest public sector reforms of the welfare society and focuses especially on the digital aspects of the reform. Overall, there are 42 investments and 26 reforms in the Finnish programme.

Strategic intent

The strategic intent in the Finnish Sustainable Growth Programme was strongly tied to Prime Minister Sanna Marin's government programme from 2019. The coalition government had established national carbon neutrality targets for the year-2035, which has been reflected in the revision of climate law and development of the new national climate and energy strategy (both identified as key reforms of the RRP). Strong climate focus also led to Finland pledging 50%

contribution towards climate actions in the RRP funding compared to 37% minimum level set by the EC. The strong climate ambition is visible in the large role of green transition pillar, which covers 40% of the total funding. Also, the pillars on employment and health and social services have potentially transformative intents by being connected to broad societal reforms taking place over the current decade. Finally, the broad cross-ministerial coordination of the preparation process was part of the strategic orientation, while it might have negatively impacted the transformativeness by supporting a quite byzantine implementation in some of the pillars with several incremental actions.

Destabilisation of existing regimes and systems

Regime destabilisation is visible especially in the reforms on energy and transport sector included in the SGP. Policy instruments, such as phase out policies for coal power and use of oil in the building sector heating, comprehensive taxation reforms for energy and transport system as well as the revised climate law, are aligned to deliberately destabilise the fossil-based energy system. Moreover, the reform of the Waste Act and nature conservation legislation provide directionality for creating new capabilities in circular economy and nature-based solutions respectively, but with less explicit regime-shifting focus. Overall, the content of the Finnish RRP is not directed towards regime destabilization but rather mobilization of resources in the societal areas already undergoing changes.

Formation and consolidation of new regime elements

Formation and consolidation of new regime elements is most visible in the electrification of industrial processes and transport system through directed investments that are further supported by RDI-activities. The intent is to institutionalize primacy of non-combustion-based technologies across the economic sectors. Furthermore, the actions in agricultural sector (e.g., support for gypsum treatment of fields, nutrient recycling to biogas production and sustainable fertilizers) are directed to changing agriculture regime practices towards better management of nutrient flows to lakes and Baltic Sea. The broader institutional reorganization intent is attempted through the digital aspect of the RRP, as many of the reforms are directed towards reskilling the public sector, strengthening processes and platforms e.g., on labor market, and enhancing digital security and resilience. In the contexts of labor market reform and building-sector energy efficiency, digitalization is connected to legislative reforms that aim to integrate digital information governance to the core of the systems. More broadly across the Finnish RRP, digitalization appears rather as an enabling aspect to other transition dynamics than as a transition process on its own right.

Stimulation and mobilisation of (system) innovations

There are three visible mechanisms on which stimulation and mobilization of system innovation is visible in the SGP. First, the competitive funding calls mobilized for the research infrastructures and piloting both on national and regional scales are directed to creating novel collaborations and mobilizing research-based development actions broadly in the nexus of green and digital transitions. Second, Finland is also participating to the EU-initiated IPCEI on hydrogen economy that is connected to national goals industry renewal and the national hydrogen strategy (part of the revised Climate and energy strategy) and thus creating systemic direction for the private-public actions across the industry sectors. However, beyond the transport and energy sector developments, many of the system innovations promoted appear to be at rather early stages.

Generalisation of innovations

Large energy technology investments in the green transition pillar provide directionality for the broader investments to heat pump technologies, geothermal energy production, offshore wind energy and large-scale solar electricity as well as setting infrastructure requirements for enhancing

the national grid connections, reconfiguration district heating systems (beyond combustion-based systems) and development of smart energy networks. This systemic transition is also reflected in the labor market reforms, as the demand for skilled labor needs to be matched in several areas, such as recruitment of planners, installers and maintainers of the new technologies and systems.

In the transport sector, the combination of taxation reform supporting low-carbon mobility (which is actually a change to the prevailing tax regime) and support instruments to emerging electric vehicle charging network creates stimulus for broader systemic change.

Changes in governance and policy mix

The SGP is tightly connected to implementation of the Finnish government programme but does not trigger new changes in the governance processes. However, the government programme reflects closely the central areas of the European Green Deal with focus on renewal of economic sectors towards sustainability. Therefore, especially the reforms included in the SGP are geared towards supporting the cross-scale coordination and coherence. Furthermore, several of the civil servants participating in the preparation process noted the importance and rigidity of the EC's role in designing and finalizing the RRP. More specifically, climate tracking model utilized in calculating the climate impact of actions, implementation of DNSH (Do No Significant Harm) principle, setting quantifiable milestones and performance indicators for each action and several rounds of revisions were considered important in positioning the national regulatory processes and policy designs in relation to governance processes. One even anticipated this as a necessary policy learning process that will become more mainstream in the future coordination of public funding.

