Strengthening the Innovation Ecosystem in Slovenia

REPUBLIC OF SLOVENIA
MINISTRY OF ECONOMIC DEVELOPMENT AND TECHNOLOGY

SPIRIT SLOVENIA

Report with actionable recommendations

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Table of Contents

1 Introduction

2.1 Background

This document constitutes the report for Activity 4: Actionable recommendations and tailor-made measures for efficient innovation policy. The assignment forms part of an overall project for DG REFORM contract REFORM/SC2020/100 – Strengthening the Innovation Ecosystem in Slovenia.

This report uses the lessons learned from the preceding Activity 2 report, which documented the innovation ecosystem State of Play in Slovenia and the Activity 3 report, which benchmarked Slovenia against a number of different innovation systems.

Following this report, there are two more stages of the 'Strengthening the Innovation Ecosystem in Slovenia' project:

- Activity 5: Capacity building for the Ministry of Economic Development and Technology (MEDT) & SPIRIT Slovenia - Public Agency for Entrepreneurship, Internationalization, Foreign Investments and Technology (SPIRIT) employees for effective implementation of tailor-made measures to improve the innovation ecosystem.
- Activity 6: Overall project conclusion and final report.

2.2 Objectives

The focus of this report is to detail the recommendations and translate them into implementable tailor-made measures for strengthening the innovation ecosystem of Slovenia. In particular, the measures address commercialisation of innovative products and services and coordination of different national and international programmes to provide systemic support to innovation and exploit synergies and prevent overlaps. The report also provides additional suggestions for measures to improve the performance of Slovenia on the European Innovation Scoreboard and other similar rankings.

The report is intended to be as detailed as possible, and each recommendation should be seen as an option that could be combined with any number of others.

2.3 Methodology

The objectives of this report were achieved by completing the following tasks:

- Close cooperation with the project Steering Committee to draft the tools, instruments and concrete support measures which address specific needs across different components of the innovation ecosystem.
- Identifying compelling drivers, incentives, stages, and milestones for implementing the measures. In support of this, suggestions have been provided in section 2 on which accompanying framework conditions need to be met.

- Estimating the necessary resources, financial, human, and institutional. Where possible, linkages and possible synergies with European programmes and tools have been identified.
- Defining the responsibilities of the different actors to manage the implementation of measures, required level of involvement and order of interventions.
- Identifying specific indicators to measure the implementation of the recommendations as well as system-level indicators to measure progress towards desired state of innovation policy and innovation environment in Slovenia.
- Drafting recommendations on how to make innovation networks efficient, effective, and well balanced at regional level.
- Organising a round table for Slovenian innovation ecosystem stakeholders to validate all the above. This roundtable took place on the 6th of August and was attended by around 30 stakeholders. A summary of discussions can be found in the Annex 1 of this report.

Notes:

Financial resources and timelines have been provided in different levels of detail for each recommendation. This report aims to base costings and timelines on international best practices and the professional experience of the research team. The data was not available at the same level for each recommendation and as such, the individual recommendations show different granularity.

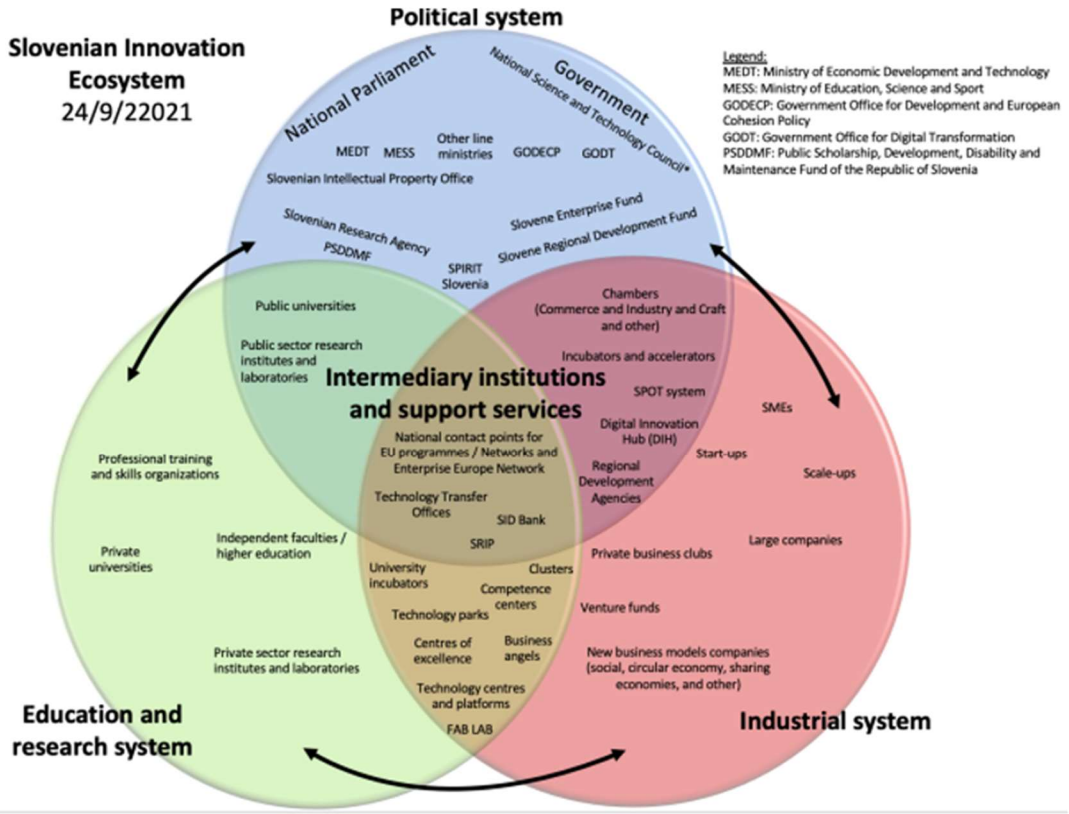
As agreed during project inception, the costings and resources are intended as high-level assessments, and will need adjusting depending on the specifics of the implementing institution and depending on the available resources.

Unless a specific salary is required for performance purposes, human resources costings are at the level of Full Time Equivalent (FTE). A full-time equivalent is a unit to measure employed persons in a way that makes them comparable although they may work or study a different number of hours per week.[1]*When it comes to the additional FTEs proposed in the report, internal validation needs to be conducted by each benefiting institution to assess whether the recommendation is in line with the regulations in place (e.g. those related to budgets and expenses – State aid) and with capacity requirements and possibilities of the institution.*

[1] Eurostat, Glossary: Full Time Equivalent. Available at: https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Glossary:Full-time_equivalent_(FTE)

2.4 Map of actors

To support the drafting of measures, the map of actors below, which was developed under Activity 2 (State of Play), has been used.



Source: Own research and consultations with national authorities (final version 24.9.2021)

* The Government of the Republic of Slovenia has adopted the Research and Innovation Activity Act which introduces the Develo pment Council of the Republic of Slovenia into the system which will replace the Council for Science and Technology.

2.5 Intervention logic

The intervention logic of these recommendations is presented overleaf. The recommendations have been designed as an overarching logical framework, that is, as a high-level chain of action which illustrates the rationale of the implementation of the recommendations, and what outputs, outcomes and impacts can be expected from the agreed inputs and activities.

The context is based on visionary goals. These came out of the State of Play report and benchmarking and were discussed by stakeholders during the roundtable in April 2021. The context also outlines the particular challenges that the Slovenian innovation ecosystem is facing, since these constitute key factors of the current context.

The inputs pillar shows the EU and national inputs respectively. The inputs cover both top-down resources (e.g. national funding) and bottom-up resources (e.g. individual activities within each priority area).

The main emphasis of the intervention logic is on outputs. These are the concrete action plan activities that are elaborated further in each section of the recommendation report. The outputs emphasise the collaboration element and set it as an essential precondition for the other two priority areas to be upgraded.

Outcomes and impacts derive from the particular outputs articulated. These are outcomes and impacts which, in agreement with stakeholders and taking account of authoritative literature, can be attributed to the outputs listed, provided sufficient monitoring is in place and provided that the measures proposed are implemented on schedule.

Context (Needs/problem)	Inputs (Resources/activities)	Outputs (What has to be produced)	Outcomes (Short & medium results)	Impacts (Long-term outcomes)

Needs
• To improve the efficiency, effectiveness and competitiveness of the Slovenian innovation ecosystem
• To ensure effective investment of the Recovery and Resilience Facility funding earmarked for RTDI
• To ensure implementation of the identified priority areas:
  • innovation collaboration
  • Risk capital
  • Support systems piloting, demonstration and research commercialisation
Problems
• A lack of trust within the RTDI ecosystem
• Low levels of competition and missing links in the entrepreneurial system
• The need for stability and a long-term policy planning
• Need to promote effective use of research
• Lack of structured and attractive Risk Capital ecosystem
• Administrative hurdles and tax burdens are hampering investors
• VC is missing for early- and late- stage (growth)
• Lack of cooperation between industry, academia and intermediaries with regards to infrastructure
• Taxation and voucher support for companies below par
• Low overall levels of national funding for RTDI
• Fragmentation of existing support
	EU level inputs
	• RRP fundings
	• ESIF funding 2021+ and CfP
	• Horizon Europe funding
	National inputs – financial and human resources
	• National RTDI instruments (in combination with ESIF funding)
	• Governance, coordination, and monitoring and evaluation resources
	• Implementation of recommendations and other actions identified as part of the study
	Activities
	• Upgrade the entrepreneurship skills system
	• Rationalise and re-structure roles and responsibilities of key stakeholders
	• Establish a single platform for R&I, where all stakeholders would be present
	• Build a monitoring and evaluation programme at both the systematic level and instrument level
	• Address Risk capital challenges
	• Implement measures to support systems piloting, demonstration and research commercialisation
		National entrepreneurship skills system
		• Establishment of three outward-facing entrepreneurship skills portfolios
		• A portfolio of pilot programmes to support the development of entrepreneurship education
		Rationalise and re-structuring roles
		• New responsibilities and division of labour among the Development Council, relevant Ministries and agencies, and the Rector's conference and Coordination of Independent Research Institutes
		Reinforce SRIPs and establish a single RTDI platform with SRIPs
		Establish new regional coordinator roles
		• Establish platform working groups
		• Launch joint action to reform online resources
		Monitoring and evaluation
		• Action plan
		• Strategic plan
		Risk capital
		• Reduction in the Information and Coordination Asymmetries
		• Reformed risk capital at the system level
		• New instruments
		Support systems piloting, demonstration and research commercialisation
		• A instrument for meaningful and productive cooperation between science and business
		• Voucher expansion and modernisation of R&D tax support
		• Stabilised Technology Transfer landscape and introduce of a proof-of-concept funding mechanism
		• Increased physical presence abroad to facilitate cross-border trade and internationalisation
			National entrepreneurship skills system
			• Increased number of students exposed to entrepreneurship education and training
			• More sophisticated programmes as part of entrepreneurship skills system
			Rationalise and re-structuring roles
			• Renewed sense of cooperation among government agencies and stakeholders, more efficient and effective cooperation
			Reinforced SRIPs and a single platform for SRIPs
			• Enhanced collaboration between the helix
			Monitoring and evaluation
			• More effective monitoring
			• Purpose for evaluation activities
			• Better use of data
			• More efficient reporting system for RTDI performers
			Risk capital
			• More effective risk capital system
			• More effective instruments
			Support systems piloting, demonstration and research commercialisation
			• More structured commercialisation pathways
			• More efficient R&D tax support
			• New proof-of-concept funding mechanism
			• Increased cross-border trade and internationalisation
				National entrepreneurship skills system
				• Improved understanding of entrepreneurship among graduates and young researchers
				• Recognised strategy for entrepreneurship
				Rationalise and re-structuring roles
				• More effective and efficient RTDI governing system
				Reinforced SRIPs and a single platform for SRIPs
				• More sustainable public/ private partnerships
				• Enhanced commercialisation of innovation products
				Monitoring and evaluation
				• Improved use of data and evaluation results
				• Improved design of support instruments and programmes
				Risk capital
				• Increased risk capital
				• Less risk aversion towards innovation
				Support systems piloting, demonstration and research commercialisation
				• Longer-term partnerships between science and industry
				• More private investment
				• Enhanced and healthy competition in technology transfer services
				• Improved international competitiveness and knowledge transfer with international partners

3 Framework condition needs

In addition to the specific recommendations and action plans, the following needs for strengthening the innovation ecosystem in Slovenia were identified during the course of analysis.

Slovenia needs to develop modern legislation. The legislation must become developmentally oriented and internationally comparable. It must regulate stable provision of funding for educational and research activities. In addition, to address insufficient knowledge and technology transfer to marketable products and to systematically accelerate time to market, an adequate and efficient supporting ecosystem of complementary funding instruments is needed to boost cooperation. This will encourage all stakeholders to contribute to more successful commercialisation. The appropriate financial resources and efficient management of such a revised legal framework will promote the dynamic development of science and research at universities and research institutes, so that they can respond quickly and effectively to the needs of the modern economy and society as a whole while systematically collaborating with the industry in the framework of seamlessly compatible funding instruments that enable paradigm shift in boosting knowledge and technology transfer. The two key laws in Slovenia in this regard are the Higher Education Act[2] and the Research and Development Activities Act,[3] both of which must better reflect the needs of knowledge and technology transfer. In the long run, it could make sense for research, science, innovation and higher education carried out at universities and institutes to be governed by a single law or that the institutes are merged with the universities or organised as independent universities. This would also increase healthy competition between higher education providers as well as in the research organisations. As a step in the direction of modernisation of legislation already, in November 2021, Slovenian Parliament adopted the new Scientific Research and Innovation Activities Act[4]. The act establishes the Development Council of the Republic of Slovenia as an expert advisory body of the Government in the field of scientific research and innovation.

Funding for research and development in Slovenia needs to be improved in quality and in quantity. The medium-term objective is financing of 1% of GDP from public sources (government budget) and 2% from the private sector until 2025. Until 2030 this number would need to be at least 1,25% GDP from public funds, and a significant part of the funds would also come from the revenues of successful SMEs and larger enterprises. The new law sees quite a significant increase in the research budget (now 0.52% of GDP of public funding goes to scientific research activities, while the target is to reach 1% of GDP within 4 years). Moreover, If GDP growth is negative or sees non-growth in an individual year, at least the nominal amount of funds for this purpose of the previous year shall be provided for state funding of scientific research activities in the state budget. [5] Detailed financial, organizational, demographic and economic analysis is needed to calculate the optimal pace of investment increase. Furthermore, the bureaucracy and financing of projects must be

[2] ZVIS (SI). Available at: http://pisrs.si/Pis.web/pregledPredpisa?id=ZAKO172

[3] ZRRD (SI). Available at: http://pisrs.si/Pis.web/pregledPredpisa?id=ZAKO3387

[4] https://www.uradni-list.si/glasilo-uradni-list-rs/vsebina/2021-01-3695?sop=2021-01-3695

[5] More information on the pace of stable financing of scientific research can be found in the new law.

made more streamlined and conducive to innovation. Typically, this can be achieved by lowering administration burden for the application and evaluation process and ensuring the financing is paid to the beneficiary at the most appropriate and useful times. In Slovenia, two reforms would be a good place to start. The first relates to the application process. Due to the fact that in Slovenia external evaluators are frequently used (specifically, for science and research projects and not for innovation development projects, where Slovenian experts are used to evaluate the applications), project applications are written in English. However, as required by law, all documents must also be written in Slovene language. Project proposals must effectively be written twice, in both Slovene and English. Evidence suggests that this represents an unnecessary burden on applicants, which could be removed. The second reform relates to the payment of funds from successful projects. Discussions within the ecosystem and outcomes from the State of Play analysis noted that payments to beneficiaries often comes too late and in too many instalments. Funding and public financing legislation should therefore be streamlined in line with international best practices, such as Horizon 2020 (from 2021, Horizon Europe). This would necessitate the introduction of a meaningful level (e.g., 75% for a 4-year project)[6] of pre-financing and fewer overall instalments.[7] It must be noted that introduction of any meaningful solutions to financing issues would include and require a change in public finance regulation.

Improve service design in public administration communication channels, promote customer orientation and encourage innovation thinking in public administration employees. Service design is a way of considering how the 'front-stage' experience of the end user is orchestrated with the 'back-stage' capabilities and sequencing of activities to enhance that experience. With regards to public administration, the question is more in terms of not only 'is the information there' but also 'how easy is the journey the user will take to access the information.' Service design is about adopting a customer-focused approach to the implementation of public services.[8] This means involving and engaging 'customers' (i.e users of government services) in development to deliver more efficient and effective contact points for the information and communications materials created by public administration.[9] This approach means that all services related to innovation (including research and science), across MEDT, MESS, SPIRIT, ARSS and others, should be mutually reinforcing and signpost each other where needed to ensure the journey of relevant stakeholders in the innovation ecosystem to access key information (funding, policies, responsible people and contact information) is as simple as possible. The key focus here should be on websites and other digital communications portals. In order to implement this and maintain it, the IT services of the government must be interconnected in a systematic and planned way and the process must be led at Director level. The long-

[6] See, for reference: https://accelopment.com/service/projectmanagement/cash-flow-in-horizon-2020-projects/

[7] See, for reference: https://www.ffg.at/en/europe/legalandfinancialmatters/h2020_external-cash-flow

[8] See for example, the Design Thinking Association which has collaborated with many government departments such as the Aarhus Public Library (Denmark), the City of Calgary, the Australian Taxation Office, The White House (Office of Science and Technology), DenMark's Municipality of Holstebro, The Office of Personnel Management (OPM) of the US Federal Government and the Government of Singapore. Information available at http://www.design-thinking-association.org/explore-design-thinking-topics/vertical-markets/design-thinking-in-government

[9] Rae et al, 06 June 2019, *Service design in government: How design thinking principles can bolster mission effectiveness, productivity, and customer satisfaction*. Available at: https://www2.deloitte.com/za/en/insights/industry/public-sector/implementing-service-design-in-government.html/#endnote-3

term goal should be to implement a single sign-on policy, unified user experience, harmonisation of forms and classifications across government.

Foster increased innovation within public administration. In order for an administration to foster innovation, the role of leaders in management processes should be to fully integrate and encourage creative problem solving through regulations, human resources management, budgeting, specific support and strategies to manage risk and manage information, data and knowledge. In order to improve this in Slovenia, one option would be that the project Steering Committee for this project, following its conclusion, is adapted in focus into a joint internal innovation and intrapreneurship task force for SPIRIT/ MEDT/ MESS/ GODECP and others, as decided by the Steering Committee (for example, ARSS could be added as well). This task force would need to liaise closely with the Ministry for Public Administration, specifically the Sector for the Elimination of Administrative Barriers, Better Regulation and Quality in the Public Sector and the Inovativen.si project.[10] There is a strong need for director/ senior management-level leadership on this task force. This task force could then systematically analyse the ways in which existing government management processes, such as public sector regulations, human resources management and budgeting are inhibiting or enabling innovation in the area of innovation policy. This committee could have, as its first output, an evaluation and plan of action for bringing together specific support that dedicated organisations for innovation (for example innovation units and teams) may then provide, as well as strategies that can be adopted to manage risk. Finally, the task force should outline how information, data and knowledge can be effectively managed to support innovation. This activity could be carried out following the implementation guidelines of the OECD framework for country analysis of central enablers of innovation.[11]

[10] See, for reference: https://www.gov.si/zbirke/projekti-in-programi/inovativnost-v-javni-upravi-inovativen-si/

[11] https://oecd-opsi.org/wp-content/uploads/2018/07/Fostering-Innovation-in-the-Public-Sector-254-pages.pdf

4 Priority Areas

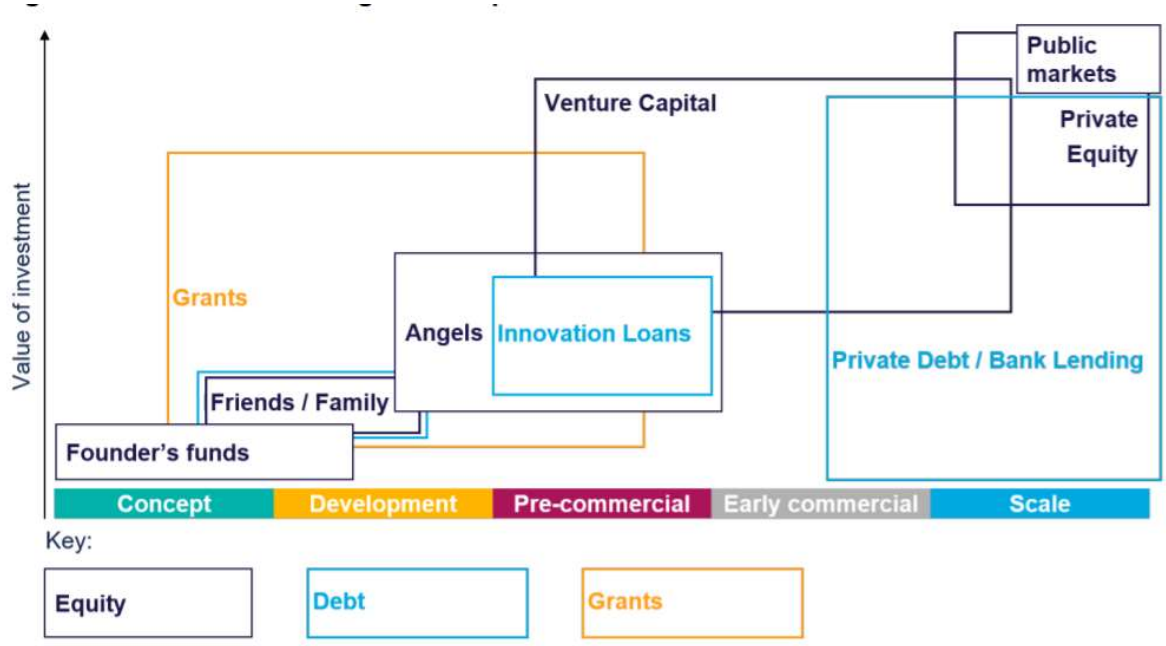
Three priority areas have been developed during previous stages of the project 'strengthening the innovation ecosystem in Slovenia'. These priority areas form the basis of the recommendations, and a summary can be found in Table 1 below.

Table 1 - Overview of Recommendations

Priority Area	Recommendation
Setting Innovation Collaboration • Improve systematic cooperation for all types of actors in the system • Trigger behaviour-change through mechanisms and incentives • Enhance implementation of innovative solutions by creating joint ownership and spreading risks	Upgrade the National Entrepreneurship skills system
	Rationalise and re-structure roles and responsibilities of actors
	Reinforce SRIPs and establish a single RDTI platform for SRIPs
	Build a monitoring and evaluation programme at both the systematic level and instrument level
Support systems for piloting, demonstration and commercialisation • Further open up local innovation infrastructure • Maximise the synergies of programmes and instruments operating different stages of the innovation process • Stimulate growth in added value of industry	A new instrument for productive cooperation between science and business (and/or logical combinations of various instruments)
	Voucher expansion and modernisation of R&D tax support.
	Stabilise the Technology Transfer landscape and include a proof-of-concept funding mechanism.
	Increase physical presence abroad to boost internationalisation of innovation
Building the Risk Capital Ecosystem • Structure an attractive Risk Capital ecosystem • Lower administrative hurdles and tax burdens • Encourage Venture Capital (VC) for early- (pre-seed and seed) but also late-stage (growth).	Address the Information and Coordination Asymmetries
	Reform the system level
	Setting up the right instruments

As noted in the background to this report, enhanced commercialisation of products and services through coherent support and smooth coordination of actors in the Slovenian innovation ecosystem is a key objective. In order to map the progress of product and service innovation, the below diagram is useful to bear in mind for each priority area. While Risk Capital covers pre-commercial stages, and support systems cover concept and development stages, the collaboration priority area covers the whole pipeline.

Figure 1 - The innovation pipeline with mapping of associated support[12]



Source: British Business Bank and Innovate UK

4.1 Setting innovation collaboration

Collaboration broadly refers to connections and behaviour between actors in the system, these can be via dedicated instruments, mechanisms or platforms, or via informal means of relationship-building and connection facilitation. Collaboration is important as it enhances the implementation of innovative ideas and solutions by creating joint ownership and spreading the risks to a larger group of actors.[13] The analysis has shown that there is the perception of a lack of systematic cooperation for all types of actors in the system, in particular the government sector, general public and civil society, as well as low levels of long-term cooperation, most common between knowledge institutions and industry. There was also an indication during stakeholder consultations that cooperation with the public administration lacks mechanisms to liaise with other actors of the innovation ecosystem and that the public administration does not communicate its activities well.

Overall, in this priority area, three distinct challenges have been outlined:

1. A lack of trust within the RTDI ecosystem. In particular, low levels of confidence in the effective evaluation and implementation of initiatives by different members of the helix. Enterprises are aware of the need to increase their innovation potential

[12] Department for Business, Energy and Industrial Strategy, July 2021, UK Innovation Strategy: Leading the future by creating it. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1005000/uk-innovation-strategy.pdf

[13] Thea Snow, 20 August 2018, *Why and how does collaboration drive innovation in the public sector?,* Nesta Blog. Available at: https://www.nesta.org.uk/blog/why-and-how-does-collaboration-drive-innovation-public-sector/#:~:text=Collaboration%20enhances%20the%20implementation%20of,across%20social%20and%20professional%20networks.

and the urgent need to transform to deliver innovative products supporting green and digital transformation. However, the overarching and efficient political and policy support that would create a fruitful ecosystem for creating new knowledge and technologies and support their transfer in innovative high added value products is seen as unpredictable.

2. Low levels of competition and missing links in the entrepreneurial system. Low levels of competition discourage upskilling, and the missing links mean Slovenia lacks a culture of patent applications among researchers. Collaboration is also built around incentives and confidence of researchers, who may have potential innovations to go outside of their comfort zone and pitch their ideas. Increased collaboration here would address the current situation and ensure access funding in a consistent manner, via public funds or exploiting innovations commercially.
3. The need to use research, analysis, understanding and knowledge of the problems that currently exist, to set achievable goals. There is also a need for stability and a long-term policy planning and implementation in the system. Slovenia has an extensively analysed innovation system, but there is room for improvement in the way actors in the ecosystem organise themselves and disseminate this information in such a way as to work towards collective, clear, defined, and implementable goals. This includes respected institutions, both academies and universities, industry, and national authorities.

All three of the above challenges are interconnected and the recommendations address them as a package. On a concrete level, this priority area calls for the paradigm shift in the way actors work together, which should on one side, continue boosting excellent basic science, and on the other side, create an efficient supporting ecosystem for knowledge and technology transfer. This ecosystem should provide clear strategic priorities, which will ensure increased competitiveness of Slovene enterprises through future proof and relevant products with high value-added. As noted by the State of Play report, previous exercises to define priorities end up with too many priorities, to ensure that each of the stakeholders or branches sees itself represented and the ecosystem lacks focus.

4.1.1 Recommendation – Upgrade the National Entrepreneurship skills system

In terms of the existing policy landscape, Slovenia's Industrial Policy (SIP)[14] envisages the transition of the Slovenian economy to green, creative and digital. To achieve this, it lays down a mandate for the promotion of a comprehensive entrepreneurial environment favourable to creativity and innovation. One key element for achieving this is skills. Please note that this specific chapter only focuses on one aspect of the CIE triangle (Creativity/ Innovation/ Entrepreneurship) - Entrepreneurship skills but strongly urges Slovenian national authorities to pay equal consideration to the remaining two.

[14] SLOVENSKA INDUSTRIJSKA POLITIKA - SIP, 2021-2030. Accessed via: https://view.officeapps.live.com/op/view.aspx?src=https%3A%2F%2Fwww.gov.si%2Fassets%2Fministrstva%2FMGRT%2FDokumenti%2FDIPT%2FIndustrija-spodbujanje-inovativosti-in-tehnologija%2FDokumenti%2FSIS2021_2030.docx&wdOrigin=BROWSELINK

Other policy documents to note related to the area of skill-building are Slovenian Development Strategy[15], strategic documents in the area of Education[16] (especially those related to open/innovative education and creativity) and the existing S4, which has a special subchapter devoted to this aspect of the educational system (Young Slovenia).

SPIRIT already operates a number of measures and activities to support the development of entrepreneurial skills, but only to a limited extent in terms of both funding and types of action. Current activities include providing information to networks and their users on sources of funding, new developments in laws and regulations, entrepreneurial training, seminars, workshops, new programmes, projects, services and ideas aimed at the development and internationalisation of small and medium-sized and large enterprises.

It's important to mention that PSDDMF Public Scholarship, Development, Disability and Maintenance Fund of the Republic of Slovenia[17] plays an important and visible "implementing" role when it comes to different activities related to reinforcing the Skills and competences of adults (conducting a multitude of different trainings, coordinating Competence Centres) and young adults still conducting their studies (providing scholarships, implementing different initiatives and calls for strengthening the cooperation, running projects such as "Creative Path to Knowledge"[18] – a long-term project focusing on the triangle Student – University – Companies).

Other stakeholders, such as the two chambers of commerce, build capacity of businesses in terms of their understanding of the innovation process. The S4 has (see pages 37-38) been supporting entrepreneurs with infrastructures, financial resources, and content related support (mentoring, etc..) through the use of ESF resources . This support has been prepared for both newly established enterprises and knowledge transfer, and for the growth and development of SMEs. The S5 will follow the same path with an increased focus on the aspect of knowledge & skills for green transition[19].

However, these initiatives lack systematic public private partnerships. In addition, the creativity and innovation sides are not well nurtured. This lack of a joined-up approach results in missing skills in the entrepreneurial ecosystem and negatively affects achievement of priorities and knowledge transfer.

With this in mind, the system should make more room for innovators with a variety of profiles, rather than focusing on researcher/ entrepreneur model founded on public funding. These new profiles need to be discovered within the ecosystem by creating mechanisms which focus on wider entrepreneurial skills. The Programme for the Development of the Innovation Ecosystem calls for the strengthening of entrepreneurial activity in the system, specifically from Technology Readiness Level 6.[20] In order to achieve this, SPIRIT aims to gather stakeholders, services and activities in order to inform them about opportunities and incentives for the development of innovation activity in Slovenia

[15] https://www.gov.si/assets/vladne-sluzbe/SVRK/Strategija-razvoja-Slovenije-2030/Slovenian-Development-Strategy-2030.pdf
[16] See National Education strategy, RESOLUTION ON THE NATIONAL HIGHER EDUCATION PROGRAM 2030. In addition, MESS started in February 2021 the multi-year modernisation of education programmes (sl).
[17] https://www.srips-rs.si/en/about-us
[18] https://www.srips-rs.si/en/human-resource-development/creative-path-knowledge
[19] Skills related to sustainability, green entrepreneurship, environmentally friendly technologies, climate change adaptation, sustainable business practices are becoming increasingly important.
[20] SPIRIT, 2020, Programme for the Development of the Innovation Ecosystem.

(the one-stop-shop).[21] Similarly, the Internationalisation strategy 2015-2020 called for an identification of the missing links in the economy chain of the national entrepreneurial system. To this end, it was suggested to actively deepen Slovenia's role as a location for innovation hubs and start-up entrepreneurship to promote innovation, create new jobs and higher added value, economic growth, and bring competitive dynamics into the business environment.[22] At present however, the ecosystem for efficient knowledge and technology transfer, including complementary funding instruments is not addressed, which means that these critical gaps remain.

The analysis conducted for this study validated these systemic needs and showed that there is still the perception that companies, regardless of size, lack knowledge about organising their in-house innovation strategies, models and processes. The same applies to researchers, who have strong expert knowledge, but lack entrepreneurial skills. This in turn makes collaboration between businesses and researchers more difficult. The State of Play report found that public higher education institutions provide formal courses that seldom include entrepreneurship across disciplines or subjects. In terms of existing instruments, representatives of the SIO network say they have been able to promote local and regional communities, which serve to build entrepreneurial capacity, but this has been uneven. This recommendation should therefore try to focus on ensuring there is a more consistent provision of services via the SIO network across Slovenia.

Overall, the entrepreneurial mindset should be encouraged by broad and specific skills. The broader skills that are emphasised are, for example, taking the initiative, mobilising others and understanding how to put a plan into action. These skills are relevant for everyday life as well as essential for the stakeholders in an innovation system.[23] Entrepreneurship education specifically, is important from Primary school upwards, and measures in university provision can be formal (courses, and credits) but also informal support, such as enterprise fairs; business competitions; Start-Up in a Day activities and Boot Camps. Overall, the university environment should be made more stimulating for the establishment of new companies and equipping both researchers and students with the entrepreneurial competencies needed to benefit the economy.

4.1.1.1 Action Plan

The improvements foreseen under this recommendation should be implemented through the following activities:

- Creation of three distinct enterprise skills portfolios in MESS, MEDT and SPIRIT
- Creation of a national entrepreneurial skills platform
- Organisation of a pilot hackathon by 2022
- Actioning the KETGATE 2021 recommendations for public researchers[24]
- Creating of a National Action Plan for Entrepreneurial skills by 2022

[21] *Ibid*.

[22] Slovenian Government, 2015, PROGRAMME FOR INTERNATIONALISATION 2015–2020

[23] European Commission, 2016, The European entrepreneurship competence framework. Available at: https://ec.europa.eu/growth/smes/supporting-entrepreneurship/education_en

[24] For reference, see: https://ketgate.eu/about-us/jsi/

As a first step, an Entrepreneurship Skills portfolio should be explicitly assigned to three individuals. One at the Ministry for Education, Science and Sport, one at the Ministry for Economic Development and Technology and one at SPIRIT. **The SPIRIT portfolio should be the leader of the overall recommendation**. These three individuals would meet once a month and be responsible for coordinating the drafting of a national entrepreneurial skills action plan, and systematic engagement with the intermediaries (e.g SRIPs, technology parks, clusters), the industrial system (e,.g companies and chambers) and the research and education system (e.g universities, public and private research institutes). It is recommended that SPIRIT, MESS and MEDT cooperate closely with GODECP[25] and MoLFSA[26] on this assignment. One vehicle for this could be the first national Strategic Council for Entrepreneurship in Education, created in 2020 by the Ministry of Education, Science and Sports.[27] It brings together a variety of professionals from education and business experienced in promoting entrepreneurship in different organisations and have successfully made changes in a variety of environments. This strategic body would be a useful resource for the operational activities of the three portfolios, which would meet more frequently. Four members of the Council are coming from the Higher Educational Institutions (HEIs).

The action plan could include concrete activities and projects with other ministries, such as the Ministry of Labour, Family, Social Affairs and Equal Opportunities.

The entrepreneurial skills system upgrade should involve at the following pillars:

- Student enterprise – further integration of entrepreneurship education and entrepreneurial skills, mindset and behaviours into wider student experience at higher education institutions.
- Researcher enterprise - action-based practical activities and challenges, which may be set by the community, businesses and enterprises or another appropriate partner.
- Support for university and public research organisation management when integrating entrepreneurship into overall strategies.
- Intrapreneurship, supporting the development of entrepreneurial mindset within an established company or organisation
- Supporting entrepreneurial skills in the private sector. This includes close work with existing initiatives as organised by the Chambers of Commerce and others.

They could begin by immersing themselves and gathering information from within the system. For example, using the outcomes of Slovenia's ongoing engagement with the HEI Innovation toolkit (reports forthcoming) from the OECD/ European Commission to familiarise themselves with 8 dimensions of Entrepreneurship Education policy and the self-assessment tools available for Higher Education Institutions. Their mandate would also

[25] Government Office for Development and European Cohesion Policy or SRVK in Slovenian.

[26] Ministry of Labour, Family, Social Affairs and Equal Opportunities

[27] For reference, see: https://www.gov.si/novice/2020-02-07-prvi-nacionalni-strateski-svet-za-podjetnost-v-izobrazevanju/

include ensuring the uptake and impact of recommendations and reforms coming out of this international support, namely organising and coordinating follow up activities following the conclusion of reports and analysis under the OECD/ European Commission support under the HEI innovate programme.[28]

These three portfolios should also support the public research institutions in Slovenia to effectively review and integrate entrepreneurial skills principles into their institutions with concrete actions. This would involve working closely with the Chambers of Commerce, including local chambers, to understand the current status of entrepreneurial skills provision in the private sector. The overall output of these three entrepreneurship skills portfolios would be the drafting of a **National Action Plan for Entrepreneurship skills by 2022, informed by an evaluation of pilot programmes delivered in 2021-2022.** It would also involve evaluating transferability and expansion potential of successful, but small, programmes. For example, the seminars and workshops under the umbrella event "Young Hopes – Entrepreneurial Training for Young Researchers" for PhD Students, co-funded via Slovenian Research Agency since 2017.[29] Lessons should be learned from this experience and stronger collaboration with SPIRIT to broaden the scope and depth of programmes such as this across Slovenia.

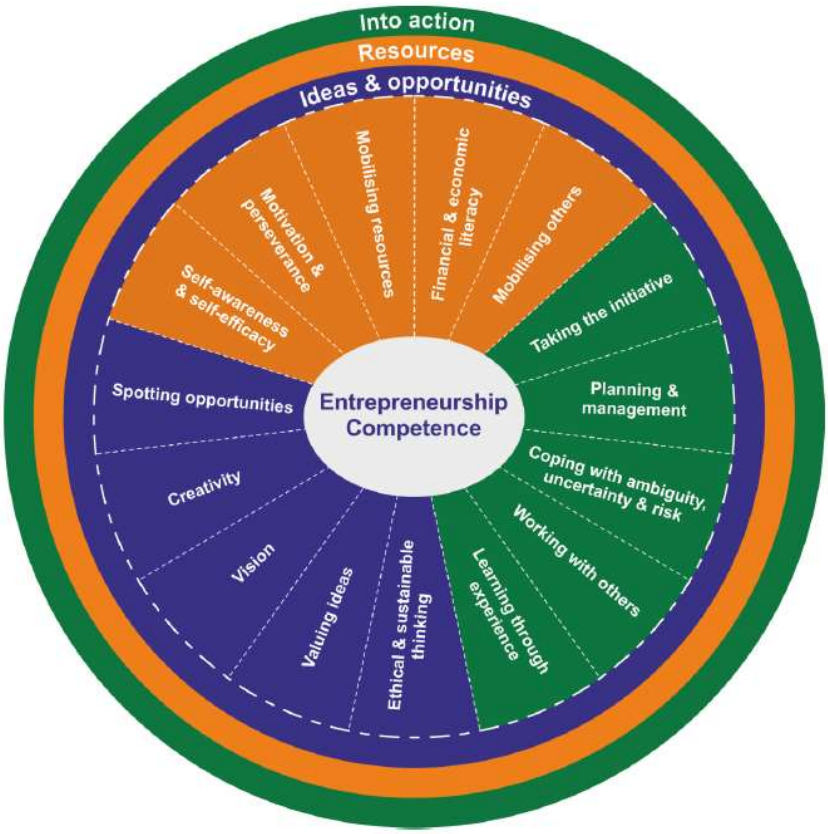
In terms of designing the pilot programmes and activities that will feature in the action plan for entrepreneurial skills, at the European level, **the Entrepreneurial Competence framework in Figure 3 (EntreComp) and Digital Competence Framework (DigComp 2.0)**[30] can provide a map to orientate the system. In addition to the need to establish a policy basis, concrete activities for designing and implementing an upgrade of the national entrepreneurship programme may include encouragement and implementation of public private hackathons and scholarships for business plan development.

[28] Organisation for Economic Cooperation and Development, *HEIInnovate Training Package*. Available at: https://heinnovate.eu/en/training-materials

[29] See, for reference: http://tehnologije.ijs.si/en/?page_id=3300

[30] European Commission Joint Research Centre, 2016, *DigComp 2.0: The Digital Competence Framework for Citizens. Update Phase 1: the Conceptual Reference Model*. Available at: https://publications.jrc.ec.europa.eu/repository/handle/JRC101254

Figure 2 - EntreComp Framework



Source: European Commission 2016

SPIRIT already runs the extracurricular course UPI (Ustvarjalnost, Podjetnost, Inovativnost), based on calls for proposals for creativity, innovation and entrepreneurship in primary and secondary schools.[31] This programme fulfils an important role, but more systemic integration of innovative mindset is needed across a wider variety of education institutions. In terms of primary and secondary schools, the UPI programme should be supplemented with a **dedicated teacher training programme.** For example, the You[th]Start programme, delivered in Austria between 2015 and 2018 and involving cooperation with the Slovenian MESS and funded under Erasmus+[32]. This programme should be renewed in Slovenia under national funding as part of the drafting of the National Action Plan for Entrepreneurship Skills by 2022.

The State of Play report outlined an existing instrument which would be relevant to build the capacity of the entrepreneurial skills system in Slovenia. The American Chamber of Commerce instrument, Partnership for Change – **the national cooperation platform, has**

[31] School Education Gateway, 2015, *Entrepreneurship education in Slovenia*, Entrepreneurship 360 Project. Available at: https://docplayer.net/14738660-Entrepreneurship-education-in-slovenia-1.html

[32] For reference, see: http://www.youthstart.eu/en/challenges/

a number of transferable practices which could be applied to this recommendation. An outline of the instrument can be found in Annex 2. The success of the instrument lies in the open and transparent approach to identification of a challenge to be addressed with open innovation methods, joint selection and design of the approach solution finding tools and co-working principles embedded in the process.

The instrument may be used by three entrepreneurial skills portfolios to develop a **national entrepreneurial skills platform** for enhanced cooperation among quadruple helix partners. Although it started as an employee exchange system, it facilitates activities beyond job rotation and could be used in this context to fund and coordinate public/ private hackathons, trainings with regards to structuring in-house innovation processes and scholarships for business plan development. Following the establishment of the Enterprise skills portfolios at MESS, MEDT and SPIRIT, they could host an **exploratory meeting with AmCham Slovenia and the Ministry of Public Administration, which is active in this instrument. The Ministry of Public Administration should be liaised with closely throughout the process and bring in emerging practices from the innovation policy lab.**

In support of efforts by national authorities and the industrial system, formal activities required by universities would be to **begin systematically broadening the provision of entrepreneurship modules outside of purely business or entrepreneurship courses.** For example, the University of Ljubljana Entrepreneurship Bachelors degree[33] contains a number of modules which could be integrated into other courses as mandatory modules (see Figure 3 below).

Figure 3 - Example modules which could be integrated across university courses

- The Entrepreneurial perspective: The nature and importance of entrepreneurs and entrepreneurship.
- Business ideas and product development approaches.
- Understanding your customer.
- Product validation; prototyping.
- Market, industry and competition.
- Business models. Lean canvas.
- Entrepreneurial marketing.
- Assessing a new venture's financial strength and viability.
- Funding of new and young ventures, investors and harvesting.

As previously mentioned, hackathons offer an opportunity for public/ private co-creation on themes which are of key national and economic importance. Therefore, **Slovenia should organise a pilot public/ private hackathon by 2022, to feed into the development of the overall entrepreneurial skills action plan.** There are a wide variety of models to employ, and many hackathons have already taken place in Slovenia. Participants from

[33] University of Ljubjana, Entrepreneurship Course. Available at: http://www.ef.uni-lj.si/content/static_english/predmet/predmet.asp?l=123&li=2413&predmet_id=195169

government bodies (e.g., SURS) have also participated in them and could be consulted in building the hackathon programme.[34] A bottom-up hackathon was organised in Nova Gorica between 18-19 September for EU Code week, which could offer some lessons for future events.[35] Closely linked with the need for a more strategic partnership with the AmCham instrument, a hackathon was organised by Partnership for Change in 2021, focused on the transfer of innovation, cooperation between industry, policy makers and university-academia. The hackathon was organised online in collaboration with the office for Knowledge Transfer of the University of Ljubljana and the Digital Sustainability Forum.[36] The development of a public/ private hackathon programme should be done collaboratively by the 3 entrepreneurship skills portfolios but led by SPIRIT. In terms of delivery of the hackathon programme itself, organisation of the events could be **either directly done by SPIRIT or via a public call for proposals.** The themes could target particularly those areas of knowledge-intensive exports where Slovenia is weak, to make them relevant to the European Innovation Scoreboard (e.g. ICT, Telecommunications).

Aside from students and young people, research staff and employees in public institutions must also be targeted to build capacity within the entrepreneurial system. In terms of building up entrepreneurial skills and knowledge of research staff within public research institutes and universities, the most **recent KETGATE 2021 recommendations (Annex 3)** are a strong example of where the three entrepreneurship skills portfolios could find orientation. The recommendations are focused on four key areas for RTOs and public researchers: 1) Trainings and further education, 2) Mentoring, 3) Infrastructure and 4) Joint Initiatives.[37] As a crucial step, the three entrepreneurship skills portfolios in MEDT, SPIRIT and MESS **should meet regularly with the KEGATE point of contact in the Jožef Stefan Institute**[38] to work collaboratively on what actions are needed and implement the recommendations. They should also focus attention on upgrading the rapport with international networks and policymakers (EEN/ TAFTIE/ EC) whose outputs should then feature in the national action plan for entrepreneurship skills in 2022.

Table 2 - Implementation of entrepreneurial skills upgrade

Timeline for implementation – Month 0				
Activity	Timeline	Cost (high)	Cost (low)	Leader
Establishment of entrepreneurship skills coordinator portfolios in MESS, MEDT and SPIRIT.	6 months (3 months consolidation of role and 3 months	3 x entrepreneurship skills portfolio coordinators	3 x entrepreneurship skills portfolio coordinators	SPIRIT

[34] European Commission, Collaboration in Research and Methodology for Official Statistics, TEAM NSI Slovenia. Available at: https://ec.europa.eu/eurostat/cros/content/team-nsi-slovenia_en

[35] https://codeweek.eu/hackathons/slovenia

[36] For reference, see: https://amcham.si/en/news/the-crisis-can-be-an-excellent-opportunity-for-slovenian-modernization-digitalization-automation-and-innovation/ and https://www.gov.si/novice/2021-03-12-hekaton-skill-up-kompetence-prihodnosti-za-druzbo-5-0/

[37] Also found in ANNEX II https://gapr.pl/wp-content/uploads/2021/03/Recommendations-for-qualification-measures-targeting-RTO.pdf

[38] https://ketgate.eu/about-us/jsi/

	training and learning.)	(MEDT, MESS, SPIRIT), at 0.5 FTE Total 1.5 FTE	(MEDT, MESS, SPIRIT), at 0.25 FTE Total .75 FTE	
Meeting with OECD and HEI Innovate project/ advisory group to implement the outcomes of Slovenia's engagement with the OECD/ HEI Innovate toolkit)	Month 7	N/A	N/A	SPIRIT
Meeting with AmCham to discuss collaboration using partnership for change instrument	Month 8, to support a national entrepreneurial skills platform (potentially under the SRIPs platform discussed in 3.1.3)	N/A	N/A	SPIRIT
First pilot hackathon takes place	18 months (6 months planning time per hackathon.)	Each public/ private hackathon is contracted wholly externally, estimated to cost 30,000-40,000 Euro and could have a co-funding element (between 15-20%).	Each public/ private hackathon is coordinated heavily by SPIRIT would cost 15-20,000 Euro with a mandatory co-funding element of between 20-30% for benefitting institutions.	SPIRIT
Drafting of national entrepreneurship skills Action Plan	12 months, informed by evaluation of pilot programmes delivered in 2021-2022.	3 x entrepreneurship skills portfolios	3 x entrepreneurship skills portfolios	SPIRIT
Establishment of an entrepreneurial skills platform	Same rollout as SRIPs platform overall (recommendation 3.1.3)	N/A	N/A	Local Chambers of Commerce

The following indicators have been developed, which could be used as examples for tracking the process of implementing the recommendation. In addition, a number of system-level indicators are proposed for integration into the national entrepreneurship skills action plan or other strategic documents.