5.4 Sweden

Strategic intent

The Swedish RRP in its original form was submitted on 28 May 2021 and a revised version endorsed by the EU Commission on 29 March 2022. The government decided early on that the RRP would mainly consist of a selection of policy measures already covered by the normal budget process in Sweden. The political program of the two-party minority government which was formed after elections in September 2021 had been laid out in an agreement reached with two other parties in January 2019. Even together the four parties behind the agreement lacked a majority in the parliament.

The total grant from the RRF to the Swedish RRP amounts to €3.3 billion. It addresses all the six pillars specified as eligible for support from the RRF. Investments contributing to green transition make up as much 44 percent of total expenditure in the plan with a focus on decarbonization of transport and industry. Of the 20 percent allocated to digital transition, three quarters are for investments in broadband infrastructure in sparsely populated areas. Almost 30 percent of expenditures concern education and skills development. Almost half of this is for paid education for staff in elderly care responding to the experience during the Covid 19 pandemic that the level of qualification needs to be secured. Investment support for rental housing and student housing represent almost 10 percent of expenditures. (There is some overlap between the categories mentioned). Reforms include changes in the labor law, changes in taxes, subsidies and regulations aimed at decarbonization of industry and transport, measures against money laundering and changes in regulations related to the housing market.

Destabilisation of existing regimes and systems

Four of the reforms in RRP are aimed at changing the balance of economic incentives from climate-negative towards climate-positive choices. This includes abolishing the reduction of energy tax for heating fuels in industry, agriculture, forestry and aquaculture. Three of the reforms focus on reducing emissions from road transport. One concerns the so called "bonus malus" for taxation and subsidies of newly purchased vehicles in which low emission cars are subsidized and cars with emission above a certain level are taxed. The reform consists in making the criteria for low-emission cars more demanding. Another reform is changing the taxation of company car benefits in a direction in which low-emission cars are taxed more lightly than other cars. Finally, the greenhouse gas reduction quota for diesel and gasoline applied to companies selling these fuels are increased which is aimed at increasing the consumption of biofuels while at the same time increasing vehicle fuel prices.

Formation and consolidation of new regime elements

The main example in the Swedish RRP is the "Industry Leap" program introduced in 2018. The focus was initially on reducing process-related emissions in industry, but the scope has been broadened to also cover CCUS, Bio-CCS and circular economy related projects and in principle also other projects through which industry directly and indirectly can significantly contribute to the lowering of carbon emissions. So far, most of the funds have been spent on large projects in steel petrochemical and mining industries. The program's focus is on the R&D and demonstration of new technologies. Even full-scale investments in full-scale facilities are included according to the press-release when the program was launched: "The initiative consists in support to companies all the way from R&I-projects to demonstration and full-scale facilities." The program also supports R&D-projects at universities or research institutes. The subsidies rate varies depending on the nature of the project. The Industry Leap is part of climate policy and in the government budget included under the budget chapter "General protection of the environment and nature". The program is managed by the Energy Agency which has a long tradition of financing R&D as well as large demonstration projects. Through the Industry Leap its mandate has been broadened.

Stimulation and mobilisation of (system) innovations

It is difficult to identify any clear examples of system innovation projects in the RRP although some of the projects under the Industry Leap program includes collaborative projects between several companies in different parts of value chains.

Generalisation of innovations

The "Climate Leap" is the single largest program in the Swedish RRP with 25 percent of total expenditure. The program offers subsidies for investments that can contribute directly to reduced greenhouse gas emissions. It is parallel to the Industry Leap program under the same budget chapter but differs from the Industry Leap by primarily supporting investments in established technologies although in the areas of hydrogen production and recycling of batteries, some of the projects are at least first-of-its-kind in Sweden. Financing under the scheme is prioritized according to expected emission reduction per invested amount of money. The coverage is very broad with transport-related investments being the largest category including biogas production and distribution, subsidies for purchase of fossil-free heavy vehicles and for building of charging stations for electrical vehicles. Other big categories are recycling facilities and energy conversion and efficiency in industry.