Name and description of indicator	Type of indicator
Number of meetings with EC/OECD/ AMCham to discuss national entrepreneurship skills action plan	Recommendation KPI
Number of meetings with public research to discuss national entrepreneurship skills action plan	Recommendation KPI
Time (in weeks) to policy proposal by national IP Strategy Steering Committee	Recommendation KPI
Time (in weeks) to adoption of national IP Strategy	Recommendation KPI
Number of meetings of entrepreneurial skills platform within SRIPs platform	Recommendation KPI
Number of meetings between the three entrepreneurship skills portfolios	Recommendation KPI
Number of meetings with KEGATE point of contact in Jožef Stefan Institute	Recommendation KPI
Number of pilot projects delivered (e.g hackathon)	Recommendation KPI
Number of graduate start-ups created	System-level indicator
Estimated turnover of active spinouts	System-level indicator
Average external investment per spinout	System-level indicator

4.1.2 Recommendation - Rationalise and re-structure roles and responsibilities of actors

An efficient, systematic and supportive ecosystem for RTDI, including measures to deliver to the market innovative and future-proof products that comply with strategic objectives, must be further elaborated in Slovenia. The upgrade and restructuring of funding instruments to serve current needs haven't taken place to the extent required. When the continuity regarding instruments and strategies is not ensured that might hinder the overall efficiency of the system. A more positive example in terms of continuity is the Slovene Smart Specialisation Strategy (S4), which currently represents a relatively durable strategy. However, S4 also features selected deficiencies, as funding calls are not published regularly and with a priori known timeline and conditions including funding volume. Therefore, on the operational level, this mechanism cannot be claimed as stable and systematic. These few selected examples already expose the challenge indicating room for improvement in the area of systematic supporting ecosystem for RTDI, including all measures to deliver to the market innovative and future-proof product. These challenges were also perceived on the international and national level. The Slovene Research Funding Agency (ARRS) can be considered as one of the exceptions, as it publishes calls regularly and in a predictable way. In Slovenia, there is a room for improvement in systematic supporting ecosystem that efficiently promotes delivering to the market innovative and future proof products. Even more importantly, there seems to be room for improvement to further develop and, where needed, transform higher education and research ecosystem as well as enterprises to be capable of consistently delivering such products in the future while additionally ensuring increasing market shares.

It is possible to identify a few illustrative examples, which expose the need for more systematic and coordinated and interdisciplinary/cross-sectorial approach by actors. On one side, Slovenia is facing challenges in fulfilling objectives outlined in the Slovene National Energy and Climate Plan (NECP)[39] and other overarching objectives of the Green Deal[40] including pressing activities to comply with the Fit for 55 objectives. It is well-accepted that batteries and the hydrogen economy will play a very important role in this transition, whereas Slovenia does not possess any significant production capacities in the area of modern batteries and hydrogen economy despite possessing a very strong R&D basis. Resultantly, even though Slovenia is capable of delivering to the international community high-level scientific achievements, it will instead be buying from foreign companies expensive and high added value products that are needed to fulfil its environmental and energy objectives. This is a good example of how R&D strategies are decoupled from the potential of industry and how R&D is unable to grow into industrial implementation. The current RTDI ecosystem does not necessarily enable, encourage or force efficient knowledge and technology transfer or spill overs. Even more importantly, it does not ensure that this transfer and subsequent creation of products is aligned with specific needs of the market.

[39] INTEGRATED NATIONAL ENERGY AND CLIMATE PLAN OF THE REPUBLIC OF SLOVENIA, February 2020. Accessed via: https://ec.europa.eu/energy/sites/default/files/documents/si_final_necp_main_en.pdf

[40] Se, for reference: https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal_en

Resolving these challenges calls for an efficient interaction of the entire quadruple-helix and re-organising the roles of actors in the system. The role of all actors should be strengthened in a focused manner to more support a paradigm shift in the RTDI ecosystem, to transform Slovenia into a high-tech country with high added value in efficient manner. This includes a refined role for public authorities, relevant industries and local bodies and agencies that can provide the basis for truly co-creative and equal partnerships within the ecosystem. The benefits of such a systematic and co-creative approach can be illustratively shown with the example of NECP[41] and Green Deal, where a clear government strategy was supported by all relevant ministries, to efficiently support R&D&I and demonstration, industrialisation as well as implementation and promotion aspects. This support would include an underlying action plan, which can represent a nucleus for a paradigm shift in not only more efficient knowledge and technology transfer to create future proof and relevant products with high added value but also in strategic approach. Furthermore, an active strategic role of government and all relevant ministries should also inherently include civil society. If elaborated thoroughly, this creates the missing collaboration that would be needed to transform the Slovenian innovation ecosystem.

4.1.2.1 Action Plan

As an answer to this challenge, several complementary and consistently applied activities are needed, with an aim to establish a structured and stable top-down system. They can be summarised as:

- Upgrading and revitalising the existing ad-hoc strategic-level group of State Secretaries for S4. It should align with the activities of the Development Council in its operations.[42]
- Expanding the roles of the Slovene Rector's Conference and Coordination of Independent Research Institutes
- Preparing more technical feasibility studies on topics which require more elaborate and focused analysis than has been possible to do under this study

First, it would be beneficial if the strategic role of government and all relevant ministries is strengthened, as outlined in the previous section. This should be realised through Development Council to be established under the new Law. In November 2021, Slovenian Parliament adopted the new Scientific Research and Innovation Activities Act (Official gazette RS No. 186/21). The act **establishes the Development Council of the Republic of Slovenia** as an expert advisory body of the Government in the field of scientific research and innovation. The Council participates in the formulation of research and innovation

[41] INTEGRATED NATIONAL ENERGY AND CLIMATE PLAN OF THE REPUBLIC OF SLOVENIA, February 2020.
Accessed via: https://ec.europa.eu/energy/sites/default/files/documents/si_final_necp_main_en.pdf

[42] In November 2021 Slovenian Parliament adopted the new Scientific Research and Innovation Activities Act (Official gazette RS No. 186/21). The act establishes the Development Council of the Republic of Slovenia as an expert advisory body of the Government in the field of scientific research and innovation. The Council participates in the formulation of research and innovation policy, proposes measures in the field of scientific research and innovation and refers in many other important activities relating to the efficiency of the Scientific Research and Innovation policy (programmes, measures, monitoring and evaluation).

policy, proposes measures in the field of scientific research and innovation and refers to many other important activities relating to the efficiency of the Scientific Research and Innovation policy (programmes, measures, monitoring and evaluation). It's envisioned to include researchers, trade unions and business sectors. The act with tasks and responsibilities is already adopted (as regards to Council work). Development council must be established in 6 months after start of use of new Act. The new Programme Committee for RRF will also be established to foster inter-ministerial cooperation on RRF and its instruments.

Second, it would be also necessary to **upgrade the ad-hoc strategic-level group of State Secretaries for Smart Specialisation** (under S4, later S5), by aligning its work with the activities of the Development Council. The working group of the Development Council would begin by elaborating high-level strategies and actively coordinate activities in all relevant inter-ministry challenges, thus efficiently addressing cross sector collaboration. In the context of the innovation ecosystem and Smart Specialisation, it is crucial to strengthen an inter-ministry coordination between the Ministry of Education, Science and Sport, Ministry of Economic Development and Technology, Ministry of Infrastructure, Ministry of the Environment and Spatial Planning and Ministry of Labour, Family, Social Affairs and Equal Opportunities, Ministry of Agriculture, Forestry and Food and intense coordination with Ministry of Finance.[43] Coordination with the Ministry of Public Administration is also of primary importance, bearing in mind that they are responsible for digitalization in the Public Sector and the forthcoming policy laboratory. Such interaction is namely crucial to elaborate adequate and holistic strategic positioning of priorities and corresponding KPIs, which are mandatory to overcome current scattered activities and outline systematic strategy that - in a coordinated and focused manner - streamlines R&I. This includes all supportive measures to simultaneously tackle emerging challenges in the areas of global Challenges and Industrial Competitiveness (Health, Inclusive and Secure Society, Digital and Industry, Climate, Energy and Mobility as well as Food and natural resources). It's important to note that efficient functioning of the State Secretaries group can only be ensured, if there is political commitment and full buy-in from all ministries involved and state secretaries thereof.

Thirdly, **the role of the Rector's conference of Slovenia as well as that of Coordination of independent research institutes should be reviewed by universities to create more effective representative bodies for higher education and research institutes.** Universities play a crucial role in the innovation policy system, in conjunction with public research institutes. However, current university representation at the policy level is underfunded and consequently uneven and limited to individuals working in Higher Education at various levels. With the full buy-in, active participation and support of universities, the Rector's conference and Coordination of Independent Research Institutes should be upgraded to create intermediary bodies which can engage on higher education policy and related issues in Slovenia. In Germany, for example, the rector's conference has

[43] In addition to ministries, the Government Office for Development and European Cohesion would need to be included.

3 offices internationally, is organised in five departments covering different policy fields, and has over 35 members of staff.[44] Working on a principle of scale and feasibility, the Slovene rectors conference and the Coordination of independent research institutes could consider each collectively funding at least one FTE senior policy adviser(s) to the secretariat, supported by all current members and administration, to represent *all* Slovenian universities and independent faculties collectively.

As previously stated, a complementary and holistic set of stable funding/supporting instruments that support efficient transfer across all TRLs is a key building block. In addition to the low TRL funding, which is the only stable funding, a new funding/supporting ecosystem that support efficient transfer across all TRLs should be established. This new funding/supporting ecosystem can incorporate some of the existing past good practices, whereas it is necessary to establish a complementary and holistic set of stable funding/supporting instruments that efficiently support efficient transfer across all TRLs. This is a large challenge, which for example in Austria took several years of work across numerous ministries (when put in the Slovene context this would be the Ministry of Education, Science and Sport, Ministry of Economic Development and Technology, Ministry of Infrastructure, Ministry of the Environment and Spatial Planning and Ministry of Labour, Family, Social Affairs and Equal Opportunities and Government Office for Development and European Cohesion).

An important aspect when creating complementary and holistic set of stable funding/supporting instruments that efficiently support transfer across all TRLs is also related to the role of agency(ies). Several countries and regions (e.g. EU, Austria…) have recognised that complementary and holistic set of stable funding/supporting instruments that efficiently support efficient transfer across TRLs (TRL 2-7 or even 2-9) is **best supported by a single research promotion and innovation agency**[45] which allows for seamless and holistic support.

In Austria, such agency is FFG[46] – Austrian Research Promotion Agency, which is the national funding agency for industrial research and development in Austria. This does not exclude existence of a separate low-TRL (TRL 1-2 or even 1-3) focused agency focusing on excellence science, as is now ARRS and e.g. FWF in Austria). This agency is supported by several ministries. The United Kingdom has UK Research and Innovation, formed in 2018.[47] Finally, at the EU level, 2021 saw the creation of the European Innovation Council and SMEs Executive Agency (EISMEA), previously formed of two EU agencies. The creation of a single agency resolves multiple challenges that are currently being faced in Slovenia:

[44] Organisation Chart of the Office of the German Rectors' Conference, 2021. Available at: https://www.hrk.de/fileadmin/redaktion/hrk/02-Dokumente/02-08-HRK/02-08-03-Geschaeftsstelle/Organisationsplan_Juni21_eng.pdf

[45] There are several examples in EU countries, where the two separate agencies function in close cooperation– Estonia (Research Council and Entreprise Estonia), Finland (Academy of Finland and Tekes – Business Finland), Sweden (Swedish Research Council and Swedish Agency for Innovation Systems -VINNOVA)

[46] For reference, see: https://www.ffg.at/)

[47] Front webpage of UK Research and Innovation. Available at: https://www.ukri.org/

1) Funding: several ministries can ensure pooling of a larger budget, which is key for establishing a complementary and holistic set of stable funding/supporting instruments that efficiently support efficient transfer across all TRLs.
2) Implementation: However, funding is only one of the prerequisites for a success, whereas inter-ministry support and involvement of a single, autonomous agency would support collaborative implementation. This might be overseen or steered by the Programme Committee or the revised Government council for science, technology and innovation (new Development Council) and politically coordinated by the Prime Minister as an intermediary between the Minister of Education and Science and the Minister of Economic Development and Technology.
3) Cross-Sectoral approaches: Such inter-ministry support and involvement namely inherently resolves challenges that ministries are facing (and these challenges are becoming more and more cross-sectorial) thus automatically paving the way towards establishing so called missions or government project units, as denoted in EU and Austria. This single research promotion and innovation agency is key for ensuring that end products serve the society and that the entire value chain, from basic research to industrialisation, is well coordinated and properly supported. This is also one of the prerequisites for establishing clear and well-defined as well as globally recognized KPIs. For example, by incentivising a multiplication effect of R&D funds through incomes on the market with emphasis on high added value products, acceleration of development of marketable products and human centric development for the benefit of society. An example of such a project unit or mission is the recently established Government Office for Digitalization. Similar units could be envisioned in other strategic areas such as green technology.
4) Vision: This in turn enables drafting clear visions and strategies as well as creating novel, adequate and efficient supporting ecosystem of complementary funding instruments[48] which enables maximisation of leveraging the funds invested in R&D, which is also a weakness in Slovenia. Thereby, the innovation circuit is closed, and science and technology can deliver measurable results with a systematic ecosystem, which in addition establishes currently missing trust between all relevant stakeholders.

It is recommended to prepare a feasibility study on establishing a single research and innovation agency, supported by multiple ministries, to increase the efficiency of knowledge transfer across TRLs. This study should focus on whether a single agency may support creation of complementary and holistic set of stable funding/supporting instruments that efficiently support knowledge transfer across all TRLs. It is further recommended to look at the example of the Government Office for Digitalization and Project Delivery Units as a method to coordinate activity and introduce dynamism in other strategic areas. Project Delivery Units are temporary units set up to address a specific challenge. The feasibility study would need to include an evaluation of these options. Larger organisational and funding advancements also require enhanced **legal frameworks and financial resources.** This activity will not be thoroughly elaborated further as its exact planning will only be possible after final conclusions are made on the feasibility study.

[48] E.g. https://www.ffg.at/sites/default/files/downloads/FFG_Folder_DE.pdf

Within the scope of this study and the given recommendations, the following sections will comprise only timeline and efforts related to outlined foreseeable activities and feasibility studies on previously outlined more strategic topics.

Table 3 - Implementation of re-structuring

Timeline for implementation – Month 0				
Activity	Timeline	Cost (high)	Cost (low)	Lead
Feasibility study on Establishing a single agency supported by multiple ministries that support the elaboration of the complementary and holistic set of stable funding/supporting instruments that efficiently support efficient transfer across all TRLs	Start at M6 (or as soon as the Development Council and Programme Committee is established) – after analysing challenges and elaborating the vision of the ad-hoc working group of State Secretaries for Smart Specialisation Till the end of Q2 2022, the appointment of programme committee (appointment of special group can be done in 2 months' time after the first meeting) 2 months for analysing deliverables of the SRSS: Strengthening the Innovation Ecosystem in Slovenia and other relevant strategic documents 3 months analysing challenges and elaborating the vision 9 months to produce an analysis on the elaboration of the complementary and holistic set of stable funding/supporting instruments that efficiently support efficient transfer across all TRLs along a fair and transparent evaluations system including feasibility analysis of its implementation in Slovenia 6 months to produce a strategy on establishing a single agency supported by multiple ministries that support this efficient transition across TRLs with	2 FTE per month for duration of study	1 FTE per month for duration of study	- Ministry of Education, Science and Sport, - Ministry of Economic Development and Technology, - Ministry of Infrastructure, - Ministry of the Environment and Spatial Planning - Ministry of Labour, Family, Social Affairs and Equal Opportunities, - Ministry of Agriculture, Forestry and Food - Ministry of Finance - GODECP

	elaborated KPIs, stakeholders and operational plan including feasibility analysis of its implementation in Slovenia			
Reviewed role of Slovene Rector's Conference and Coordination of Independent Research Institutes and addition of human resources[49]	Research on different models of HE associations internationally (3 months) Agreement of role description and funding (6 months) Recruitment of FTE (3 months)	0.3 FTE for rollout activities 1 FTE to be recruited permanently	0.3 FTE for rollout activities 1 FTE to be recruited permanently	Secretariat of Rectors Conference and Coordination of Independent Research Institutes

Some indicators which may be useful for the establishment of the platform can be found below: [50]

Name and description of indicator	Type of indicator
Feasibility study on Establishing a single agency supported by multiple ministries that support the elaboration of the complementary and holistic set of stable funding/supporting instruments that efficiently support efficient transfer across all TRLs ● SOP = M6 ● SOP + M2: Check on analysing deliverables of the SRSS: Strengthening the Innovation Ecosystem in Slovenia and other relevant strategic documents ● SOP + M6: Check on analysing challenges and elaborating the vision ● SOP + M6: Check on possible role for the Rector conference and Coordination of independent research institutes ● SOP + M14: Check on strategy on Establishing a single agency supported by multiple ministries that support this efficient transition across TRLs with elaborated KPIs, stakeholders and operational plan including feasibility analysis of its implementation in Slovenia	Recommendation KPI

[49] It's important to note, that this specific recommendation will need to be first accepted and validated by the universities and independent institutes themselves.

[50] In addition to these recommendation and system-specific indicators, the monitoring and evaluation should contain complementary Economic indicators, for example: GDP per capita (in EUR), Exports in absolute figures (in EUR million), Share of exports in GDP (%), Exports per capita (in EUR million), Net revenue of SMEs from sales in foreign markets (in EUR), Exports to non-EU countries* (in EUR), State of inward FDI in GDP in Slovenia (in %), Number of exporters among Slovenian companies, Level of Slovenia's participation in Global Value Chains, Value of inward FDI (in EUR million), Mobility of students, Mobility of Researches, Mobility of experts in enterprises

Reviewed of role of Slovene Rector's Conference and Coordination of Independent Research Institutes and addition of human resources ● Hiring of at least one FTE funded by Slovene university sector as well as independent research institute sector. ● First output of a strategic plan with concrete goals for the whole Slovene university and research institute sector ● Implementation of a performance-related pay scheme for at least one FTE based on achievement of objectives	Recommendation KPI
Multiplication effect of public R&D funds through incomes on the market with emphasis on high added value products.[51] The precise methodology for calculating this would need to take note of the range direct and indirect indicators used in EU and international examples,[52] such as the NEMESIS macro-economic model. This includes: ● Direct technology licensing, spin-outs and start-ups ● Human capital (e.g increases in skilled graduates) ● Crowding-in effect (e,g increased foreign direct investment, relocation of industries, leveraging of private R&D investment)	System-level indicator
Acceleration of development of marketable products	System-level indicator
Human centric development for the benefit of society (education, support, employment of highly skilled and educated persons…)	System-level indicator

[51] E.g. https://www.ffg.at/sites/default/files/downloads/FFG_Folder_DE.pdf, https://www.2zeroemission.eu/wp-content/uploads/2019/04/Impact-Assessment-2019-digital-version-1.pdf.

[52] The NEMESIS Macroeconomic model was used in the Horizon 2020 interim evaluation and concluded that every EUR 1 spent under Horizon 2020 brings an estimated benefit in terms of GDP increase of between EUR 6-8.5 by 2030. Source: European Commission, 2017, Interim Evaluation of H2020, p103 available at: https://op.europa.eu/en/publication-detail/-/publication/fad8c173-7e42-11e7-b5c6-01aa75ed71a1/language-en/format-PDF/source-77918455

4.1.3 -Recommendation - Reinforce SRIPS and establish a single RTDI platform with SRIPs

The need for this action is an inherent continuation of the challenges outlined in 3.1.2 as this section addresses the same challenges, however, from a complementary perspective. This makes possible an efficient, systematic and targeted solution of the challenges while using tailored actions to enhance overall effectiveness.

SRIPs are, in the current organisational structure, facing specific challenges which have implications with an impact significantly beyond themselves. At present, the active strategic role of government beyond a funder and relevant ministries as a co-creative partner representing one of the helixes is missing. The SRIPs therefore represent a top-down initiative now being run in a bottom-up manner by industry and research organisations. SRIPs would benefit from more stable funding/supporting instruments that efficiently support knowledge transfer across all TRLs. SRIPs are required to deliver success indicators and KPIs for the whole partnership and sometimes the entire topical area that they are representing, without having any substantial funds or other financial instrument (networking support) that can directly influence the R&I output of the partnerships. At present, SRIPs remedy this by seeking collaborative funding projects where they can, through EU and other sources. It is key that:

1. SRIPs are selected upon and establish with a clear business plan (inc. legal entity)
2. Private sector leadership is made a sine qua none condition
3. Funding should be foreseen as per the Flemish model.

Establishing a single RTDI platform with all SRIPs will boost the efficient operation of SRIPs on an operational level providing that the national platform bears proper funding at scale, and that clear synergies are established with SRIPs to ensure that funding can flow to industry (e.g. - and for illustration only - with SRIPs potentially playing the role of partners in the setting up and running of the platform and its projects). The platform itself would be formed of two parts:

1. An online digital tool to facilitate remote interaction and best-practice exchange
2. A physical platform with clear working groups to promote networking, interaction and combined goals and impact

This single platform would have all relevant stakeholders present, e.g., representatives of SRIPs, upgraded permanent working group of State Secretaries for cross-sectorial challenges, representatives of Revised Government council for Science and Technology (Development Council, Programme Committee, GODECP, Chamber of Commerce and potential other relevant stakeholders identified in the constitution process. The function of such a platform will be multi-layered with the ultimate aim of delivering the innovative products needed to transform the Slovenian economy.

Such a single platform for all SRIPs could inherently act as an efficient helix, which would resolve one of the important common organizational and funding challenges of SRIPs. In addition, it would support an ecosystem based around communities of practice. Such an organisational structure will for the first time establish constant, permanent best practice sharing between all SRIPs and the wider innovation community. This will make possible

efficient exchange of the needs and requirements from all stakeholders and simultaneously offering the platform for efficient and fast solutions of such challenges. In addition, such organisation inherently boosts cross-sectorial activities and provides the basis for establishing large impactful projects and solutions.

4.1.3.1 Action Plan

This recommendation should be implemented through the following activities:

- Secure the SRIPs funding based on a clear business plan, and private sector leadership
- Initiate a constitution-building process for the platform by inviting all relevant stakeholders to the table
- Establish new regional coordinator roles
- Establish platform working groups
- Launch joint action to reform existing online resources

SRIPs are only able to develop their activities once they have secured enough resources to conduct them. Having a clear business plan will demonstrate their focus and future activities. A clear business could be monitored with key indicators based on the activities of the business plan. Private sector leadership will ensure focused business driven activities.

As outlined in the previous section, a single platform for all SRIPs is aimed at boosting efficient operation of SRIPs, which is one of the important pillars for delivering future-proof and relevant products with high added value. **Therefore, all relevant stakeholders need to be represented in the single platform for all SRIPs.** It is thus suggested that, in addition to representatives of SRIPs, members of the new Programme Committee and revised Government Council for Science and Technology are present (new Development Council), in addition to representatives of the State Secretaries Group, GODECP and close coordination with the Ministry of Infrastructure, Ministry of the Environment and Spatial Planning, Ministry of Labour, Family, Social Affairs and Equal Opportunities, Ministry of Agriculture, Forestry and Food and Ministry of Finance, and the two Chambers of Commerce is crucial. **Potential other relevant stakeholders will be identified during a constitution-building process, led by MEDT in close cooperation with SRIPs. This process will be first and foremost an online written consultation.**

Such representation of the entire triple helix with active co-creative role of government, academia and industry is namely crucial to achieve the key objective: Delivering innovative products needed to transform Slovenia in a modern knowledge-based society, while preserving clearly defined roles and responsibilities. According to current operational principles, SRIPs report to GODCEP but funds are distributed through MEDT. This is inherent to the current organisational context, while it hinders co-creative relations between SRIPs GODECP and MEDT. **The single platform for all SRIPs, thus exactly resolves these challenges and provides additional benefits due to a much broader membership,**

where in an operational environment all relevant stakeholders discussion challenges in an open, equalised and balanced manner.

The single platform could borrow from the example of the Austrian national cluster platform, which was launched in 2019 and focuses on the following topics:[53]

- Future Trends and transfer to the cluster landscape
- Digitalisation in clusters
- New financing options from the EU for Austrian clusters
- RTI strategy and its cluster connection
- Foreign trade strategy and clusters

The single RTDI platform with all SRIPs will have as a key goal act as a facilitator for faster and targeted elaboration of strategies, action plans, instruments and associated policy measures, as well as organisational and structural activities in each of the helixes. **The platform would therefore be both consultative and technical in nature, established as offline working groups but with an online digital platform to facilitate exchange and coordination.**

The working groups could have quarterly physical meetings and must have a set agenda and carefully structured and agreed work plan. It would also exist to ensure adequate signposting and upgrade of existing resources and databases in the ecosystem. The working groups could include, for example:

- Technology Transfer
- Entrepreneurship Skills
- Internationalisation and networks
- Access to Infrastructure
- National R&I policy forum

The platform itself will require an animator at local level to coordinate stakeholders. For this animator role, the Chamber of Commerce and Industry is in a good position to lead, working collaboratively with SPIRIT and MEDT. This would be done by **establishing a number of new regional coordinator roles within the GZS offices but part-funded by SPIRIT and MEDT.** This role is outlined below.

Regional innovation coordinator role.[54] This forms the digital element of the platform; would be a joint responsibility of the regional coordinators and in consultation with Chamber of Commercel:

- To coordinate local innovation actors and animate a national SRIPs platform for RTDI.

[53] See, for reference: https://clustercollaboration.eu/news/realignment-austrian-national-cluster-platform-and-first-cluster-day-4-july-2019

[54] It should be noted that Slovenia currently has no regional level of governance, and the proposed regional innovation coordinator role could only be implemented providing this will be developed in the future. Moreover, further dispersion of responsibilities should be avoided and the regional level should only get an implementing role while all strategic planning will remain at national level.

- This involves working with platform and working group chairs to organise physical and virtual meetings (suggested are quarterly working group meetings and annual plenary meetings)
- To enhance the digital presence of innovation actors and improve signposting within the system of key databases
- To support SRIPs to implement online communities of practice beyond their geographical areas
- To engage with national actors, gather information and forge connections between different parts of the helix.

Performance and monitoring:

- Ideally the role would have some kind of performance-based bonus pay scheme linked to screening/ mentoring potential collaborations via local actors.
- The role would also have set KPIs (e.g. must have monthly network meetings, target for number of new connections, website hits etc..)

For the digital element of the platform, this would be a joint responsibility of the regional coordinators (within GZS) and SPIRIT. This could also include coordinating changes to SPIRIT and Ministry websites (and thus it would require the involvement of the digital communication teams of each institution). In particular, the current situation is that there are many individual websites and there is a clear need to create a true single access platform (i.e. one-stop shop) as, for instance, in Flanders. The goal is to improve signposting and enhance design thinking principles and customer journey to government websites and databases, including signposting and improvements for:

- SICRIS database
- SRIPs database
- ARRS infrastructure database
- KTT database of RTOs
- EEN database of RTOs

This enhanced signposting should be done line with design thinking framework condition needs stated in section 2 of the report. Additionally, upgrades to the existing ARRS infrastructure database would be foreseen under the remit of these regional innovation coordinators. In this regard, long-established good practices such as the ZEUS platform in South Korea, launched in 2013 and upgraded several times, should be borne in mind.[55]

[55] OECD: Observatory of Public Sector Innovation, 18 March 2021, *ZEUS: Research infrastructure innovation platform for science and technology researchers.* Available at: https://www.oecd-opsi.org/innovations/zeus-research-infrastructure-innovation-platform-for-science-and-technology-researchers/

Figure 4 - ZEUS Research Infrastructure Platform[56]

Description:

ZEUS is an integrated management system for research infrastructure that improves the soundness of research and development investment under the current circumstances of South Korea. It is useful when investment comes from many different sources and for shifting attitudes away from the individual ownership culture of research infrastructure. Through ZEUS, it is possible to deter additional demand through the establishment of infrastructure based on joint utilisation and promotion of management and reduced demand for the establishment of infrastructure can be distributed to new investment and marginalised groups.

Impact:

The share of joint utilisation of equipment among total equipment went from 18% in 2009 to 65% in 2019. The improved access to research infrastructure promotes innovative and adventurous research.

Implementation:

The innovation ministry implemented the system by coordinating the roles of various stakeholders:

- Task 1: Research infrastructure information and reservation system were integrated into a single platform.
- Task 2: Linkage between Research Infrastructure Management System and Government System via Application Protocol Interface (API).
- Task 3: Providing information and online consulting on research infrastructure.

Relevant lessons for Slovenia

- An integrated implementing agency is key
- Communication is intense: ZEUS explains the system to more than 3000 researchers through more than 30 offline lectures each year. In 2015 and 2016, training courses were developed under the theme of national research infrastructure management targeting high-ranking policy officials.
- Use of local actors is crucial, ZEUS is implemented with 7 local authorities

Table 4 - Timeline Single RTDI Platform with SRIPs

Timeline for implementation – Month 0				
Activity	Timeline	Cost (high)	Cost (low)	Lead
Launch a call for SRIPs renewal	3 months for establishing the call criteria (business plan inc. legal entity, Private sector leadership, etc…) 3 months for leaving the call open	1 FTE Cost of each FTE role: 60K per year per FTE base (with performance-linked element)	1 FTE Cost of each role: 40K per year per FTE base (with performance-linked element)	MEDT

[56] For reference, see: https://www.zeus.go.kr/main

	6 months for conducting the evaluation with an international jury 3 months for contracting SRIPs	Plus, the cost of an international jury	Plus, the cost of an international jury	
Establishment of regional innovation coordinator role[57]	Coordination, budget and location decision ministries/ SPIRIT and Chamber of Commerce and Industry (3 months) Formation of job description (3 months) Recruitment and start up (3 months)	3-6 FTE Cost of each FTE role: 60K per year per FTE base (with performance-linked element) Cost of set up: 5K	3-6 FTE Cost of each role: 40K per year per FTE base (with performance-linked element) Cost of set up: 5K	Chamber of Commerce and Industry
Launching the process to establish the SRIPs platform	2 months for online consultation 3 months analysing challenges and elaborating the vision as well as final organisational structure 1 month constitution of the single platform for all SRIPs (start of operations) 6 months strategy, working plan and supporting documents	N/A	N/A	Regional Innovation Coordinators
Upgrading digital signposting and online resources	Constant, as part of regional innovation coordinator role.	TBD	TBD	Regional Innovation Coordinators

Some indicators which may be useful for the establishment of the platform can be found below: [58]

[57] See footnote 47.

[58] In addition to these recommendation and system-specific indicators, the monitoring and evaluation should contain complementary Economic indicators, for example: GDP per capita (in EUR), Exports in absolute figures (in EUR million), Share of exports in GDP (%), Exports per capita (in EUR million), Net revenue of SMEs from sales in foreign markets (in EUR), Exports to non-EU countries* (in EUR), State of inward FDI in GDP in Slovenia (in %), Number of exporters among Slovenian companies, Level of

Name and description of indicator	Type of indicator
Targets for regional innovation coordinator[59] ● For example, must have monthly network meetings, target for number of new connections, number of website hits etc, number of new products commercialised.	Performance KPI
Monitoring and evaluation of establishing a single platform for all SRIPs: ● SOP (start of project) + M1: Check on establishment of the working group of relevant stakeholders ● SOP (start of project) + M4: Check on analysing challenges and elaborating the vision as well as final organisational structure ● SOP (start of project) + M5: Check on constitution of the single platform for all SRIPs (start of operations) ● SOP (start of project) + M11: Check on strategy, working plan and supporting documents	Recommendation KPI

Slovenia's participation in Global Value Chains, Value of inward FDI (in EUR million), Mobility of students, Mobility of Researches, Mobility of experts in enterprises

[59] See footnote 47.

4.1.4 Recommendation - Build a monitoring and evaluation programme at both the systematic level and instrument level

Monitoring and evaluation (M&E) is essential in ensuring effective investments of public money. It is essential practice – required by European law – when involving EU funds.[60] Many EU Member States also have comprehensive and longstanding processes in place to facilitate for regular monitoring and evaluation, including of national RTDI programmes (e.g., the Nordic countries[61], Germany[62], Austria and Estonia[63]).

Monitoring and evaluation are the two (interlinked) processes required for assessing to what extent an intervention – designed to support RTDI – has fulfilled its objectives. Monitoring refers to the ongoing process, designed at the ex-ante stage of an intervention, and should be designed to continuously collect data at the project and/programme level. These data should allow for policymakers to track progress of implementation (e.g., the number of applications received vs applications granted funding, the level of funding disbursed, activities carried out, outputs produced). Evaluations are commissioned or carried out in-house to assess to what extent the intervention has performed in accordance with its objectives. Evaluations are based on monitoring data as well as other data and stakeholder opinions, hence the monitoring process plays a major role in evaluation culture since the data collected through monitoring is triangulated with other data collected during an evaluation.

Effective M&E should be designed to function at the systems level (e.g., agency or instrument portfolio level) as well as the instrument level (e.g., programme and project level). As such, M&E of RTDI is a challenging activity in need of investment and on-going commitment to improve. However, M&E is done at a high quality in many European countries, so there are good practice examples which can be adapted to the Slovenian context, and which can improve on the Slovenian efforts to date to build a monitoring system (e.g. the SICRIS information system[64]).

Without monitoring and evaluation data, policymakers are unable to systematically prove the effectiveness of the interventions for which they are responsible. They are also unable to design effective instruments since they lack the information of where and how support should be implemented to constitute the best value of public money. Monitoring and evaluation is useful for optimisation of policy actions. Evaluation, in particular, plays an essential role in the entire policy cycle, as it helps design and implement evidence-based policies and implementation. The goal of this is to increase the policy's accountability and transparency, highlight achievements towards policy objectives and assess the policies overall effectiveness, efficiency, results, and impacts.

[60] European Commission, *Impact assessment, evaluation and monitoring of EU research and innovation programmes* . Available at: https://ec.europa.eu/info/research-and-innovation/strategy/support-policy-making/shaping-eu-research-and-innovation-policy/evaluation-impact-assessment-and-monitoring_en

[61] Holm, 2007, Evaluation in the Nordic Countries.

[62] Struhkamp, 2007. Evaluation in Germany: An Overview

[63] Unpublished report for project 'strengthening the innovation ecosystem in Slovenia', 2021, Benchmarking Slovenia Against Advanced Practices, DG REFORM.

[64] See for reference: https://www.sicris.si/

The State of Play report produced as part of this study describes the current monitoring and evaluation system in Slovenia, which is focused on instrument reviews that are conducted as part of the evaluation process in ESIF-financed programmes. The State of Play report also addresses current shortcomings in the Slovenian M&E system. Its overarching conclusion is that the setting up of internal evaluation procedures for support instruments designed for RTDI would certainly improve their performance. Currently, there is a lack of comprehensive understanding of 'what works and how' with a possible exception of the activities of ARRS. The New Law foresees different types of evaluations.[65]

A recent (2020) academic paper on the evaluation of public policies in Slovenia also called for more systematically performed evaluations,[66] suggesting that current practices lack a clearly defined and practical evaluation process. The factors behind a lack of purpose and process were identified as missing human and financial resources alike.

There are several ways in which M&E strongly contributes to better design and implementation of instruments:

1. Better **transparency and accountability** when monitoring data are available to the policymakers responsible for an intervention. Improved transparency also positively impacts on accountability.
2. M&E **helps to identify problems encountered early**. These can then be mitigated more effectively and at a lower cost. For example, regular analysis of monitoring data of a RTDI instrument can help identify organisational, financial or behavioural bottlenecks in implementation and find solutions to address these.
3. M&E **improves decision-making**. Evaluations should provide evidence on how to avoid past mistakes, important success factors in the implementation of interventions. It is important to understand *why* and *how* a particular programme is successful. Success factors should then be carried over to new intervention designs.
4. M&E can help **to lower the administrative burden** through, for example, the standardisation of the data collected by RTDI performers' funding application. A concrete example of this can be found in Estonia, as described in the previously submitted Benchmarking report, where the funding agencies responsible for RTDI have worked to make the application process more homogenous in order to i) ensure RTDI performers become familiar with the application process for various grants, ii) helps to produce data for policymakers. Indeed, Slovenia has also developed an information system which can fulfil the same function (the aforementioned, SICRIS), as long as its content and services are perceived as useful and accessible by policymakers and research performers.

4.1.4.1 Action Plan

This recommendation should be implemented through the following activities:

- Appointing one staff member in MESS, MEDT, SPIRIT, ARRS and SEF to establish a dedicated joint implementation, monitoring and evaluation team (possibly within

[65] See Article 30- evaluation of research programmes and article 31- institutional self evaluation.

[66] Kotnik et al (2020) Analysis of the Key Factors for Successful Public Policy Implementation: A Qualitative Study in Slovenia. See https://www.researchgate.net/publication/343696707_Analysis_of_the_Key_Factors_for_Successful_Public_Policy_Implementation_A_Qualitative_Study_in_Slovenia

Programme Committee), in consultation with and supported by the Government Council for Science and Technology (new Development Council), that would look at the Monitoring and Evaluation design and implementation on a strategic policy level and monitor results and impacts of RRI activities. Individual M&E to be done at the level of line ministries.

- Developing a list of instruments that should be prioritised for review or a full evaluation in a Strategic Plan
- Agreeing on effective offline and online ways to periodically consult with stakeholders on the goals of the Strategic Plan
- Drafting a short-term Action Plan focused on the activities which are required in order to achieve the longer-term goals

As stated in the above section, the current problem in relation to M&E of RTDI in Slovenia is that the implementing bodies for support instruments do not have established procedures to collect in-depth data.

To address this problem, both a Strategic Plan and an Action Plan should be established. The former would aim to establish the longer-term needs for M&E, including what broader, systematic evaluations would be required in order to ensure that (the impacts of) high level RTDI policy is assessed. The long-term document would also set out the common goals of evaluation (e.g. *what do policymakers need to know and why in order to carry out their work effectively and improve RTDI performance*) and principles to adhere to (e.g *use of international peer review, commitment to exchanging good practice, training, investment, and to improving quality)*.

The Action Plan on the other hand, would focus on immediate and short-term needs for setting up a monitoring system, and how this needs to be designed to mutually benefit policymakers and RTDI performers alike.

It is of fundamental importance that both the Strategic Plan and Action Plan are designed as working documents so that, once their content has been agreed, can be actively used by the policymakers responsible for implementation. For example, this would entail that the:

Strategic Plan outlines a clear and timebound vision for what M&E should look like in the Slovenian innovation ecosystem, including what concrete goals are set, by when and who is responsible for these. This Plan is a clear example of a more strategic and long-term policy goal compared to other more "quick-wins" as discussed in this report. The milestones to be reached (e.g., number of evaluations and their themes) should be measurable so that progress can be gauged. The Strategic Plan should also tackle current shortcomings identified such as (e.g.): irregular, opaque or too limited stakeholder consultation activities, a lack of financial resources, and propose an improved approach to assigning peer reviewers to the evaluation of grant proposals. Inspiration from these can be found in the benchmarking report delivered under activity 3 of the project.

Action Plan focuses on the activities which are required in order to achieve the longer-term goals of the Strategic Plan and what the schedule is for these activities. Key Performance Indicators should be developed to measure progress, a number of which are suggested under other recommendations in this report.

The content and policy activities required for these two plans should also be aligned with the recommendation covered in section 3.1.2 (rationalisation and restructuring of roles and responsibilities). Any action plan established to address monitoring data would need to be designed with the objectives of:

- Bringing the relevant implementation bodies together to agree on the nature of the collaboration required for establishing an effective M&E system in Slovenia for RTDI (perhaps through a needs analysis).
- Developing suitable KPIs (key performance indicators) for which data should be collected *before*, *during* and *after* implementation of any intervention.
- Developing a mechanism through which these data (KPIs) should be collected and implementing this. For example, as suggested in the State of Play report, the structure of the existing database could be further improved with data already available in reports and official databases available in the country (AJPES, tax authority) as long as data interoperability and quality assurance is ensured.
- Ensuring personnel at the implementing bodies have access to relevant training.

The Strategic Plan should define long-term strategic objectives of M&E, principles and stable, long-term criteria. The Action Plan should include a list of instruments that should be prioritised for review or a full evaluation. It will be necessary to develop the methodology for reviews and select robust indicators (result and outcome) for each instrument that will be independent from any changes in data capture.

The methodologies envisaged should also combine the data on actual use (implementation) and consistent long-term and periodic inventories (e.g. every 2 years) with the census plots used for monitoring indicators. The number of plots should be determined as part of the overall structure of each innovation support instrument. Each innovation support instrument needs an established control group covering different areas/regions, sectors and levels of development of products/services or processes, in order to facilitate evaluation of the effects of that instrument by comparing the key parameters (e.g., revenues, number of employees) of the control group with the beneficiary group. **When designing the monitoring process, implementing bodies need to cooperate with those responsible for data collection and monitoring.**

Cooperation with stakeholders in the innovation ecosystem is highly important for establishing the sharing of information and development of the evaluation culture in the innovation ecosystem. **Effective ways of consulting with stakeholders ought to be included in the Strategic Plan too.** For example, the Slovenian Chamber of Commerce – along with other stakeholders – can gather intelligence and feedback on the perception of enterprises with regards to support measures and instruments, which can, and ought to, complement the monitoring data gathered.

Regular stakeholder consultations and consultations among RTDI funders will be needed to establish robust and useful M&E practices in Slovenia. Lessons learned can be drawn from Estonia, where the public funding agencies for RTDI have worked a long time to

develop strong evaluation practices[67]. Estonian research funders and ministries support multiple studies. Over the years these studies have become more relevant and effective in supporting the policy process as policymakers have developed more precise needs around the study designs and research questions to be addressed.

Enterprise Estonia regularly (on an annual basis) surveys and monitors entrepreneurs and businesses to understand their needs and behaviour. For example, surveys that ask about why a business is not investing in R&D consistently show the same conclusions, where the top reasons are the following:

1. The company has no previous history of R&D investment and has no habit to innovate.

2. The company lacks the knowhow (lack of R&D personnel).

3. The company is concerned about intellectual property.

4. The company does not know with whom to cooperate.

According to these surveys, financial concerns only arise as the number 5 or 6 reason. Hence, the reasons for a lack of R&D activities in many Estonian firms are due to behavioural reasons rather than financial ones. These kinds of findings are important to take into account when designing or reviewing support instruments.

Many Estonian studies on R&I are also impact assessments of current initiatives. Although the monitoring and evaluation system is rather advanced, improvements are still being made in particular to improve the consistency between monitoring and evaluation. For example, one particular challenge is to ensure that the ex-post assessments of programmes are carried out in time to feed into the next round of the policy cycle – the design of the follow up programme.

There is a scientific advisor in each ministry in the Estonian government, who together make up a network of advisors. They are aware of what the main current research topics are and, consequently, what questions to address when commissioning studies. This network of scientific advisors has been an effective forum, which the government is also working to improve further, through, among other things, ensuring that the advisors have access to the ministry budgets and can influence spending priorities.

These Estonian, and other good practices identified, ought to help to shape the Slovenian Strategic Plan and Action Plan. For example, a network of scientific advisors could support the Programme Committee and the newly established Development Council highlighted in another recommendation.

The Strategic and Action Plans should be developed in collaboration with MESS, MEDT and SPIRIT, ARRS and SEF (possibly within Programme Committee) and in consultation with new Development Council (for strategic advice) and international experts (providing advice and political troubleshooting) and by Slovenian RTDI performers.

The development of the Plans should take into account the Programme for Development of Innovation Ecosystem. They should be developed taking into account lessons learned

[67] Unpublished report for project 'strengthening the innovation ecosystem in Slovenia', 2021, Benchmarking Slovenia Against Advanced Practices, DG REFORM.

from ESIF monitoring and evaluation in Slovenia and interoperability with future ESIF M&E plans. Priority should be given for key instruments (not yet evaluated) and a plan for evaluating portfolios of instruments.

M&E responsibilities predominantly fall on the ministries and agencies in charge of funding RTDI. Close work with the Chamber of Commerce and Industry, who already consults stakeholders regularly about instruments and can provide input, as well as scientific advisors, is needed. The joint implementation, monitoring and evaluation team, is central to this recommendation. While the newly revised Development Council will be key to provide strategic advice.

Table 5 - Implementation of Monitoring and Evaluation reform

<table>
<tr><td colspan="5">Timeline for implementation – Month 0</td></tr>
<tr><td>Activity</td><td>Timeline</td><td colspan="2">Cost (high)</td><td>Cost (low)</td><td>Lead</td></tr>
<tr><td>Production of Strategic Plan (on Evaluation of policies effectiveness, efficiency, results and impacts)</td><td>Within 12 months with a 5-year horizon period

Strategic Plan: to be reviewed once per 3 years</td><td colspan="2" rowspan="4">An initial set-up of a comprehensive M&E system requires substantial resources. Once operational, a budget corresponding to 2-5% of the combined budgets of the main support instruments will suffice.

Financial savings can be made if M&E activities are implemented through effective and efficient public procurement competitions.

1 FTE in MESS, MEDT, SPIRIT ARRS and SEF .

Extra costs incurred:
• Training for staff
• Upgraded ICT infrastructure</td><td rowspan="4">Operationally could be done through Programme Committee , in consultation with newly revised Development Council</td></tr>
<tr><td>Production of Action Plan</td><td>Within 6 months as an operational document.

Action Plan to be reviewed every 12 months the first 2 years</td><td>Operationally could be done through Programme Committee, in consultation with newly revised Development Council</td></tr>
<tr><td>Set up of an international expert panel for advice on M&E</td><td>12 months</td><td>Operationally could be done through Programme Committee, in consultation with newly revised Development Council</td></tr>
<tr><td>Establish a dedicated joint implementation, monitoring and evaluation team (within Programme committee) for strategic policy evaluation needs</td><td>12 months</td><td>Operationally could be done through Programme Committee, in consultation with newly revised Development Council</td></tr>
</table>

Concrete milestones need to be articulated for the Strategic Plan and Action Plan alike. These should be allocated to each actor responsible for short, medium and long-term progress. Several recommendation-level indicators have been suggested in each recommendation, along with numerous other system-level and economy-level indicators.

4.2 Support Systems for piloting, demonstration and commercialisation

Support Systems are concrete resources, programmes, instruments, and tools available in the innovation ecosystem to help stakeholders implement their aims and the broader strategic goals of the Slovenian policy landscape. Specifically, this priority area focuses on support systems for piloting and demonstration and commercialisation and takes note of the need to further open up local innovation infrastructure in a clear and systematic way and stimulate internationalisation with growth in added value of industry. This is important to increase the efficiency of investments, maximise the synergies of programmes and instruments operating different stages of the innovation process. By adjusting the incentives for activity and effectively implementing them, cooperation between industry, academia and intermediaries can also be improved. During the course of analysis, the following key challenges have been identified for this priority area:

1) Systemic cooperation between industry, academia and intermediaries in the use of research and innovation infrastructure must improve. Inherent in this, is a need to find and engage with companies that are motivated and technologically ready to absorb the kind of knowledge being generated by research performers.
2) Taxation and voucher support for companies can be improved to stimulate R&D investment and internationalisation. Existing voucher and tax support is well-designed but suffers from low funds, administrative burden and fragmentation.
3) Consolidation of existing support and additional, targeted and complimentary support. This also includes supporting research institutes and universities to generate additional income from intellectual property. Slovenia has lots of strong sectors, including automotive and home appliances. However, these feature in the supplier value chain and there is a lack of Slovenian companies offering a final product on the market. Support for TRLs 4-6 remains critical, and proof of concept funds, although beginning to develop in Slovenia, must be rolled out in the most efficient way.

4.2.1 Recommendation – A new instrument (combination of instruments) for productive cooperation between science and business

There is a need to more systematically interconnect the industrial and academic sectors to boost knowledge and technology transfer and increase the level of high-tech knowledge in companies. This would facilitate a paradigm shift in strategies and development and industrialisation workflows.

In Slovenia there was in the past an Industrial PhD programme, which was designed in a way that individual PhD students solved specific problems encountered in the industrial environment while being supervised by academic institutions. The Industrial PhD programme could be renewed, with the need to ensure that previous organisational structures should be modernised in line with Danish best practices.[68] Or, alternatively a new instrument to allow for systematic tackling of contemporary societal challenges, centred around industrial challenges could be introduced. These industrial challenges call for a radically new product, large scale transitions to green and digital as well as for a holistic and cross-sectorial approach. This new instrument had the advantage of working more systematically than a single PhD student could. Even if embedded both in a research or higher education organization as well as in a company, industrial PhD students are not intended to deliver more than an incremental innovation in a specific isolated area. This has high value as an instrument but would not be enough to trigger the system-wide paradigm shift needed in Slovenia. As a mid-term recommendation, discovering logical combinations of different instruments (funding infrastructure combined with funding projects making use of the infrastructure and operational costs, etc) could also be considered.