The large investments in education and skills – other than those specifically focused on staff in elderly care - are intended to facilitate and support societal transformations, especially digitalization

and climate transition although the measures are designed as general in scope. Three components work together. One consists in changes in the labor law through which job security is reduced while the opportunities for competence development of persons in the labor force are improved. The second element is increased funds to institutions for vocational, continuous and higher education. These two components are included in the RRP. In addition, a new comprehensive system for covering up to 80 percent of salaries for up to a year for persons in the labor force who would like to study is being introduced. When fully implemented it is expected to cost around € 1 billion per year.

Changes in governance and policy mix

Given the process through which the Swedish RRP was constructed, there seems to be little direct influence on the governance and policy mix beyond presenting major policy initiatives already under way in a coherent way according to the specifications in the RRF. Most, if not all, of the reforms were already on the table. Whether the precise timetable for their implementation was influenced by the RRP-process is certainly possible but difficult to judge.

The connection with research and innovation policy in the common sense of the term is limited to the Industry Leap which, as mentioned, is implemented by the Energy Agency. Moreover, strictly speaking the activities of the Energy Agency are not included in what is normally referred to as the Swedish research and innovation policy. That policy, which covers most of the other R&I-financing agencies in Sweden, is articulated in research and innovation bills every four years, the most recent covering the period 2021-2024. The activities of the Energy Agency have usually been governed by separate government bills for energy research but no such bill has been presented since 2016.

Numerous R&I-programs related to climate and digital transitions are run by Sweden's Innovation Agency (Vinnova) and the research council Formas but none of them were included in the RRP. In this sense the RRP has only to a limited extent served as a means to integrate R&I policy and policies for climate and digital transitions.

6 Comparative analysis

Some first comparative observations can be made on the basis of the three cases. First of all, it is of little surprise that the **recovery packages in the three countries show very different characteristics in terms of both policy mix and governance**, and this in spite over the common feature among all three of being very advanced in terms of their innovation and transformation policy and governance. They are the latest addition to long-standing trajectories in the evolution of their national innovation systems and policies.

As regards the 'protect – prepare - transform' ambitions underpinning the recovery packages, the **'protect' dimension is mainly addressed by (national) measures outside of European RRF-plan**, and generally with much larger resources. Moreover, the distinction between the three categories is not always clear-cut: "protect" and "prepare" elements can be pre-conditions for "transform" elements, but they may also hamper them (e.g. when they serve to conserve existing industries, practices or behaviors that are not conducive to transformation). This is why one of the key lessons from the analysis is that a **transformative ambition requires a good orchestration of the policy mix as part of a national strategy**, considering existing national policies and context.

However, the **extent to which such a national strategy frames the national and European recovery packages in practice differs** across the three countries. The Austrian and Finnish cases show, though implemented in different ways, a quite conscious embedding in and complementarity with national

strategy, driven also by recent changes in government. This seems to be less so in Sweden, where the plan seems to be more of an 'off the shelf' solution, with elements largely mirroring already planned or existing national policies and initiatives. While the RRP was also used in Austria and Finland to realise long-awaited initiatives, these two countries seem to have taken greater care to pursue an overarching strategic approach.

In spite of their limited volumes in the three countries, the **European RRP turned out to play a crucial role for ensuring a transformative commitment**. A policy innovation: By tying the RRF investments to institutional reforms (e.g. setting targets for climate funding, implementing the do-no-significant-harm principle), it is difficult to soften the commitments made.

Finally, it is important to keep in mind that the **transformative success of the recovery packages depends a lot on context**. All three countries pursue proactive R&I policy with comparatively high levels of R&D funding, they tend to have quite effective governance systems, and (in particular in Finland and Austria) have assigned a central role to climate policies. There are at the same time important differences in governance structures across the three countries, with quite diverse mandates for STI funding agencies (from mainly implementing in Austria to strategic in Sweden and Finland), as well as differences in the levels of coordination of sectoral and R&I policy, in particular when compared to traditional STI policy approaches.

7 Conclusions

Assessing the transformative nature of RRP is a challenge due to the multitude of interactions with national COVID measures packages as well as with existing policy strategies and instruments. An assessment thus needs to be performed in conjunction with these other policies, and particular attention needs to be paid to the influence of RRP on these policies, rather than to the effects of the RRP in isolation.

RRP can thus be used to *strengthen* existing policy strategies that already aim at transformation and institutional reforms towards sustainability and resilience. Against this backdrop, the coherence and complementarity between RRP and national reform strategies is of decisive importance. To achieve this, an effective orchestration and embedding of the RRP as an integral part of national policy mix is needed. This requires a coordination and alignment process across different ministries to be in place during the preparation phase of RRP, and across agencies during the implementation phase.