The need for an additional environment has already been seen by several countries and regions. The EU has established the Marie Skłodowska-Curie Actions that cover doctoral networks (and only postdoctoral fellowships). The objective of Marie Skłodowska-Curie Actions Doctoral Networks is to implement doctoral programmes by partnerships of organisations from different sectors across Europe and beyond. This is done to train highly skilled doctoral candidates by stimulating their creativity, enhancing their innovation capacities and boosting their employability in the long-term. Specifically, Doctoral Networks are aimed at implementing doctoral programmes, by partnerships of universities, research institutions and infrastructures, businesses including SMEs, and other socio-economic actors. These doctoral programmes are responding to well-identified needs in various research and innovation areas. They expose the researchers to the academic and non-academic sectors, and offer research training, as well as transferable skills and competences relevant for innovation and long-term employability. Certainly, such a pan-European initiative is beyond financial resources as well as human resources capabilities of Slovenia. However, it clearly indicates that holistic approaches are the right path, unlike scattered individual approaches.

[68] A simple tried and tested procedure, as implemented by Denmark for many years, has a legal basis in Slovenia. For a description of the functioning of this system, please see: https://innovationsfonden.dk/sites/default/files/2019-07/guidelines-for-industrial-phd-06-07-2018.pdf

Multiple other countries have instruments that address these challenges and an Austrian instrument with a long and successful history, executed by Christian Doppler Research Association is recommended (https://www.cdg.ac.at/en/). The Christian Doppler Research Association (CDG) is namely considered a pioneer in Austria for successful cooperation between science and the private sector.

The form of cooperation funded by the CDG is usually via a research group, which elaborates fundamental knowledge that flows into the development of new products and processes at commercial partners. This generates a brisk exchange of knowledge, experience and questions between the partners.

The Christian Doppler Research Association performs three functions:

- Funding application-orientated research,
- Giving companies effective access to new knowledge
- Operating at the interface between business and science.

CDG is thus **committed to the use of scientific findings as the basis of knowledge for the development of innovative products and processes**, thereby inherently working in the area of efficient knowledge and technology transfer, which is critically missing in Slovenia.

The CDG thereby funds application-orientated scientific research in the environment of CD Laboratories. This very important instrument complements funding of pure basic research, which in Austria takes place through the Austrian Science Fund (FWF) (being similar to Slovene ARRS with some notable differences), and funding of Austrian Research Promotion Agency (FFG), which is the national funding agency for industrial research and development in Austria. With the CD Laboratories, the work is **positioned precisely at the interface of science and business and thus precisely in the area where Slovenia has gap of support systems**.

4.2.1.1 Action Plan

This recommendation should be implemented by the following activities:

- Commissioning a study to analyse suitability of the CD Laboratory instrument
- Appointment of MESS and MEDT as leads for policy development.
- Drafting a transfer plan by MESS and MEDT with guidelines and policy orientation from the Government Council for Science and Technology (new Development Council)
- SPIRIT/ ARRS consulting stakeholders to validate transferability plan
- Recruiting dedicated staff under collaborative SPIRIT/ ARRS undertaking to prepare the programme launch

Multiple elements in this section are taken from the original source[69] to convey the information most consistently and thus propose the action plan. In addition to adapting the CDG model, policymakers should also integrate best practices from schemes in

[69] See: https://www.cdg.ac.at/en/

Slovenia, such as the Young Researchers in the Economy Programme and the Young Researchers Training Programme.[70]

CDG features 3 financial instruments: CD Laboratories, JR Centres and Partnership in Research. For transference to Slovenia, it is recommended to first analyse and transfer **only the CD Laboratory instrument**, as this instrument is also the most important and influential instrument of the CDG, while transfer of other instruments might follow later.

In the subsequent text JR Centres will also be mentioned. This is complementary structure, although that the entire organisation might be leaner in Slovenia, when initially establishing **only CD Laboratories.**

CD Laboratories are established at universities and non-university research institutions. Important features are:

- Application-oriented research on a high level
- Integration into scientific environment of universities and non-university research institutions
- Maximum duration of seven years
- Rigorous scientific quality monitoring

The labs also have bottom-up orientation and should be organised as:

- Compact research groups (5-15 people)
- Key position of the Head of Laboratory
- Guaranteed scientific freedom for the scientists, keeping in mind, however, the needs of industry
- Joint financing by the public funds and companies
- Flexibility and relatively small organisational effort

In such an organisational form supported by clear guidelines and objectives CD Laboratories can deliver substantial progress in a broader field and support a paradigm shift in enterprises and thus substantially outperform scattered individual approaches on the level of a single PhD.

The CD model enables cooperation between science and business that are meaningful, useful and productive both for the participating partners and for society. The cooperation is generally structured as outlined in Figure 5.

Figure 5 - The structure of CD Lab cooperation

1) The research group elaborates fundamental knowledge that flows into the development of new products and processes at the commercial partner.
2) A brisk exchange of knowledge, experience and questions between the partners prevails throughout the collaboration. This type of research cooperation therefore differs fundamentally from contract research.

[70] Ana Arzensek, Katarina Kosmrlj and Nada Trunk Sirca, 2014, *Slovenian young researchers' motivation for knowledge transfer.* Available at: https://www.researchgate.net/publication/263285142_Slovenian_young_researchers'_motivation_for_knowledge_transfer

3) CD Laboratories keep the companies up to date with new scientific developments through their integration into the scientific community. They therefore also perform a 'radar function' for the commercial partners.
4) In order for this role to function optimally, the scientific freedom available in the CD Laboratories is of decisive importance: it enables the researchers to collaborate actively at the leading edge of research during the entire duration of the CD Laboratory.

For the commercial partners of a CD Laboratory, the attractiveness of the funding programme exists primarily in the following points:

- Building up basic knowledge
- Sustainable competitive advantages from the acceleration and deepening of innovation processes
- Strategic alliances with the world of science
- Attractiveness of the CD Laboratories from the perspective of the universities and research institutions
- Developing own or potential future human resources.

For the scientific partners – universities and research institutions – as hosts of CD Laboratories, the funding programme is particularly attractive for the following reasons:

- Excellent scientific research that has industrial relevance
- Funding the next generation of scientists in case few of the best choose to stay embedded in their organizations and not continue work in the industry.
- Close contact with research-intensive businesses

The **Goals and measures** of the CDG pursues business and socio-political objectives. It contributes to the building of a society in which people can develop their entrepreneurial and scientific skills.

The CDG achieves this goal by funding the joint research of companies and universities, universities of applied sciences and research institutions as the basis for future innovation. **Crucially in the Slovene context, both partners - science and business – would be indispensable and make equivalent contributions.** This is achieved by each lab through self-organised cooperation between science, business and national authorities for the joint development of each lab. Each partnership has its own distinct constitution agreed cooperatively by partners across the helix on a lab-by-lab basis. **Three principles underpin the success of the CDG's funding model**: Thematic openness, flexibility and integration into universities and public research institutions. These are essential when transferring the labs to the Slovenian context. Also important is the acknowledgement of the differences in size. A CD lab should bring together some 5-15 FTEs over a time of 7 years. Given the size of Slovenian R&D budget, such labs could be created only in highly strategic areas where there is industrial interest. A temptation to create more but weaker CDG should be avoided. Size is important to create impact.

Figure 6 - Essential elements to transfer to Slovenia

The first principle is that of thematic openness. The research programme of a CD Laboratory or a JR Centre is based on a research issue of a company and is processed jointly by science and business. Any and all topics that a company needs to research are important and allowed (bottom-up orientation). This is a very important fact that puts "thematic openness" in the appropriate context, as themes are "based on a research issue of a company and is processed jointly by science and business", which is another critically missing mean to achieve knowledge and technology transfer in Slovenia.

The second principle is flexibility. This applies both to the research units and to the organisational body itself. Thanks to this flexibility, the research units can react to new developments during their entire duration of existence, set up new modules, involve new commercial partners and adjust the budget - in other words, the CD Laboratories and JR Centres can "breathe". The CDG itself guarantees their flexibility through the direct involvement of companies and scientific partners in their ongoing processes and strategy development. In this way it can quickly react to the constant changes in research and innovation and further develop its funding programmes for the future.

The third principle is the integration of the research units: in the Austrian case, CD Laboratories and JR Centres do not have any legal personality, but are integrated into the university, university of applied sciences or research institution. In this way, they work in an ideal scientific environment, and the limited term can be easily implemented.

From the **organisational** point of view, the Christian Doppler Research Association is an association whose activities are determined and implemented by the General Assembly, the Executive Board, the Scientific Board and the General Secretariat. The research performed at the CD Laboratories and JR Centres is financed in the form of a **Public Private Partnership.** The CDG is a non-profit association and the members are companies active in research, that participate in CD Laboratories and/or JR Centres. Specifically, the corporate members are expected to enter into a long-term partnership with one or more research units and to be able to implement the knowledge gained there in new products or procedures. Within the scope of a Public Private Partnership arrangement, the companies jointly finance the research of the CD Laboratories and JR Centres with the Federal Ministry for Digital and Economic Affairs and the National Foundation for Research, Technology and Development, which would in Slovenia reflect Slovene the structure of ministries. In addition to performing its role as a funding institution, the CDG can also act as a cooperation platform, whereby the stakeholders themselves do the organising and further develop the funding model of the CDG together. The organisation structure of the CDG (of which the labs are just one instrument) can be found below.

Figure 7 - Organisational structure of the CDG

Representatives of the public sector, scientists and company representatives work together in the committees of the CDG. The **General Assembl**y appoints the **CDG Executive Board**. The CDG Executive Board ("Kuratorium") takes all decisions on matters of principle and structure that are not reserved for the General Assembly and is tasked with the management of the research association. It consists of up to 20 members from business and academia as well as representatives from the Federal Ministry for Digital and Economic Affairs, the Federal Ministry of Education, Science and Research and from sister institutions.

The CDG Executive Board appoints the **CDG Scientific Board** and takes all decisions with regard to research units and the membership of companies. The CDG Scientific Board ("Senat") is the scientific advisory committee of the CDG and ensures the quality of the research. It gives form to the scientific framework of the funding programmes, assesses applications for the establishment of CD Laboratories and JR Centres as well as applications for changes to existing research units. It also evaluates the progress of research in the context of interim evaluations. The CDG Scientific Board comprises around 45 highly qualified individuals and is responsible for CD Laboratories, the JR Scientific Board for JR Centres.

The **General Secretariat** of the CDG is a service facility for researchers, companies, public funding providers, committees and functionaries. It answers all questions on the funding programmes and supports the research units during their entire life cycle.

As outlined at the beginning of this section, the entire organisational structure should be leaner in Slovenia, when initially establishing only CD Laboratories. It is crucial to mobilise sufficient financial resources for funding such an instrument. One way of doing this would be to embed "industrial" PhD candidates with an existing and functioning and funded research group but add "industrial" element to them. Regardless, as recapitulated from the CDG strategy, it is crucial to engage all relevant stakeholders, which, as exposed above, comprise several ministries[71] and also companies which can ensure jointly ensure sufficient financial resources. A crucial partner in this regard would also be the technology transfer offices. In the Austrian context university tech transfer offices provide support to the labs, including administrative support, information and networking events.[72] Their role in the Slovene context should feature in the transferability assessment and be discussed in consultation with them.

The responsible actors in this case relate to the development of the instrument, rather than the functioning of it in the long-term.

Table 6 - Implementation of new instrument in Slovenia

Timeline for implementation – Month 0				
Activity	Timeline	Cost (high)	Cost (low)	Lead
Establishment of CD Lab-type instrument	1 months for establishment of the working group of relevant stakeholders 4 months analysing challenges and documents of the foreign association, e.g. CDG 4 months elaboration of a transference plan, fully	Initial capital investment of 5 million EUR to establish 20 labs under the new collaborative instrument in Slovenia over the next 10 years.	Initial capital investment of 2.5 million EUR to establish 10 labs under the new collaborative instrument in Slovenia over the next 10 years.	MEDT/MESS

[71] In the case of Slovenia, MESS should lead but coordinate with, MEDT, Ministry of Infrastructure, Ministry of the Environment and Spatial Planning, Ministry of Labour, Family, Social Affairs and Equal Opportunities, Ministry of Agriculture, Forestry and Food and Ministry of Finance.

[72] See, for reference: Vienna University Tech Transfer office website: https://transfer-nl.univie.ac.at/072018/

	adapting the CDG programme to the Slovene context 6 months preparing legal framework Acceptance of the legal framework and subsequent constitution are not elaborated in detail, as acceptance of the legal framework cannot be well defined in time			

Monitoring and evaluation is divided into long term monitoring and evaluation and monitoring and evaluation needed to finalise all preparatory documents including legal documents.

Name and description of indicator	Type of indicator
Monitoring and evaluation of establishing the instrument ▪ SOP (start of project) + M1: Check on establishment of the working group of relevant stakeholders. ▪ SOP (start of project) + M5: Check on analysing challenges and document of the foreign association, e.g. CDG ▪ SOP (start of project) + M9: Check on elaboration of the transference plan ▪ SOP (start of project) + M15: Check on the preparatory status of the legal framework	Recommendation KPI
Specific measurable short term KPIs are recommended to be: ● Number of established Laboratories (i.e. Like CD Laboratories), Number of PhDs trained, Number of academic achievement of Laboratory members (paper, patents, citations….), Number of new products at industrial partners, Specific measurable long term KPIs that are reported by industrial partners are recommended to be:	Recommendation KPI

● Increased income due to results generated in the Laboratories, which make possible evaluation of the multiplication effect of R&D funds through incomes on the market.	
As outlined above, it is beneficial to monitor indicators that are directly applicable to the activity of CD laboratories and thus to the responsible association/agency. They should cover the following topics: ● Increases in application-oriented basic research ● Strengthening the university and public research organisation level ● Private sector-innovation and competitiveness ● Transfer of knowledge and technology between the scientific partners and companies ● Indicators measuring the structure of the national innovation system (e.g. number and value of patents)	System-level indicators

4.2.2 Recommendation - Voucher expansion and modernisation of R&D tax support.

Innovation vouchers are small grants intended to catalyse the formation of longer-term relationships and aim to address market and system failures. SMEs tend to lack leading-edge knowledge and relationships with public sector research and the research institutes and HEIs often have difficulties finding users of their research.[73] Vouchers have many advantages, not least the low-administrative costs for companies.

The Programme for the Development of the Innovation Ecosystem outlined under the 'Supporting businesses in establishing and strengthening international cooperation and exchanges' pillar that support through vouchers of at least two expert conferences per year to promote technological developments was needed. The Internationalisation strategy 2015-2020 also introduced the concept of an E-voucher to stimulate companies to seek new business opportunities. In 2020/21, four internationalisation vouchers were administered by SPIRIT, in cooperation with the regional development agencies.[74]

- Expert market research voucher, up to 5000 euro which can only be used once. This voucher was popular, and the maximum amount was used in many cases.
- Attending a fair abroad voucher. SMEs were only eligible to attend fairs abroad with their presence organised by SPIRIT Slovenia. This voucher was underutilised.
- International forums voucher. This voucher was underutilised.
- Business delegations' voucher for delegations organised by SPIRIT. Eligibility included specific industries. This voucher was underutilised.

The most popular of these four internalisation vouchers was the expert market research voucher. The key element in the success of voucher schemes is in the capability of actors to recognise the benefits of interaction to alter the long-term attitude of SMEs towards R&D and innovation. For the other vouchers, eligibility conditions for the business delegations and fair abroad vouchers (only attending those organised by SPIRIT) were cited as reasons for the lower uptake of these vouchers. The popularity of a voucher is not necessarily indicative of its effect on the beneficiary, but it is indicative of the ease of application process, administration capabilities of the agency, eligibility restrictions and how well the purpose of the voucher was understood by target recipients.

In addition to vouchers, one further option for Slovenia to stimulate increased R&D spending and participation of high-growth potential SMEs in the innovation system would be an adjustment of the current R&D tax incentives. In 2018, SMEs accounted for 87% of R&D tax relief recipients, while in 2020, SMEs accounted for around 32%. While 2008-2018 saw the number of R&D tax relief recipients increase in Slovenia, with a peak in 2015, the number of R&D tax relief recipients has since declined back to 2008 levels.[75] This decline must be contextualised with information provided by MEDT regarding an improvement in

[73] The innovation policy platform, *Innovation Vouchers*. Available at: http://www.innovationpolicyplatform.org/www.innovationpolicyplatform.org/content/innovation-vouchers/index.html

[74] INTERREG Europe, 2014, Good practice: Voucher Opportunities of Internationalization. Available at: https://www.interregeurope.eu/policylearning/good-practices/item/1515/voucher-opportunities-of-internationalization/

[75] OECD, 2021, *R&D Tax Incentives: Slovenia, 2020*, Available at: www.oecd.org/sti/rd-tax-statsslovenia.pdf

the monitoring system for companies utilising the tax relief and subsequently the decline was related to companies incorrectly using the tax relief. Slovenia increased its tax relief in 2012 but a Deloitte 2015 report notes that companies in Slovenia view R&D costs as necessary costs of business. Consequently, they did not reconsider their level of R&D spending based on the 2012 increase.[76] This suggests the current tool is not sufficiently tailored to specific R&D activities.

While research on the precise policy mix is dependent on particular country contexts, SMEs' internal funding capacity has been found to positively influence the level of R&D expenditure. Research in 2017 concluded that SMEs with high profit margins spend 14% more on R&D than businesses with medium profit margins.[77] A 2019 review of R&D policies by Stanford University economist Nicholas Bloom suggests that a 10 percent reduction in the tax cost of R&D spending translates to a 10 percent long-run increase in R&D.[78] A 2020 study from the OECD found that, across countries, industries and firms of different sizes, 1 unit of R&D tax support is associated with around 1.4 units of R&D investment.[79]

4.2.2.1 Action Plan

This recommendation necessitates the following implementation actions:

- Re-programming the current prototyping voucher, delivered by the Slovene Enterprise Fund, to increase its maximum size to 15K
- Introducing a 50% co-financed two-step voucher for piloting, demonstration and export innovation
- Commissioning a review of differentiated tax credit, R&D wage tax exemption and patent boxes, including stakeholder consultation

The outcome of the analysis indicates that two implementation actions on the side of vouchers would strengthen the innovation ecosystem in Slovenia. The first is **to re-programme the current prototyping voucher, delivered by the Slovene Enterprise Fund, to increase its maximum size to 15K[80].** In addition to this, the eligible participants should be broadened beyond micro enterprises to include SMEs. Conditional upon the larger amount should be better integration of SIOs into the process as coaches. For example, ahead of the increased voucher size, SIOs would be required to submit a plan for more intense preparatory coaching and networking activities with beneficiaries.

[76] Deloitte, 2015, *Slovenia Corporate R&D Report 2015*. Available at: https://www2.deloitte.com/content/dam/Deloitte/si/Documents/tax/Slovenia.pdf

[77] KfW Research, December 2017, *Research and development (R&D) in SMEs: internal funding capacity determines scope of R&D expenditure*. Available at: https://www.kfw.de/PDF/Download-Center/Konzernthemen/Research/PDF-Dokumente-Fokus-Volkswirtschaft/Fokus-englische-Dateien/Fokus-2017-EN/Focus-No.-190-December-2017-R-D-in-SMEs.pdf

[78] OECD, 2002, Tax Incentives for Research and Development: Trends and Issues. Available at:https://www.oecd.org/science/inno/2498389.pdf

[79] Silvia Appelt, Matej Bajgar, Chiara Criscuolo, Fernando Galindo-Rueda, October 20202, Effectiveness of R&D tax incentives in OECD economies. Available at: https://voxeu.org/article/effectiveness-rd-tax-incentives-oecd-economies

[80] The only way to effectively increase the value of vouchers is with the support of Ministry of Finance and by amending the law stating the maximum value of vouchers (that are meant as small-value support of startups). This can be accomplished without necessarily changing the overall budget dedicated to this but by simply decreasing the number of end recipients (higher-value vouchers, lower number of recipients).

The second is the introduction of a 50% co-financed two-step voucher for piloting, demonstration and export innovation.[81] This voucher would combine several best practices, including the Polish Małopolska "Vouchers for success" programme, Portuguese national[82] and regional vouchers and Italian[83] internationalization voucher best practices. It would also incorporate the lessons learned from existing SPIRIT vouchers, including the existing vouchers for internationalisation and the national demo centre concept, piloted by TECOS/ SRIP Factories of the Future (FoF) in 2021 called the High Impact Action (HIA) for Industrial Transition. The action is simple, tested and easily upscaled. The voucher would therefore be organised as a form a cascading funding at the level of the SRIPs, as has been shown with the recent national demo centre concept pilot, outlined in Figure 9 below.

For both vouchers, it is important that the **administrative burden falls on public institutions as much as possible**. They are used to the administrative work and have dedicated staff and resources. As noted in the State of Play report, other vouchers, such as the intellectual property protection voucher, prototyping voucher, digitalisation strategy voucher and digital marketing voucher are well-regarded. However, a pre-requisite for the success of future voucher schemes in Slovenia is to increase the flexibility with which recipients can execute projects under the vouchers. This is to be achieved through establishing a systematic and instrument-level monitoring and evaluation system, an action plan for which has been outlined in an earlier recommendation. This system would minimise risks and mean individual activities under vouchers can be more dynamic. Furthermore, to improve the efficiency of the instrument, the SIO network should be involved in validating the project idea and shadowing the applicant in the whole process of the prototype development.

Figure 8 - National Demonstration Centre Pilot 2021[84]

The High Impact Action pilot program is implemented by MEDT, TECOS and SRIP FOF.

In order to have pilots and start-ups in the area of Factories of the future, there is a need for proper infrastructure, which will enable innovation and demonstration of new technologies. This requires proper investment.

The program offered EUR 50,000 at 50% Co-funding for 5 SMEs to develop new solutions, together with pre-certified solution providers.

Assessment of applications by international group of experts from Belgium, Spain, Croatia and Slovenia. Each application was evaluated by 2 experts.

Used a mechanism of a physical and virtual platform for piloting and demonstrating modular and reconfigurable cells across various industries.

The platform serves as the channel for public support to technology development and deployment (mainly piloting and demonstration activities), education for industry, as well as networking, matchmaking and information diffusion.

[81] On a related note, this report recommends continuing the existing SPIRIT expert market research voucher at the same level of 5k, while in parallel introducing the new regional innovation voucher scheme for piloting, demonstration, and internationalisation.

[82] European Commission, 2020, I*ncentives System for Internationalisation of SMEs: Portugal Sistema de Incentivos Internacionalização das PME*. Available at: https://ec.europa.eu/growth/tools-databases/regional-innovation-monitor/support-measure/incentives-system-internationalisation-smes-2

[83] Invitalia: The development Agency, 2020, *Internationalisation Voucher*. Available at: https://www.invitalia.it/cosa-facciamo/rafforziamo-le-imprese/voucher-internazionalizzazione/normativa

[84] TECOS, 2021, *Final Report for National Demonstration Centre Pilot*, unpublished.

Monitoring purposes via monthly meetings with all companies. The SMEs are also monitored via provision of cost sheet, proof of contracts, invoices and proof of invoices paid. Recipient SMEs were required to report twice.

Scaling up HIA is a clear path forward, or the combination of HIA and IJS experience.

Demo centre should be driven by a private sector organisation or business-driven cluster.

Before the deployment of an international group of experts, as outlined in the case of the Demo Centre Pilot above, the new proposed voucher would first require the use of local networks to validate the project idea and coach applicants. This is supported by experiences internationally and within Slovenia. For example, the Polish regional Małopolska voucher, which allows SMEs to get expert advice on ICT, the first step triggers a comprehensive diagnosis of the applicant's need by the Małopolska Regional Development Agency. As a result, the scope of the services needed is specified and the applicant can submit a full application which eventually leads to the signature of a grant agreement. Similarly, the Slovene Enterprise Fund Cyber voucher requests that SMEs get a pre-approval of their application by the local Digital Hub. This provides a guarantee the quality of the application but also to increase the outreach of the Digital Hubs in the SME community.[85] This local network validation and coaching element should be integrated into all existing SPIRIT vouchers, including the proposed voucher for piloting, demonstration and export innovation. In this case, the local network validation could come via a SRIP or an SIO.

Following initial validation of the idea, regional innovation actors should perform a coaching role for the application. This would include, for example, explaining concepts such as the differences between piloting and demonstration (Figure 10). However, the coaching should be flexible and needs should be agreed with the beneficiary, a certain number of contact hours may be appropriate more than a specific curriculum. During the implementation of the project, they would also act as brokers for SMEs to access local infrastructure. This first stage could last for 9 months, after which the regional innovation actor assesses the idea's progress and if this is positive the SME can advance to the internationalisation step of the voucher, which could last another 6 months.

Figure 9 - Difference between pilot and demonstration projects [86]

Pilot projects concern an early phase of the development and test the technical feasibility of a given technology to obtain previously unavailable findings concerning its practical application. As a rule, pilot facilities portray sub-systems and are used for examining specific technological or scientific issues.

Demonstration projects also focus on technological developments but at a more advanced stage and at actual scale. They also involve studies concerning economic, social and regulatory

[85] INTERREG Europe , April 2021, *Vouchers for the competitiveness of SMEs*, policy brief. Available at: https://www.interregeurope.eu/fileadmin/user_upload/plp_uploads/policy_briefs/TO3_Policy_Brief_Vouchers_for_the_competitiveness_of_SMEs.pdf

[86] Swiss Federal Office of Energy, 27.08.2020, *Pilot and Demonstration programme*. Available at: https://www.bfe.admin.ch/bfe/en/home/research-and-cleantech/pilot-and-demonstration-programme.html#accordion1627995262253

aspects and facilitates support answering questions such as system integration, economic viability and marketability.

For stage two of the voucher, the **underutilised elements of existing SPIRIT Internationalisation vouchers (fair abroad voucher, international forums, business delegations) would be integrated** into a broader set of internationally facing instruments and combined with more tailored coaching to ensure SMEs fully understand their value. Importantly, the eligibility restrictions for these elements (SPIRIT-organised trips) would be replaced by closer coordination between SIOs, SPIRIT and the beneficiaries. Here, a specific meeting would also be required with the Chamber of Commerce and Industry, which already conducts support services for companies internationally. The Chamber would be listed as a preferred partner for certain activities. The practices of Portuguese and Italian internationalisation vouchers have been used to construct a tentative list of eligible costs which can be used to procure the services of a TEM (Temporary Export Manager) for micro and small enterprises that aim at foreign markets.

- Analysis and research on foreign markets;
- Identification and acquisition of new customers;
- Assistance in contracts for internationalisation;
- Advanced management of logistic flows.
- Development and promotion of brands internationally;
- Prospecting and presence in international markets;
- International marketing;
- New methodologies in business practices and external relations;
- Certifications for foreign markets;

The size of the vouchers could be 30K euro for stage one (piloting/ demonstration) and 15K euros for stage 2. It would be co-financed at a rate of 50% with the beneficiary for piloting and demonstration, as the Demo Centre Pilot from 2021 was. One option may be to decrease the level of co-financing to 25% for stage two, since the overall size of the second stage is smaller and the services have a different focus. One further option, from the Italian example, is a performance-related bonus of 5K euro if there is an increase in the volume of sales abroad of at least 15% in year 2. A summary of the process can be seen in Figure 10 below.

Figure 10 - Two-step voucher programme

Regarding R&D Tax Incentives, **Slovenia currently has one of several incentives** widely used by OECD countries, an R&D tax allowance. This allowance calculates an R&D deduction on overall tax liability of a company, combined with a carry-forward option of maximum five years. The relief amount is 100% for both SMEs and large companies and from 2020 there is a 63% ceiling for claims.[87] In terms of how generous the tax allowance system is, Slovenia is ranked 11th among OECD countries for large firms by the Tax Foundation, which is above average.[88]

However, a significant number of other OECD countries combine tax allowances with other R&D tax support. The main elements that Slovenia does not have at present are an R&D patent box and an R&D Tax Credit system:

- **R&D patent boxes** are a profit-based tax incentive for innovations and apply a reduced corporate tax rate to profits from patents and similar intellectual property.
- **R&D tax credits**[89] perform essentially the same function as an allowance; however, the amount is directly credited off R&D expenses incurred by a firm, rather than applied to the overall tax liability which may be more substantial for more successful companies

The case for credits is that they are more visible to those responsible for R&D spending within a company and more likely to encourage additional R&D investments. Having said this, according to the OECD, smaller firms may not have significant tax liabilities and so may benefit more from tax allowances, which lower their taxable income.[90] To encourage SMEs and smaller firms to use R&D tax incentives to increase R&D spending, national authorities should explore the following options, which may be combined:

[87] Ceilings for claims may limit the amount of qualifying R&D expenditure or value of tax relief. Source: OECD, December 2020, *OECD Compendium of information on R&D Tax Incentives*.

Available at: https://www.oecd.org/sti/rd-tax-stats-compendium.pdf

[88] Daniel Bunn, March 2021, *Tax Subsidies for R&D Spending and Patent Boxes in OECD Countries*, Tax Foundation. Available at: https://files.taxfoundation.org/20210315164148/Tax-Subsidies-for-RD-Spending-and-Patent-Boxes-in-OECD-Countries.pdf

[89] This is an example of a clear long-term, more strategic proposal which will need to be further elaborated before being put in practice.

[90] OECD, 2002, Tax Incentives for Research and Development: Trends and Issues. Available at: https://www.oecd.org/science/inno/2498389.pdf

- **Introducing an R&D tax credits system**[91] in Slovenia, which is refundable. This refundable approach is a feature of EU and non-EU countries, such as Canada.[92] Innovative firms are not likely to make profits in the first years of operation. Refundable tax credits are of more use to young firms or SMEs, who may be without taxable income but still undertaking R&D activities with innovation potential.
- **Introducing tax credits as a partial wage tax exemption**[93] for researchers, as is employed in Belgium (Figure 11 below). This would also allow national authorities to target specific industrial sectors where Slovenia performance is lower than the EU average. For example, knowledge-intensive exports in the European Innovation Scoreboard (financial services, telecommunications, computer, and information services) and where Slovenian regulations are making the work uncompetitive due to high levels of taxation.

Figure 11 - 2020 Wage Tax Exemption in Belgium[94]

Since January 1, 2018, qualifying master's degree or PhDs in specific domains such as applied sciences, medical science, veterinary medical science and civil engineering can claim a partial wage tax exemption of up to 80% of the wage tax by 2020. This partial wage tax exemption also exists for researchers having a bachelor's degree in specific domains such as biotech, industrial sciences, technology and computer science.

This partial exemption of the wage tax for researchers having a bachelor's degree is capped at 25% of the total amount of the partial exemption of wage tax granted for researchers having a master's degree or a PhD. The limit of 25% is doubled for SMEs.

- **Applying a differentiated R&D incentive system**,[95] with a preferential tax allowance system for SMEs and a tax credit system for larger companies. This would create more targeted R&D tax support, tailored to the needs of the different sizes of innovative companies. Generally speaking, tax allowances have lower administrative costs for businesses to use and so may be more suited for SMEs and micro-enterprises.
- **Introducing a differentiated tax allowance system,** with different rates for SMEs and large companies and different rates for varying activities. For example, raising the level of super deduction for SMEs from 100% to between 130-200%. Globally, there is a trend towards increasing tax incentives to encourage companies to invest in research and development. The UK has just announced an increase of its tax super deduction to 130% capital allowances on qualifying plant and machinery investments.[96] The Slovak Republic has the most competitive tax allowance system

[91] See footnote 81.

[92] OECD, 2002, Tax Incentives for Research and Development: Trends and Issues. Available at: https://www.oecd.org/science/inno/2498389.pdf

[93] See footnote 81.

[94] Osbourne Clark, April 2018, *Extension of wage tax exemption for R&D activities in Belgium*. Available at: h\ttps://www.osborneclarke.com/insights/extension-of-wage-tax-exemption-for-rd-activities-in-belgium/

[95] See footnote 81.

[96] Department for Business, Energy and Industrial Strategy, July 2021, *UK Innovation Strategy: Leading the future by creating it.* Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1005000/uk-innovation-strategy.pdf

in the OECD, with a 200% deduction on taxable income and differentiated volume-based rate for SMEs and large firms conducting research projects.[97]

- **The introduction of an R&D patent box system**, which could target key industrial sectors or, alternatively, create a level playing field for all. The patent box incentivises companies to produce more patentable innovations and other intellectual property or earn more profits from patents and other intellectual property. They apply a reduced corporate tax rate to profits from patents and similar intellectual property. Charges for the use or selling of intellectual property was one of the key areas of the European Innovation Scoreboard where Slovenia performed poorly. The lowest patent box rate is in Belgium, which provides an 85 percent deduction for income related to eligible IP. The country with the highest patent box rate is Italy, which provides an exemption for 50 percent of qualifying IP income.[98] A recent and very thorough study in the United Kingdom concluded that Patent Box users increased R&D investment by around 10% more than non-users.[99] Designing a modern patent box regime for Slovenia would support companies to increase the volume of patents and IPR in the country. It could also include cultural and other creative sectors perhaps in a way that would stimulate the collaboration with traditional industries in areas such as marketing, design, and the creation of products with "status" or "meaning".

Table 7 - Implementation of voucher and R&D tax incentive expansion

Timeline for implementation – Month 0				
Activity	Timeline	Cost (high)	Cost (low)	Lead
Expansion of prototyping voucher scheme	Rolled into regular programming period of existing voucher	No extra human resource costs, only extra cost of higher value voucher.	No extra human resource costs, only extra cost of higher value voucher.	SEF
Expansion of R&D tax incentives scheme[100]	Discussion and coordination at ministry level, preparation of legal assessments for options (3 months)	A recent estimate of the UKs patent box regime indicates that it costs 1.3 billion EUR per year.[101] Adjusting for the Slovene case, a high-level costing could be in the range of 50-150 million EUR per year for the patent box. A recent estimate of the UKs R&D tax credits system indicates that it costs 8.6 billion EUR		MEDT

[97] OECD, December 2020, *OECD Compendium of information on R&D Tax Incentives.*
Available at: https://www.oecd.org/sti/rd-tax-stats-compendium.pdf

[98] Daniel Bunn, March 2021, *Tax Subsidies for R&D Spending and Patent Boxes in OECD Countries*, Tax Foundation. Available at: https://files.taxfoundation.org/20210315164148/Tax-Subsidies-for-RD-Spending-and-Patent-Boxes-in-OECD-Countries.pdf

[99] David Connell, May 2021, *Is the UK's flagship industrial policy a costly failure?* Cambridge Judge Business School. Available at: https://www.jbs.cam.ac.uk/wp-content/uploads/2021/05/cbr-report-uk-flagship-industrial-policy-2021.pdf

[100] International best practices indicate that the final policy mix must have a fixed design and rates for at least 5 years. Furthermore, routine (annual or bi-annual) public consultations are needed to help national authorities to acquire the information necessary for an effective design and organization of tax incentives.

[101] David Connell, May 2021, *Is the UK's flagship industrial policy a costly failure?* Cambridge Judge Business School. Available at: https://www.jbs.cam.ac.uk/wp-content/uploads/2021/05/cbr-report-uk-flagship-industrial-policy-2021.pdf

	Structured online consultation with stakeholders (3 months) Decision on policy mix (6 months)	per year.[102] Applying the same high-level costing and taking into account the existence of the tax allowance system in Slovenia, a credit system could cost between 150-450 million EUR.		
Two-step cascading voucher for piloting, demonstration and export innovation	Fast rollout of pilot scheme – 12 months Evaluation of pilot scheme, policy adjustment and preparation of calls - 6 months Publication of calls for proposals for cascading voucher funding by – 1 months.	0.5 FTE per SRIP to implement cascading voucher 0.5 FTE in Chamber of Commerce 0.5 FTE in SIO 1 FTE in funding body (SPIRIT) 1 FTE in policy body (MEDT) Total 3.5 FTE	0.3 FTE per SRIP to implement cascading voucher 0.3 FTE in Chamber of Commerce 0.3 FTE in SIO 0.5 FTE in funding body (would recommend SPIRIT) 0.5 FTE in policy body (MEDT) Total 1.9 FTE	SPIRIT

Some indicators which may be useful for the establishment of the platform can be found below: [103]

Name and description of indicator	Type of indicator
Estimate of rate of return (For each Eur in R&D tax, how much is invested for firms of different sizes. According to evaluation best practices (regression analysis).	Recommendation KPI
Number of firms using R&D tax incentives, of which micro-enterprises, SMEs, large companies	Recommendation KPI
Age profiles of companies using incentives.[104]	Recommendation KPI
Charges for the use of intellectual property (via patent box)	Recommendation KPI

[102] *ibid*

[103] In addition to these recommendation and system-specific indicators, the monitoring and evaluation should contain complementary Economic indicators, for example: GDP per capita (in EUR), Exports in absolute figures (in EUR million), Share of exports in GDP (%), Exports per capita (in EUR million), Net revenue of SMEs from sales in foreign markets (in EUR), Exports to non-EU countries* (in EUR), State of inward FDI in GDP in Slovenia (in %), Number of exporters among Slovenian companies, Level of Slovenia's participation in Global Value Chains, Value of inward FDI (in EUR million), Mobility of students, Mobility of Researches, Mobility of experts in enterprises

[104] European Commission, WORKING PAPER N. 52 – 2014, *A Study on R&D Tax Incentives Final report*. Available at: https://ec.europa.eu/futurium/en/system/files/ged/28-taxud-study_on_rnd_tax_incentives_-_2014.pdf

Net revenue of SMEs from sales in foreign markets (new voucher only)	Recommendation KPI
Number of all companies supported (both vouchers)	Recommendation KPI
Number of SMEs supported (both vouchers)	Recommendation KPI
Number of SMEs benefitting from networking opportunities and technological solutions (both vouchers)	Recommendation KPI
Number of SMEs signing contracts or negotiating partnerships with investors (both vouchers)	Recommendation KPI
Number of products commercialised (both vouchers)	Recommendation KPI
Number of companies planning to build pilot lines or new production lines (both vouchers)	Recommendation KPI
Size of total investment in pilot of production lines (both vouchers)	Recommendation KPI
Number of jobs created (both vouchers)	Recommendation KPI

4.2.3 Recommendation – Stabilise the Technology Transfer landscape and include a proof-of-concept funding mechanism.

The interviews undertaken to build the recommendations indicated that one clear task was to **further integrate the work of technology transfer intermediaries into the research and innovation landscape by upgrading the professionalisation of the services provided.** The State of Play report found that some TTOs and incubators are successful and overall, well positioned, but further development of their systemic role in the system is needed. Despite their proximity to some intermediary institutions (TTOs), education and research institutions still have a focus on public calls for proposals, rather than business models for commercialisation. Stabilising the technology transfer landscape and encouraging more local collaborations with intermediary institutions (SRIPs, SIOs, incubators) and the industrial system (SMEs) through targeted support and financial incentives, is crucial.

Between 2017 and 2022, EUR 6 million was made available via MESS to support the activities of Technology Transfer Offices (TTOs).[105] This was done via the KTT project, with 8 partners spending 80% of the finances on human resources.[106] This helped to forge a network of TTOs in Slovenia which should be preserved but also improved in terms of impact. In order to achieve this report recommends the following:

- Stabilisation of KTT funding through performance-linked but not project-based public funds, delivered by MESS over the next 5-year period. This should be delivered with interim (2 year) evaluations and a further 5 years follow on budget. By removing the project element to existing TTO funding, reporting costs could be lower and further financing available for core TTO activities. This is with a view to reducing human resource costs from 80% to 60% with 40% devoted to patenting activities. This is more in line with academic literature analysing TTO cost breakdowns in other systems, such as the United States.[107]

- A separate, pilot scheme, launched by MEDT in close cooperation with MESS, to make competitive funding available for technology transfer to local innovation actors (e.g. intermediary and support services, industrial system actors). This must be on a competitive call basis and may include a cascading proof-of-concept funding component. This has been done in other systems, for example via the UK University Enterprise Zones, which provided four TTOs and collaborators with EUR 11,75 million Euros in a pilot scheme in 2015 and announced a further 25 million Euro investment for 20 TTOs in 2019.[108] A similar competitive pilot scheme should

[105] European Commission, 2017, *RIO Country Report 2017: Slovenia*, Joint Research Centre.

[106] Špela Stres, Levin Pal, 2020, *A decade of Knowledge Transfer in Slovenia.* Available at: http://ittc.ijs.si/13ittc/wp-content/uploads/2020/10/A-decade-of-knowledge-transfer-in-Slovenia_StresPal_final_PDF.pdf

[107] Irene Abrams, 2008, *Is it all about the money? How are US Academic Licensing Offices Tasked and Motivated?*. Available at: https://www.wpi.edu/sites/default/files/docs/Offices/Intellectual-Property/How_are_US_Academic_Licensing_Offices_Organized_Tasked_Financed_and_Motivated_--_Final.pdf

[108] For reference, see: https://re.ukri.org/knowledge-exchange/university-enterprise-zones/ The interim evaluation of this programme is available at https://re.ukri.org/documents/2021/interim-evaluation-of-the-red-uez/

be implemented in Slovenia. The suggested aims of this pilot scheme can be found below.

Figure 12 - Example aims of Competitive Technology Transfer Pilot

1) To ensure that RTDI infrastructure is future-proofed. One of the focus areas could be identifying how common, interoperable digital tools and platforms, as well as physical testing and innovation spaces can be brought together to form a digital and physical shared infrastructure for innovators. Examples of these include digital twins,[109] simulation and emulation tools, synthetic environments, test beds and living labs. Supporting and enabling this shared infrastructure will help remove time, cost and risk from the process of bringing innovation to market.

2) To upgrade Technology Transfer and tailor it more to the local landscape. For the pilot call, it is important that the delivery models outlined by MEDT are not too prescriptive. The call should therefore be structured in such a way as to allow local actors to propose a package which may include:
    a. Local collaborative projects (e.g. with SRIPs, Chambers, SMEs, local development agencies)
    b. A realistic offer of both workspace and links to university researchers and facilities, the precise type of space offered varies (it could be lab space or office provision across different buildings.)
    c. A sectoral focus could also be proposed (e.g. mobility)
    d. Procurement of specialist business space managers or use of existing TTO/ incubator staff.

2) To deliver a proof-of-concept funding option to innovative ideas on a local level. The fund can target specific sectors, and justification of this should be laid down in the proposal submitted by the local innovation actors.

Funding of proof-of-concept

Stakeholders in the Slovenian innovation ecosystem were largely content with the range of current instruments available for the ecosystem; however, the State of Play analysis has revealed that there is one area where Slovenia is missing a key element. This is emphasised by the popularity of the 2019 OIS-AIR Proof of Concept Call by INTERREG Adriatic-Ionian region, focused on Transport & Mobility, Energy & Environment, Agro-Bioeconomy. In this call, researchers based in Slovenia were awarded 4 out of 10 of the grants, with 15 overall applications.[110] In terms of ERC Proof-of-Concept applications, Slovenia has had 2 proof of concept winners since 2014 out of 3 proposals evaluated, giving it the highest conversion rate of any EU member state.[111] When looking at the portfolio of support offered by public grants in Slovenia, Proof-of-Concept is a missing link in the pipeline. There is therefore a

[109] Digital twinning has already featured in some research projects in Slovenia, for example the GOSTOP project, concluded in 2020: https://www.gov.si/assets/ministrstva/MIZS/Dokumenti/ZNANOST/Strukturci/GOSTOP-Report.pdf

[110] INTGERREG Adrion, 2020, *OISAIR PROJECT- Open Innovation System of the Adriatic-Ionian Region PROOF OF CONCEPT CALL FINAL RANKING.* Available at: https://www.oisair.net/uploads/news-attachs/ZJgr-8H_K6t3Aw8JTRWZ5IGS8MPop2aI.pdf

[111] Only researchers who have been in receipt of another ERC main grant can apply for the Proof of Concept. Non-EU member states are also eligible to apply, and Iceland is the only one that has a 100% conversion rate but has only ever submitted one application (in 2014). For reference see: https://erc.europa.eu/projects-figures/statistics

clear requirement and demand for Proof-of-Concept funding in Slovenia, backed up by innovators who have ideas that are internationally recognised as being of high-quality. On the topic of the Proof-of-Concept grant, the Programme for the Development of the Innovation ecosystem stated that it will also be necessary to create programmes aimed at a better and more effective dialogue between industry and knowledge institutions, while addressing the specific needs of specific sectors or technology areas, both at national and global level. The Internationalisation strategy 2015-2020 outlined the need for support for demonstration and/or pilot projects of the Slovenian economy in order to market high-quality development and innovation-oriented Slovenian companies with breakthrough ideas, products, services. This was with a view to the promotion of partnerships and business models for easier inclusion in global value chains.

The Proof-of-Concept is a key step for innovation activities, taking place at TRLs 3-4[112] and both analytical and laboratory studies are required at this level to see if a technology is viable. Beyond proof of concept, TRL 5 is a continuation of TRL 4 but seeks to rigorously testing the technology through piloting of subsystems and finally demonstration. Support for this has been outlined in the previous recommendation. Therefore, to support the innovation ecosystem to open up piloting and demonstration facilities in a more systematic way, Proof-of-Concept funding is an essential component.

In terms of the particular set up for Proof-of-Concept funding, respondents of the technology transfer pilot call would be encouraged to develop one of the three options below:

- A grant, such as that provided by the Estonian Research Council[113]. This can be co-financed, for example as is the case with the 2021 University of Ljubljana call.[114]
- A loan, such as that provided by the Netherlands Enterprise Agency[115]
- A grant or a loan, depending on the nature of the project, such as that provided by Unitectra, the joint Technology Transfer Office (TTO) of the Universities of Basel, Bern, and Zurich.[116]

Proof-of-Concept funding can be provided to a single recipient, or in public/ private collaboration. Target recipients are usually SMEs, innovative start-ups (5 years old or newer) and academic researchers. The key element to consider with a proof-of-concept fund is to deliver it as close to the beneficiary as possible (i.e. locally).

On the note of financing the Proof-of-Concept, it is important to bear in mind the July 2021 announcement of the Central Eastern European Technology Transfer – CEETT venture capital fund of funds. The fund is between the Croatian Bank for Reconstruction and

[112] NASA, 2012, *Technology Readiness Level*. Available at: https://www.nasa.gov/directorates/heo/scan/engineering/technology/technology_readiness_level

[113] Estonian Research Council, 2021, *Proof of Concept Grant*. Available at: https://www.etag.ee/en/funding/research-funding/proof-of-concept-grant/

[114] LinkedIn publication, *the 2nd call for proposals for the University of Ljubljana Innovation Fund is open*!, University of Ljubljana, https://www.linkedin.com/posts/ur%C5%A1ajer%C5%A1e_the-2nd-call-for-proposals-for-the-ul-innovation-activity-6818535750980681728-KvRQ/

[115] Netherlands Enterprise Agency, January 2021, *Proof-of-concept-funding*. Available at: https://english.rvo.nl/subsidies-programmes/proof-concept-funding

[116] Herbert Reutimann, 2012, *Open Innovation University and commerce – a winning partnership*. Available at: https://www.unitectra.ch/download/pictures/67/tkqus7qgx7wvhrvhzl34wn0n0pfch5/reutimann2_qj0112_en.pdf

Development (HBOR), the European Investment Fund (EIF) and SID Bank, the Slovenian export and development bank. It is worth at least 40 million EUR and will be the first regional platform for financing commercialisation of innovative technological solutions and intellectual property of Croatian and Slovenian universities and research institutions.[117] MEDT should explore the extent to which this new fund may be combined with other sources to deliver the pilot call, thereby also including a risk capital element.

4.2.3.1 Action Plan

In order to implement stable financing for tech transfer and the competitive local pilot call, there are a number of steps:

- Pursue the KTT funding under a permanent budget for the TTO instead of a project-based budget. This would improve the performance and focus of the TTO. MESS will monitor the performance of the funding though performance indicators.
- Establishment of a joint fact-finding mission to understand the state of play in local knowledge transfer practices
- Commissioning of a feasibility assessment of funding a pilot call via MEDT, ERDF, Recovery and Resilience Facility (RRF) and CEETT venture capital fund of funds
- Launching a pilot scheme, via MEDT in close cooperation with MESS, to make competitive funding available for two technology transfer projects delivered by a consortium of local stakeholders

The main legal barrier for commercialisation of ideas by PROs and universities in Slovenia is the difficulty in establishing spin outs and need for licensing agreements to facilitate some of the knowledge and research potential of the universities to be commercialised. The law on Research, Development and Innovation proposed to lift these legal barriers, however, in light of their continued prevalence, **a joint fact-finding mission should be led by MEDT and involve MESS/ SPIRIT** on the current implementation status of various licensing agreements used by public research performers in Slovenia. The fact-finding mission would also seek to understand more deeply the current implications of the legal barrier. For example, whether stakeholders have had experiences of excessive litigation or disputes in this area.