The experiences from the three countries show that this coordination and alignment during the preparatory phase was achieved to varying degrees. It requires i) an overarching strategy to be in place as common reference point regarding strategic intent, and ii) an effective involvement of different ministries to ensure coherence and complementarity, and this in spite of time constraints. Austria and Finland had limited, but quite effective strategies and policy coordination mechanisms in place, while in Sweden there was generally more reluctance to engage seriously with the RRP approach. As regards implementation, it is still too early to make an informed assessment.

What the cases have also shown is that the relationship between RRP and national measures/strategies is ambivalent: the commitment to the RRP with their respective milestones and reforms enhances the reliability of the transformation-oriented reform efforts. On the other hand – see the Swedish case – there was a lot of reluctance to hand over control over national strategies to the EC, because the Swedish government wanted to maintain the flexibility of adjusting its national approach and strategy as needed by the further events in the post-COVID period.

The six dimensions proposed in the conceptual and analytical framework for assessing the transformativeness of the RRP turned out to be useful for guiding the analysis, but the analysis needs to be performed for the entire policy mix rather than for the RRP in isolation. The categories also need to be further sharpened to avoid overlaps between dimensions and operationalized into sub-categories. For some dimensions, existing work on transformative outcomes will be of help in this effort. Finally, a more explicit distinction between preparation and implementation of RRP is advisable, in order to reflect shifting responsibilities and governance arrangements.

References

- Brodnik, C. & Witte, J. (2020) A Narrative About the Transformation to Sustainable Land Use Management: SATURNs Portfolio of Actions. The TIPC - MOTION Project Blog Series (online) retrieved from: <https://www.tipconsortium.net/a-narrative-about-the-transformation-to-sustainable-land-use-management-saturns-portfolio-of-actions/>
- BMF (2021), Österreichischer Aufbau- und Resilienzplan 2020-2026. Austrian Federal Ministry for Finance, Vienna.
- Dachs, B., Weber, M. (2022): National recovery packages, innovation, and transformation, Report Project to the Austrian Council for Research and Technology Development, January 2022, Vienna
- European Union (2021). Regulation (EU) 2021/241 of the European Parliament and of the Council of 12 February 2021 establishing the Recovery and Resilience Facility. Official Journal of the European Union, L 107/130.
- ESIR (2020): Protect, prepare and transform Europe. Recovery and resilience post COVID-19. Expert group on the economic and societal impact of research and innovation (ESIR), Brussels.
- Ghosh, B., Kivimaa, P., Ramirez, M., Schot, J., Torrens, J. (2021): Transformative outcomes: assessing and reorienting experimentation with transformative innovation policy, *Science and Public Policy*, 48(5), 739-756
- Kivimaa, P., Kern, F. (2016): Creative destruction or mere niche support? Innovation policy mixes for sustainability transitions, *Research Policy*, 45(1), 205-217
- Kivimaa, P., Lazarevic, D., Lukkarinen, J. (2022): Analysis of Covid-19 Recovery and Resilience Policy in Finland: A Transformative Policy Mix Approach, Paper for the EU-SPRI 2022 Conference, Utrecht
- Kropp, C. (2015): Exnovation – nachhaltige Innovationen als Prozesse der Abschaffung, in: Arnold, A., David, M., Hanke, G., Sonnberger, M. (eds.): *Innovation - Exnovation: Über Prozesse des Abschaffens und Erneuerns in der Nachhaltigkeitstransformation*, Metropolis, 13-34
- Rogge, K.S., Reichardt, K., (2016): Policy mixes for sustainability transitions: An extended concept and framework for analysis. *Research Policy* 45, 1620-1635. <https://doi.org/10.1016/j.respol.2016.04.004>
- Dreher, C., Kovač, M., Schwäbe, C. (2016): Competing Technological Innovation Systems as a Challenge for New Mission Orientation - Insights from the German Energiewende, *International Journal of Foresight and Innovation Policy*, 11(1–3): 43–72
- Weber, M., Biegelbauer, P., Brodnik, C., Dachs, B., Dreher, C., Kovac, M., Scharfing, D., Schwäbe, C. (2021): *Agilität in der F&I-Politik: Konzept, Definition, Operationalisierung*. Studien zum deutschen Innovationssystem. EFI, Berlin.