The aim of this fact-finding mission would also be to provide a **sound understanding of the different types** of licensing models and their uses, strengths and weaknesses to enable more systematic support by national authorities of the innovation ecosystem. The final output of this fact-finding mission would be twofold. Firstly, it would directly inform the content of the competitive call for tech transfer pilot scheme. Secondly, it would contribute to an overall co-created **national training programme delivered by the TTO network and local partners** via the stabilised KTT funding for the next period. The network was

[117] HBOR, 27 July 2021, *Technology transfer platform worth EUR 40 million established by hbor, sid bank and EIF*. Available at: https://www.hbor.hr/en/technology-transfer-platform-worth-eur-40-million-established-by-hbor-sid-bank-and-eif/

partially established under the 2017-2022 KTT project.[118] Topics for this training programme could include:

- How to expand support provision to incorporate emerging technology trends
- State of the Art in private investment and finance models
- Learning from past projects and incorporating best practice into daily activity
- Integrating innovation outputs into collaborative modules and degree programmes
- Anchoring organisations in the local innovation environment
- Delivering innovation services through recognised commercial partners
- Internationalisation options and how to access them.

The content of this programme should also be seen as one implementation tool for the upgrading the national entrepreneurial skills system, outlined in an earlier recommendation.

The overall package of technology transfer support, including the ringfenced proof-of-concept fund, should be developed as part of a collaborative proposal with other local innovation actors (e.g. SRIPs, SIOs). The competitive nature of the programme and initial 4-year pilot phase, with two projects funded in the first stage, would mean that efficiency, effectiveness quality of partnerships and financial sustainability would be brought to the forefront of the programme.

What is crucial for the proof-of-concept grant is that recipients need a fast and simple grant application, and the funding must be issued at quickly as possible. Therefore, taking decisions as close to the researchers or companies as possible is required. This approach is also more economical and would contribute to the need for Slovenia to be efficient with the funding it has for innovation. Evidence of the success of this approach from the Swedish example can be seen below.

Figure 13 - Evaluation of efficiency of local proof-of-concept funding at KTH Royal Institute of Technology[119]

> By being closer to researchers and making more timely and adequate funding decisions locally, such decentralised PoC funding programmes may lower expenses associated with evaluation and administration processes by a factor of five from about 25% to about 5%, according to the experience of KTH.

Therefore, part of the overall competitive funding call for tech transfer should be a proposal outlining delivery of a proof-of-concept fund using local innovation actors utilising the cascading funding principle. The proposal itself would need to detail a specific method of delivery for the Proof-of-Concept funding and rationale. For example, Proof-of-Concept can be delivered through calls or via pre-selection from a pool of projects already being supported by local support systems (e.g. TTOs, SIO, Local Chambers). If a Tech Transfer Pilot Project proposes not to use a call for proposals, it would need to outline how they will

[118] Špela Stres, Levin Pal, 2020, *A decade of Knowledge Transfer in Slovenia.* Available at: http://ittc.ijs.si/13ittc/wp-content/uploads/2020/10/A-decade-of-knowledge-transfer-in-Slovenia_StresPal_final_PDF.pdf

[119] PROGRESS-TT Project, 2016, *Case study on PoC funding*, Horizon 2020 project. Available at: https://www.progresttfund.it/

assess existing project, and with which local stakeholders they collaborate to draw up eligibility criteria. The Pilot Project would also need to outline funding model (loan, grant, both) and at what pace the funding would be delivered. For example, in order to effectively control the use of PoC funding a TTO could opt to pay the bills directly according to the planned milestones rather than giving the money directly to researchers. The rationale behind an open call such as this is to encourage heterogeneity, decentralisation and healthy competition among innovation stakeholders.

The funder for this tech transfer pilot scheme would be MEDT, in combination with ERDF, RRF and newly available funds under the newly announced CEETT venture capital fund of funds. For this competitive tech transfer call, it is important to emphasise that the quality of support provided is key. Therefore, the potential beneficiaries could be any of local organisations active in the area of innovation and knowledge exchange, so long as they can provide a convincing plan for ensuring quality of support and training of staff to maintain quality of support. This also means frequent surveys and gathering of information of how they will measure the quality and improve their service. Practices such as this ensure that competition is healthy and follow international examples, such as the UK University Enterprise Zones and Enterprise Ireland's 'Technology Transfer Strengthening Initiative'.[120]

Table 8 - Implementation of the Technology Transfer landscape and include a proof-of-concept funding mechanism

Timeline for implementation – Month 0				
Activity	Timeline	Cost (high)	Cost (low)	Lead
Renewed KTT base funding on a non-project basis	Agreement by the end of 2022 – to avoid gaps in funding from previous programme ending in 2022.	To be decided by MESS	To be decided by MESS	MESS
Joint fact-finding mission to understand current tech transfer practices	3 months to complete mission,	0.5 FTE in MESS, MEDIT, SPIRIT	0.3 FTE in MESS, MEDIT, SPIRIT	MEDT
Development of training programme	Creation of workshop programme after 6 months and delivery being months 6-12.	Under renewed KTT base funding	Under renewed KTT base funding	TTOs
Competitive Technology	Preparation of guidance notes and online and offline	Human resources to be assessed based on internal discussions	Human resources to be assessed based on internal discussions	Call drafted by MEDT

[120] Enterprise Ireland, December 2017, *Commercialisation from State funded investment in research boosted through Technology Transfer Strengthening Initiative (TTSI),* Press release. Available at: https://www.enterprise-ireland.com/en/News/PressReleases/2017-Press-Releases/Commercialisation-from-State-funded-investment-in-research-boosted-through-Technology-Transfer-Strengthening-Initiative-TTSI.html

Transfer pilot scheme	training on innovation management based on fact-finding mission – 6 months Formation of a joint committee to draft the call, recruitment of international evaluation panel for proposals, establishment of programme, monitoring and evaluation procedures. – 6 months Publication of call – after 1 month Evaluation of competitive funding proposals within 3 months.	within ministries and agencies. An indication may be: ● 1 FTE MEDT ● 0.5 FTE SPIRIT ● 0.5 FTE GODECP ● 0.5 FTE MESS 3 million Euro for two pilot projects over four years, co-financed at 50-60%	within ministries and agencies. An indication may be: ● 1 FTE MEDT ● 0.5 FTE SPIRIT ● 0.5 FTE GODECP ● 0.5 FTE MESS 2 million Euro for two pilot projects over 4 years - co-financed at 60-70%	Pilot programmes delviered by local stakeholders

The most important element to consider with monitoring indicators is that they remain stable across the whole period and are based on activities, outputs (e.g., total number of innovating firms/ businesses on site), outcomes (e.g. value of income from licences to SMEs) and impacts (e.g. net change in employment as a result of the investment.)

Monitoring and evaluation of competitive funding calls for Technology Transfer could be done through indicators such as:

Name and description of indicator	Type of indicator
Prevalence of detailed market assessments	Recommendation KPI
Number of researchers/ businesses assisted	Recommendation KPI
Number of FTE jobs created	Recommendation KPI
Number of new products, collaborative R&D projects and businesses accessing new markets	Recommendation KPI
Number of licensing agreements of universities	Recommendation KPI
Number of spin-off companies increased from	Recommendation KPI
Number of research contracts and other agreements (e.g consulting)	Recommendation KPI
Calculation of the rate of return from public funds investment (e,g for every Euro spent by MEDT, X	System-level indicator

amount was generated via the beneficiaries of public funds)	

4.2.4 Recommendation - Increase physical presence abroad to boost internationalisation of innovation[121]

Supporting the internationalisation of innovative companies is a key challenge for Slovenia. SPIRIT organises a number of delegations and visits per year, however, ensuring meaningful engagement of industry in these visits requires a lot of resources and this decreases efficiency. The need for internationalisation of innovation is clear and well-documented. Slovenia's internal market is small, so internationalisation is also essential to prevent stagnation of ideas. The Programme for the Development of the Innovation Ecosystem noted that the now-defunct JAPTI agency set up representations abroad to analyse and inform on the situation and trends in the market where they operate. The agency also helped to organise events abroad and to ensure contacts with foreign potential partners (identification of potential partners and assistance in setting up communication).

Through looking at country comparisons (notably Denmark), the analysis indicates that if done in an efficient way, international offices could develop more impactful international activities to support Slovenian companies. A recent example is an ambition of the Government digitalization office to open a Slovenian mission in the Silicon Valley, however, this is a one-off activity that could be fostered into a systematic approach.

Slovenia could establish such representative offices also with the aim of identifying innovation achievements and reaching out to businesses, institutes and platforms in the field of innovation. In order to achieve this, investment in employees would need to be increased. It would also be necessary to create tailored programmes aimed at a better and more effective support for exporting, while addressing the specific needs of specific sectors or technology areas, both at national and global level. In support of this, establishing a network of economic representatives abroad was outlined in the Programme for Development of the Innovation Ecosystem. Here, practices such as Advantage Austria network[122], with the Austrian Chamber of Commerce, could play a role in particular for cross-border trade. Advantage Austria has a team of nine focused on boosting cross-border trade, based in Ljubljana.

A survey in 2017 indicated that around 60% of Slovenian SMEs have an internationalisation plan. Future internationalisation efforts should therefore be directed towards supporting those who have a plan to implement it (and improve it) and supporting those who do not have a plan to build one.[123] By bringing in structures to support systematic international coordination within the ecosystem, it will improve how national authorities implement European Enterprise Network activities, how they works with TAFTIE and how they cooperate with the diplomatic consular posts of the Republic of Slovenia abroad.

However, national authorities alone cannot answer the questions, the role of the SRIPs in internationalisation is also crucial. Current initiatives and areas of reform are outlined below.

[121] Please note that this recommendation can be put into action only in the case that the mandate fo establishing presence abroad be obtained and political support for such a decision is ensured.

[122] Advantage Austria, *Advantage Austria Ljubljana*. Available at: https://www.advantageaustria.org/si/servicecenter/Buero-Laibach.sl.html

[123] INTERREG Europe, 2017, *Internationalisation Policy in Slovenia/Podravje region: State of affairs.* Available at: https://www.interregeurope.eu/fileadmin/user_upload/tx_tevprojects/library/file_1528789481.pdf

Figure 14 - The role of SRIPs and system requirements

The mid-term evaluation of the SRIPs, and State of Play analysis, revealed that the SRIPs are already undertaking internationalisation activities with a range of innovation stakeholders, including the Chambers of Commerce, however there are some key gaps that should be filled.

In addition to collaborative projects, SRIPs international activities include connecting with international associations, contacting representatives of similar initiatives and companies abroad, participation in international events, foreign delegations and visits. Many promotional activities are reported to take place within the framework of the delegations with GODECP, MEDT, SPIRIT and the Chambers of Commerce (e.g. through the Go International Slovenia programme) but these can be made more effective through increased tailoring, fostering interlinkages and directing resources. Each SRIP reports different levels of integration into international value chains, while they do implement research into target markets on behalf of members and also overall for the cluster, smaller companies require more concrete actions, tailored to their needs. These actions to boost internationalisation and export must be delivered by SRIPs in collaboration with national authorities and other innovation actors. More formal mechanisms and appropriate contacts with the national authorities (including embassies abroad) are needed in the area of internationalisation, and this can be provided by boosting human resources within SPIRIT, and the provision of specific internationalisation programmes.

The Chamber of Commerce performs an important and stable role as a national point of various European networks and hubs, while also providing development opportunities. The SRIPs internationalisation activities support members by registering them for international projects and with international events, for example conferences. A number of SRIPs prepare and implement workshops for small and medium-sized enterprises. For example, SRIP MATPRO developed a training focused on the integration of members into international global markets. Integrating into digital communities of practice is also occurring, for example in October 2017, SRIP Health-Medicine became a full member of the Twin International Multihelix (TIM) super cluster. However, this could be stepped up with the provision of horizontal ICT support. Some SRIPs have been in communication with foreign embassies and Slovenian ambassadors abroad, with limited impact.

In terms of goals for the SRIPs under this recommendation, the aim should be to support the further development of a Slovenian 'SRIP brand', increase the consistency and quality of training and workshops on how to do business with a particular foreign market or group of markets, grow the impact of international networking with identified stakeholders of SRIP members in the target market and increase the value of the involvement of types of members in programmes designed to facilitate integration into value chains and cross-border projects. One way of building capacity to implement these goals in a joined-up way is via the internationalisation working group under the RTDI platform with SRIPs.

In light of the above, this recommendation is centred on four points:

- SPIRIT to open international office(s) abroad in partnership with the Chamber of Commerce and Industry, local chambers, the Chamber for Crafts and Small businesses and SRIPs to deliver at least one tailored internationalisation programme for companies.
- Cross-border trade to be boosted through further integration of SPIRIT, MEDT and innovation actors into embassies in Austria, Croatia, Hungary, and Italy. In

collaboration with the Chamber of Crafts and Small business and local Chambers of Commerce.

- SRIPs should focus on building digital presence and community of practice and setting up a horizontal ICT platform.
- SRIPs should focus on growing the value of their advice to different types of members with regards to integration in international value chains and providing more tailored advice to individual companies interested in increasing exports.

4.2.4.1 Action Plan

To effectively implement the recommendation, the following steps are required:

- Establish a working group led by SPIRIT, in close coordination with the Chambers of Commerce and supported, including MEDT, the Ministry of Foreign Affairs (MoFA), SID Banka, the Slovene Enterprise Fund, and SRIPs, to begin preparations for opening an international office abroad.
- Establish a dedicated Internationalisation Relationships Manager post within SPIRIT
- SPIRIT/ MEDT to start holding monthly meetings with Chambers and SRIPs and quarterly meetings with MoFA representatives in Austria, Croatia, Hungary, and Italy on cross-border internationalisation promotion
- Launch a public/ private partnership with SRIPs/ GZS/ SPIRIT to provide a tailored support programme to SMEs who want to internationalise

In order to action the creation of international office(s) abroad, the first step is to **establish a working group with SPIRIT, MEDT, the Ministry of Foreign Affairs (MoFA), SID Banka, the Slovene Enterprise Fund, the Chambers of Commerce and SRIPs** to formalise connections with the relevant internationalisation portfolios and individuals and understand in detail the current status of support being offered to innovative companies wishing to internationalise and boost their exports. **SRIPs would be required to provide detailed information on the interests of its membership, and the Chambers would represent the interests of broader industrial environment. Interest should be gauged in terms of if, and how much, stakeholders would be willing to co-fund the activities under this recommendation.**

The next step would be the **identification of potential target markets, taking into account geographic and thematic factors,** for the first SPIRIT international office. SPIRIT should look into whether the recent Silicon Valley initiative provides an opportunity to channel political support into setting up a lasting mechanism in SPIRIT. More generally, analysis indicates that the most compatible economies and highest demand for Slovene goods are in the USA, China, Japan, Mexico, Canada, Korea, Taiwan and Saudi Arabia.[124] In addition to target markets, ease of setting up international representations should also be taken into account on a practical level for each target market.

After a decision has been made on which country to open the first office in, this recommendation proposes the model of Denmark, which has 8 innovation offices abroad. **Each office has around 5 or 6 members of staff and the Slovenian office should be**

[124] INTERREG Europe, 2017, *Internationalisation Policy in Slovenia/Podravje region: State of affairs.* Available at: https://www.interregeurope.eu/fileadmin/user_upload/tx_tevprojects/library/file_1528789481.pdf

equally well-staffed. The roles of these individuals include consultant, attaché and innovation officer, as well as administrative staff. Denmark has around 50% of staff in each office seconded (senior management) and 50% local hires. Each member of the working group should invest funding into supporting a representative in the office and propose a system of funding this person. **This includes the Chamber of Commerce and SRIPs, although this post should be funded in part directly from public funds.**

In addition to the international office itself, internationalisation activities in SPIRIT must be re-organised with the addition of **at least one dedicated Internationalisation Relationships Manager**. This role would also include more active management and more tailored content of outward-facing tools such as the SLOEXPORT database, InvestSlovenia website. This should be done along the principles of design thinking and would actively connect content on Chambers of Commerce website and engage with the SRIPs who should be developing online communities of practice and a horizontal ICT system. **Overall, this post would be responsible for managing relationships with internationalisation stakeholders in Slovenia, as opposed to providing direct internationalisation support to companies**. This includes being a key player in the internationalisation working group of the SRIPs RTDI platform recommended in 3.1.3.

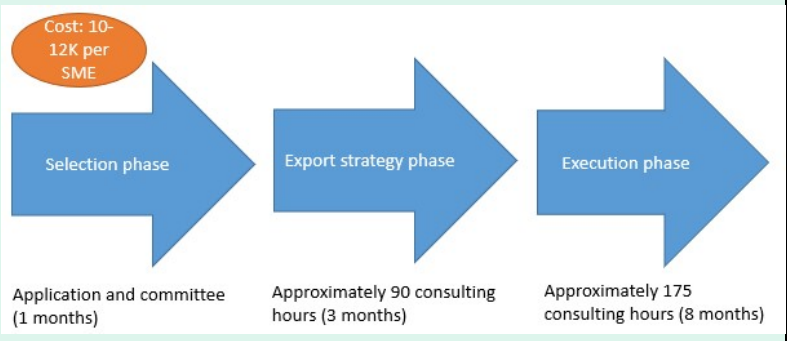
In terms of concrete programmes for the new international office and SPIRIT. This recommendation proposes to begin operations with highly tailored business support programme. For this, the VITUS programme in Denmark, launched in 2010 has been adapted to the Slovene context below.

Figure 15 - Example export support programme for Innovative SMEs in Slovenia

Parameters:

Implementing stakeholders: SPIRIT, new international office, GZS, SRIPs.

Initially one call every year, increasing to every 6 months after 2-year trial phase. Five Slovene companies on the programme for each call.



Eligibility: Company must be an SME, 5-100 employees, below 20M EUR and have a product or service that has been tested on the market.

The programme:

A kick-off event in which the company representatives meet each other and SPRIT international advisors, GZS and SRIPs make presentations about the target markets, international networks and value chains.

Stage one. The recipient company can choose whether they would like SPIRIT, GZS or a SRIP advisor to spend a day in the company to learn its products, services organisation and ways of working.

Following this, a fact-finding trip is made to the target market, organised by the international office, followed by a workshop with SPIRIT, GZS and SRIP scrutinised in detail the company. The

workshop should also include academic faculties from Slovenian universities. The workshop results in an export strategy jointly created by the company and the selected advisor.

End of stage one, there is an opportunity to test the export strategy in Slovenia with a panel consisting of business leaders organised by SPIRIT, GZS and SRIP advisor. This first stage lasts from three to four months.

Stage two lasts 8 months and intends to implement the export strategy with the help of all advisers. The international office and advisers help the company open doors and organise meetings with potential clients in the company's target market. There should be a strong focus on sales activities and the overall aim of the programme is to achieve the first export sale in the target market during the 12-month period.

Conditions for success:

From the Danish experience over the past 11 years, a company is not likely to be successful on its own, the activity and involvement of the selected advisor is highly important. If done correctly, many companies experienced their first export during the 12-month programme. Additionally, evaluations of the Danish example show consistent increase of turnover, exports and personnel growth.

Monitoring and evaluation. Close work with SID Banka to get quantitative data on export guarantees, as well as treated SME surveys and impact evaluations led by SPIRIT and completed after 2 years. These evaluations would look at indicators such as continued engagement of company in other areas of international environment.

On the topic of cross-border representation, further integration of SPIRIT, MEDT and innovation actors into existing representations (embassies and consular services) in Austria, Croatia, Hungary, and Italy should be formalised. **As a first step, the Chamber of Commerce and Industry should lead this activity and gather information of the availability of the services provided by the Ministry of Foreign Affairs and how they are currently promoted.**

As a second step, the Chamber of Commerce should establish key contacts in SPRIT, the Ministry of Foreign Affairs and intermediaries (for example via the country portfolios[125] at the Chamber of Commerce). SPIRIT/ MEDT should make themselves available to start holding monthly meetings with all relevant individuals, and quarterly meetings with representatives in Austria, Croatia, Hungary, and Italy.

A prioritisation of these countries should then be made based on innovation conditions, economic compatibility and embassy receptiveness to **establish one economic representative consultant position in the pilot country**, which could be funded jointly by SPIRIT, MEDT, GZS and Chamber of Craft and Small Business. This consultant would work in the country, closely collaborate with the embassy and build on existing matchmaking initiatives undertaken through programmes such as 'Go International Slovenia' and Connect2Slovenia[126]

[125] Chamber of Commerce and Industry of Slovenia, *International Business > About CEMP > CEMP Team*. Available at: https://www.gzs.si/skupne_naloge/mednarodno_poslovanje/vsebina/O-CEMP-u/Ekipa-CEMP

[126] Chamber of Commerce and Industry of Slovenia, *Go International Slovenia Programme*. Available at: https://www.gzs.si/skupne_naloge/mednarodno_poslovanje/vsebina/Go-International-Slovenia and Chamber of Craft and Small Business of Slovenia and Enterprise Europe Network Slovenia, *Registration for Connect2Slovenia I International Matchmaking Event*. Available at: https://connect2slovenia.b2match.io/page-4741

In addition to new posts and resources, the success of these new international representation also **depends on the ability of the SRIPs to focus on growing the value of their advice to different types of members with regards to integration in international value chains. At present, SRIPs can exchange best practices and experiences** but they must collaborate with one another to build their capacity to provide tailored advice to individual companies interested in increasing exports. This needs to be done while creating an **enhanced digital presence and community of practices along verticals and setting up a horizontal ICT platform.** The internationalisation measures of SRIPs should differentiate beneficiaries according to their internationalisation maturity (and different needs) by developing a shared typology.

Effectively, the cluster model itself must be adapted. A cluster is a geographical location where enough resources and competences amass to reach a critical threshold, giving it a key position in a given economic branch of activity. However due to globalisation and the dramatic acceleration of the digital era various paradigm shifts have occurred **SRIPs must look further beyond their geographical location into their online presence.**

A high-tech start-up or SME should be individually supported to define its position in the value chain via 'SRIPs-branded' value chain analysis tool. They could, for example work with the Enterprise Europe Network (EEN) to develop open innovation challenges to connect small companies to larger ones via a 'needs analysis'. Programmes should be developed, and experience and expertise gained which is explicitly dedicated to the vision and mission for the future and position the beneficiary companies.

Table 9 - Implementation of increased physical presence abroad

Timeline for implementation – Month 0				
Activity	Timeline	Cost (high)	Cost (low)	Lead
Setting up Internationalisation Relationships Manager position within SPIRIT	ASAP[127], to feed into all other activities under this recommendation.	Cost of each role: 60K per year per FTE base (with performance-linked element)	Cost of each role: 40K per year per FTE base (with performance-linked element)	SPIRIT
Setting up international office	Research, analysis and selection of target markets (3 months including structured consultation) Coordination with ministries on budget models, structure, staffing (3 months) Fact-finding mission to country and	Initial set up: 2FTE plus expenses EUR 100,000 Cost: Running costs of one office for one year EUR 500,000	Initial set up: 2FTE plus expenses EUR 75,000 Cost: Running costs of one office for one year EUR 400,000	SPIRIT in close collaboration with Chamber of Commerce and Industry

[127] Please note that this activity can commence only in the case that the mandate for establishing presence abroad be obtained.

	follow up analysis (3 months) Recruitment and property acquisition (Slovenia and local – 6 months) Setting up of operations (3 months)			
Establishment of an Internationalisation working group within the SRIPs platform	Same rollout at platform	N/A	N/A	Regional Innovation Coordinators[128]
Further integration of innovation into existing representations (embassies and consular services) in Austria, Croatia, Hungary, and Italy	Initial meetings and communication programme with embassies and consular services to establish current practices and baseline – 3 months Development of SPIRIT requirements from embassies – 3 months Hiring of economic representative consultant – 3 months	TBD	TBD	Chamber of Commerce and industry of Slovenia working closely with chamber of craft and small business of Slovenia

To support the development of this recommendation, the following indicators could be used

Name and description of indicator	Type of indicator
The international office, international relationships manager and cross-border economic representatives could set targets using the following indicators: ● Increase in enquiries for internationalisation support ● Implementation of the sales process in companies with a higher value ● Percentage of customers indicating the SPIRIT has delivered major or decisive value These indicators could also be performance linked, with bonuses for staff who can demonstrate higher impact.	Recommendation KPI

[128] See footnote 47.

In addition, the monitoring and evaluation should contain complementary economic indicators, for example: GDP per capita (in EUR), Exports in absolute figures (in EUR million), Share of exports in GDP (%), Exports per capita (in EUR million), Net revenue of SMEs from sales in foreign markets (in EUR), Exports to non-EU countries* (in EUR), State of inward FDI in GDP in Slovenia (in %), Number of exporters among Slovenian companies, Level of Slovenia's participation in Global Value Chains, Value of inward FDI (in EUR million).	System-level indicators

4.3 Building the Risk Capital Ecosystem

The ecosystem of risk capital refers to a set of public and private funds investing during the early stages of a company in exchange for equity, or an ownership stake. Venture capitalists (VC) take on the risk of financing risky start-ups in the hopes that some of the firms they support will become successful. Because start-ups face high uncertainty, VC investments have high rates of failure. The start-ups are usually based on an innovative technology or business model, and they usually demonstrate high growth potential (in terms of number of employees, annual revenue, scale of operations, etc).

For this priority area, three distinctive challenges have been identified in Slovenia:

1. Lack of structured and attractive Risk Capital ecosystem;
2. Administrative hurdles and tax burdens, which are currently hampering investors to settle down in Slovenia. Regulatory adjustments are needed to ease their way into the country;
3. VC is missing for early- (pre-seed and seed) but also late- stage (growth).

In the next 5–10-year period, developing and attracting risk capital (national or foreign) should be a key priority. The above challenges show three areas to which clear recommendations can be derived.

4.3.1 Recommendation - Address the Information and Coordination Asymmetries

Financial instruments are mostly managed by the Slovenian Enterprise Fund (SEF). While SEF has developed several instruments such as: micro-loans, guarantees (that are also matched with private investments), start-up incentives, seed capital, venture capital, they can only be available for a limited number of SMEs. **Although SEF is developing further, the total amount of funding is too small. The same applies to the second key player in Slovenia, SID Banka, the Slovenian Development bank.**

Risk capital is available but for a limited number of SMEs. According to the OECD[129], venture capital investments in Slovenia in 2020 amounted to 3.003 million US dollars, 2.513 million US dollars were in start-up and other early stage, while 0.492 million US dollars were in later-stage ventures. In the same year, total VC investments in Austria were 116.668 million US dollars, in Estonia total investments were 25.214 million US dollars allocated to seed 5.217 million USD, start-up and other early stage 9.061 million USD and 10.936 million USD in later-stage ventures. On the European Innovation scoreboard[130], 'Venture Capital expenditures' in Slovenia is only 4.4 % in comparison to the EU average (100%). The amount of funding is simply too small. **The dedicated Slovenian (or regional funds) such as the Slovenian Equity Growth Investment Programme (SEGIP), the Central Europe Fund of Funds (CEFoF), or the Central Eastern European Technology Transfer (CEETTT), have limited resources.** For example, SEGIP committed €100 millions while Poland for example

[129] OECD, Stat, 2021, *Venture capital investments.* Available at: https://stats.oecd.org/Index.aspx?DataSetCode=VC_INVEST

[130] European Commission, 2021, *European Innovation Scoreboard 2021: Slovenia.* Available at: https://ec.europa.eu/docsroom/documents/45935

has invested €500 million of national funds to jump start the VC industry. In addition, there are large untapped domestic capital resources including the permitting corporate/pension and investment funds.

Another explanation is that currently, venture capital (VC) lacks clarity, transparency and confidence to invest in Slovenia. Although there are funds, companies have difficulties to match the scheme proposed with their needs or alternatively to find the right scheme for their need. **This is mainly due to the large number of criteria to fulfil. It implies a need to coordinate better across schemes, and to focus on deep-tech companies.** However, there is a lack of trust for other investors to join, when a young company receives public funds.

The stakeholder workshops also revealed that there are many administrative hurdles and an unfriendly environment for foreign investment in Slovenia. For example, while establishing a company is easy, a notary is required for any change of capital. Furthermore, the owners of the company must be present in the country. Both of these are a disincentive to foreign investors. One further challenge is the expenses related to employment of higher value-added employees. The tax rate and social contributions of very high skilled labour are comparatively high and the provision of stock options and similar incentives to employees in Slovenia is impractical.

In summary, the information collected through interviews and document reviews showed the following main points:

- There is the perception of an unfriendly foreign investment environment in Slovenia which is evidenced by the actual numbers;
- Insufficient local funds for financing innovation risk (risk capital for innovation). In addition, centrally managed EU-backed regional venture capital funds had very limited or no investment in Slovenia[131] (CEFoF[132]);
- Lack of network / association federating public and private investors;
- Available funds are not easily accessible to SMEs (criteria to fulfil, various schemes from different stakeholders);
- There is a need for an outward-looking value proposition and coordination.

To respond to the first challenge, ***a lack of structured and attractive Risk Capital ecosystem***, a clear and communicable 'offer' is needed for investors including for foreign investors to address the information and coordination asymmetries. The policy design should also give more attention to the start-up and scale-up of SMEs.

This leads to the below sub-recommendations for addressing the Information and Coordination Asymmetries:

a) Improve the communication on SI instruments toward SMEs and start-ups

[131] European Court of Auditors, 2019, *Centrally managed EU interventions for venture capital: in need of more direction*, Special Report. Available at: https://www.eca.europa.eu/Lists/ECADocuments/SR19_17/SR_Venture_capital_EN.pdf

[132] European Investment Fund, *What we do: Central Europe Fund of Funds (CEFoF).* Available at: https://www.eif.org/what_we_do/resources/CEFoF/index.htm?lang=-en

b) Improve the coordination of SI innovation support instruments and existing financial products

c) Integrate VC priorities in REACT EU innovation vouchers under preparation (blending)

d) Develop a communicable 'offer' for foreign investors, to capitalise on the benefits of the Law on Alternative Investment Fund Managers (capital provision)

e) Learn from success stories (see below), use the expertise and contacts of the few successful businesses that went through the process (pioneers?), such as ZEMANTA[133] and embed this learning within the support system's institutions.

4.3.1.1 Action Plan

In order to implement this recommendation, the following activities are needed:

- Set up an internal risk capital task force or steering group at director level to discuss political ground
- Conduct a scoping exercise: risk capital for companies, blending finance, ecosystem, structures, etc.
- Start consultations using the momentum to get a solid consensus among the task force or steering group: ministries or the Economy and finance, SPIRIT, SID BANKA, and SEF. Build upon individual measures. Clarify the role allocation/priority points: e.g. awareness raising versus specific regulatory topics. Propose a consultative Roadmap.
- Conduct the task force work. Involve independent experts to conduct analysis where needed.
- Amend the law if needed and undertake action agreed by the task force, including HR and incentives.
- Improve coordination of the current public offer, drawing inspiration from the "start-up plus" initiative with a focus on scale-up following the model of foreign agencies such as Bpifrance
- SPIRIT to monitor KPIs and convene the task force twice a year to review progress and provide amendments where needed

In terms of the elements these activities should focus on, there is a need to simplify the information, requirements, and offer for the beneficiaries (SMEs / start-ups). This includes improved communication and coordination on SI instruments to have a clear offer for SMEs. The task force must work towards better coordination of available financial products with other instruments / institutions. This is with the aim of making Slovenia more attractive for private risk capital. One way of doing this is via integration of VC priorities in REACT EU innovation vouchers under preparation (blending).

As an indication of the direction to take, the "start-up plus" initiative[134] (funding + training + mentoring) coordinating several partners (more than 50 in this partnership) provide a

[133] For reference see: https://www.zemanta.com

[134] Slovene Enterprise Fund, *StartUp+ SI-SK: Co-investment with private investors.* Available at: https://startup-plus.podjetniskisklad.si/SI-SK/

good indication (see box in the next section). Slovenia should look to Estonia (see below) for an example how to boost the image of a country as a high-tech hub and VC destination. The innovation capacity, human resources, and the business demographics are similar between the two countries, but their perception on the global VC owners are differing.

As a summary: ***there is a need to coordinate better the current public offer, drawing inspiration from the "start-up plus" initiative with a focus on scale-up*** following the model of foreign agencies such as Bpifrance (see good practice above).

Figure 16 - Good Practices France, and Flanders

- **France:** Bpifrance[135] communication strategy toward SMEs. Since 2013, Bpifrance has become the one stop shop for entrepreneurs with a large toolbox offered through 50 local branches. Bpifrance offer a continuum of solutions adapted to every key step in a business' growth such as: business creation, financing, guarantees or equity investment. Bpifrance is also the French agency for innovation, delivering programs to innovative entrepreneurs. In a summary: Bpifrance is a financial institution, with private culture, serving the collective interest. Bpifrance also coaches entrepreneurs to help their businesses succeed. Bpifrance finances innovators and accelerators for start-ups, but also for small caps and mid-caps in order to help those who are impatient and want to grow as quickly as possible. At the beginning of 2019, 25 SME accelerator programs were launched and the goal is to accelerate 4000 companies by 2021. Bpifrance works to create an ecosystem that favours entrepreneurship. To do so, Bpifrance organises events in France and abroad to allow entrepreneurs to exchange best practices and find new partners. For example, BIG[136] (Bpifrance Inno Generation) gathers 45.000 entrepreneurs at an event, held in the Paris stadium AccorHotels Arena.
- **Flanders**: The most important providers of private equity and venture capital on the private side are Ban Vlaanderen, the Business Angels Network in Flanders, and GIMV (Flanders Investment Company). GIMV[137] is an EU investment company, listed on Euronext Brussels. It manages a portfolio of around 55 companies with a combined turnover of €2.5 billion and 14,000 employees. GIMV plays an important role in this the financial anchoring of Flemish growth companies with nearly 40 years of experience in private equity.
- **Estonia**: is one of the smallest country in the world but is looking good on a number of striking indicators: number of start-up per person, fast broadband, all government services conducted online, every kid is taught how to code, etc. Many recent reforms have led the country towards a digital nation: digital identity card, digital voting, etc. instituting a digital culture. Then a major success story with SKYPE incentivised others to follow and skype founders became rock stars. SKYPE success also contributed to attract foreign VCs. Among the other key success factors, the two are relevant for Slovenia: the exchange of people between the private sector and government positions, and the agency Enterprise Estonia with its 2023 objectives[138].

[135] For reference see https://big.bpifrance.fr/fr

[136] *Ibid*

[137] For reference see https://www.gimv.com/en

[138] For reference see https://www.eas.ee/eas/?lang=en

The stakeholders involved are mostly SEF, and SID banka - public investment funds but also all intermediary organisations in the SI innovation system to improve the communication on SI instruments toward SMEs and start-ups, and of course the ministries in charge. Slovenian potential 'rock stars' and past receivers of investment should also be added to lead the debate.

Table 10 - Roles and responsibilities for implementation

SEF SID Banka	Intermediary organisations (TTO, SRIPs, incubators, accelerators, GZS, etc..)	Ministry of Economic Development and Technology	Ministry of Finance	SPIRIT	Slovenian potential 'rock stars' but past receivers of investment
Provide advice	Provide advice	Provide expertise	Lead the task force should the agreement from the Ministry of Finance obtained	Lead the secretariat of the task force Monitor KPI	Lead the debate and prevent to reach unproductive conclusions

Table 11 - Implementation of addressing asymmetries

Activity	Timeline
Set up a risk capital task force	Task force set up during next 6 months to: a) Propose how to coordinate available financial products with other instruments / institutions and simplify the information / requirements / offer for the beneficiaries (SMEs / start-ups). Improve the communication and coordination on SI instruments to have a clear offer for SMEs; b) Review the current legislation, and propose amendment / changes where needed in order to simplify current offer, and attract private risk capital; c) Review the options to setup new funds under REACT EU or others with the support of Slovenian experts acting in existing funds; d) Integrate VC priorities in REACT EU innovation vouchers under preparation (blending). The task force should involve representatives of the below actors. No financial resources needed at this stage. SPIRIT might lead the secretariat of the task force. The secretariat is mainly responsible for: - Ensuring meetings are effectively organised and minuted. Liaising with the Chair to plan meetings. ... - Maintaining effective records and administration. ... - Upholding legal requirements. ... - Communication and correspondence.

	The secretariat might also offer sound and trusted advice on the topics addressed by preparing issue papers. The Ministry of Finance might lead the task force should the agreement be obtained .
Amend the law if needed and undertake action agreed by the task force, including HR and incentives.	Early 2022
SPIRIT monitor KPI and convey the task force twice a year to review progress and provide amendments where needed (better coordination, etc..)	2022 onwards

To support the development of this recommendation, the following indicators should be taken as an example to inform the development of a risk capital task force.

Name and description of indicator	Type of indicator
Task force setup, number of task force meetings, number of agreed actions, number of actions implemented, …	Recommendation KPI
Number of new VC and size	Recommendation KPI
Number of investments in start-up by size and stage of development (national monitoring);	Recommendation KPI
Venture capital investment by stage / amount invested (OECD source)	Recommendation KPI
Venture Capital expenditures (Finance and Support)	System-level indicator (European Innovation Scoreboard)
State of inward FDI in GDP in Slovenia (in %),	System-level indicator
Value of inward FDI (in EUR million)	System-level indicator

4.3.2 Recommendation - Reform the system level

Early-stage investments from corporate sources are currently missing. Slovenia should rely more on investors and venture capital funds to finance the innovation ecosystem including start-up through accelerators, technology transfer offices, etc. To do so, investors and venture capital (VC) funds must be attracted by the Slovenian ecosystem. According to experts in the venture capital market interviewed for this study, the annual need for funding in Slovenia from VC is around €70 million while the country has a fragment of the funds ready to invest (3.003 million US dollars in 2020).

Several initiatives have taken place recently:

- The Central Europe Fund of Funds (CEFoF) is a €97 million fund-of-funds initiative setup in December 2017. CEFoF is created by the European Investment Fund (EIF) in close co-operation with the governments and national agencies of Austria, Czech Republic, Slovakia, Hungary and Slovenia to boost equity investments into small and medium-sized enterprises (SMEs) and small mid-caps across the region. Slovenia investment in SEFOF is of €8 million, which should return 200% of the investment Slovenia. However, so far, no investments were registered in Slovenia;
- The Slovenian Equity Growth Investment Programme[139] (SEGIP) is a € 100 million fund launched in November 2017. SEGIP is based on a collaboration between the European Investment Fund (EIF) and SID Banka (the Slovenian Development bank). The program is intended to provide financial support to private equity firms. Several funds have been selected following a call[140] such as ALFI PE[141] for € 25 million, or KD Funds[142]. Some of the companies[143] financed based on these agreements are:
    - Trival antene d.o.o., one of the world's leading manufacturers of antennas and antenna masts for HF, VHF and UHF wireless communications;
    - Prevent & Deloza d.o.o. which is a leading manufacturer and specialist for protective clothing and safety work wear;
    - Medilab d.o.o. which specializes in magnetic resonance imaging (MR) and computed tomography (CT);
    - Baby Center d.o.o. and Pikapoka d.o.o. the leading chains of baby and child care shops;
    - Panorganix d.o.o., a modern agricultural production business;
    - LIT Tranzit d.o.o., a global high-tech company;

[139] European Investment Fund, *Slovene Equity Growth Investment Programme (SEGIP).* Available at: https://www.eif.org/what_we_do/resources/slovene-equity-growth-investment-programme/index.htm

[140] European Investment Fund, 2018, *Closed call for Financial Intermediaries under the Slovene Equity Growth Programme.* Available at: https://www.eif.org/what_we_do/resources/slovene-equity-growth-investment-programme/segip-call-for-expression-of-interest.htm

[141] For reference see https://alfipe.si/stran/o-nas

[142] Generali Investments, May 2019, KD Funds selected as manager of SEGIP programme funds. Available at: https://www.generali-investments.si/en/kd-funds-selected-as-manager-of-segip-programme-funds/

[143] For reference see https://www.generali-investments.si/en/?s=SEGIP and https://alfipe.si

- Paradajz, podjetje za proizvodnjo, trgovino, storitve in distribucijo d.o.o., an agricultural company specialising in integrated vegetable production.

KD Funds (called today Generali Growth Equity Fund) investments range[144] between € 2 million and € 7 million (more if needed). The focus is on minority stakes (around 25%) or majority stakes (around 75%). The Fund can invest in the form of equity or quasi-equity instruments. The target company size is revenues between € 1.5 million to € 50 million, and EBITDA between € 400,000 to € 5 million. The average investment period ranges between 5 to 7 years.

The Central Eastern European Technology Transfer – CEETTT is established by the Croatian Bank for Reconstruction and Development (HBOR), the European Investment Fund (EIF) and SID Bank, the Slovenian export and development bank. The agreement signed on 27 July 2021 establishes the first regional platform for financing commercialisation of innovative technological solutions and intellectual property of Croatian and Slovenian universities and research institutions worth at least € 40 million.

One explanation for the lack of investment is the current regulations which may hamper investors and VCs to come to Slovenia. For example, double taxation with key trade partners, and lack of agreements on the protection of investments are real barriers. There are ongoing efforts in this area such as the Slovenian alternative investment fund legislation. The Law on Alternative Investment Fund Managers has been amended on 6 October 2021[145]. A new law on forms of alternative investment funds is also being written. Both acts were scheduled to be passed by June 2021.

In summary, the information collected through interviews and document reviews showed the following main points:

- Administrative burden over foreign funds;
- National saving is not sufficiently supporting the Slovenian risk capital ecosystem;
- Public research institutions and universities cannot have shares in a company currently (by law);
- Lack of incentives to attract funds;
- Two acts scheduled to be passed in June 2021: the reviewed Slovenian alternative investment fund legislation (the Law on Alternative Investment Fund Managers) and a new law on forms of alternative investment funds;
- Call for emulating the UK Seed Enterprise Investment Scheme Tax relief.

To respond to the second challenge ***administrative hurdles and tax burdens are currently hampering investors to settle down in Slovenia. Regulatory adjustments are needed to ease their way into the country***. A reform of the existing law should simplify the framework and attract more risk capital (including VCs). Incentives will also be needed to initiate the early phase.

This leads to the below detailed recommendation for reforming the system level:

[144] For reference see https://ggef.generali-investments.si/en/

[145] For reference see https://www.uradni-list.si/glasilo-uradni-list-rs/vsebina/2021-01-3059?sop=2021-01-3059

a) Improve and streamline the regulatory requirements for risk capital providers to invest in Slovenia. Once the regulation is in place, inform all stakeholders;

b) Consider providing support for business angels in the form of a tax break inspired by the UK model.

c) When the fundamentals are in place, work on the image of Slovenia as an investment destination.

4.3.2.1 Action Plan

To implement the above recommendation, the following activities are needed:

- Engage in a regulatory review that can lead to adjustments to the legal framework, requiring strong political leadership and a comprehensive consultative approach following the model of UK Seed Enterprise Investment Scheme (SEIS) tax relief
- Mandate the Risk Capital Task force to investigate how to provide incentives to invest
- Review the act passed in June 2021 and propose amendments if needed

At the system level, when undertaking the above activities there is a need to inform and consult heavily and systematically with stakeholders. This is with the aim of simplifying the existing framework to attract more risk capital investors (mainly VCs) and establishing incentives to attract, but also to retain, investors who will grow Slovenian SMEs and start-ups.

As a summary: ***there is a need to engage into a regulatory review that can lead to adjustments to the legal framework, requiring strong political leadership and a comprehensive consultative approach*** following the model of UK Seed Enterprise Investment Scheme (SEIS) tax relief (see good practice below).

Figure 17 - Good Practice the UK Seed Enterprise Investment Scheme (SEIS) tax relief

- To stimulate investing in early-stage and growth-focused businesses that are permanently established within the UK, two corresponding schemes (SEIS and EIS for Enterprise Investment Scheme) have been setup. Investors need to be UK taxpayers.
- SEIS[146] is designed to help companies raise money when it's starting to trade. It does this by offering tax reliefs to individual investors who buy new shares in the company. SEIS encourages investment in qualifying new seed-stage companies by providing individuals with income tax relief at a rate of 50% on the value of the investment (up to a maximum of £150,000 each tax year). In addition, investors can also benefit from Capital Gains Tax reliefs (CGT). Reinvestment relief allows individuals to reinvest any chargeable gains from the disposal of any asset into SEIS shares. This allows for the deferral of CGT which will crystallise on the disposal of SEIS shares. Individuals are then also able to treat up to 50% of the chargeable gain as totally exempt from CGT and the remainder crystallises on the disposal of the SEIS shares. As long as SEIS shares are held for at least 3 years, investors

[146] United Kingdom Government, 2017, *Guidance: Use the Seed Enterprise Investment Scheme to raise money for your company*. Available at: https://www.gov.uk/guidance/venture-capital-schemes-apply-to-use-the-seed-enterprise-investment-scheme

will not have to pay CGT on the disposal of SEIS shares. If investors make a loss on the disposal, they can set this against their chargeable gains or income.

- The Enterprise Investment Scheme[147] (EIS) is designed to encourage investment in slightly later-stage qualifying companies by providing investors with up to 30% of their investment back in income tax relief. Investors can only invest up to a maximum of £1 million into EIS qualifying companies in each tax year. Investors can also benefit from disposal relief, where they will not have to pay CGT on a gain from the disposal of EIS shares, as long as the shares have been held for at least 3 years. If investors make a loss on the disposal, they can set this against their chargeable gains or income. Also, where a gain from the disposal of any asset is invested in EIS shares, this gain can be deferred and will crystallise on the disposal of the EIS shares.
- These schemes provide great incentives for UK taxpayers who are either active investors or are just looking to support their friends and family in their entrepreneurial projects. Many companies are looking to raise investment under one of these schemes and are identified as eligible with a SEIS or EIS logo.

seis
Seed Enterprise Investment Scheme

Enterprise Investment Scheme

Table 12 - Roles and responsibilities for implementation

SEF SID Banka	Intermediary organisations (TTO, SRIPs, incubators, accelerators, GZS, etc..)	Ministry of Economic Development and Technology	Ministry of Finance	SPIRIT	Slovenian potential rock stars but past receivers of investment
Provide advice	Provide advice	Provide expertise	Lead the task force should the agreement from the Ministry of Finance obtained.	Lead the secretariat of the task force Monitor KPI	Lead the debate and prevent unproductive conclusions

Table 13 - Implementation of reforming the system level

Timeline for implementation – Month 0			
Activity	Timeline	Cost (high)	Cost (low)
Use the above-mentioned **risk capital task force** (or set up a specific task force) to:	During the next 6 months, national authorities must ensure that the task force involves representatives	No financial resources needed at this stage. SPIRIT might lead the secretariat of the task force. The secretariat is mainly responsible for: - Ensuring meetings are effectively organised and minuted. Liaising with the Chair to plan meetings. …	

[147] United Kingdom Government, 2017, *Guidance: Use the Seed Enterprise Investment Scheme to raise money for your company*. Available at: https://www.gov.uk/guidance/venture-capital-schemes-apply-to-use-the-seed-enterprise-investment-scheme

a) Review the current legislation (in particular the act passed in June 2021), and propose amendment / changes where needed; b) Provide incentives to invest.	of all actors mentioned in the recommendation.	- Maintaining effective records and administration. ... - Upholding legal requirements. ... - Communication and correspondence. The secretariat might also offer sound and trusted advice on the topics addressed by preparing issue papers. The Ministry of Finance might lead the task force should the agreement be obtained.
Amend the law if needed and undertake action agreed by the task force, including HR and incentives.	Early 2022	No financial resources needed at this stage. SPIRIT might lead the secretariat of the task force. The ministry of Economic Development and Technology might lead the task force
SPIRIT monitor KPI and convene the task force twice a year to review progress and provide amendments where needed (better coordination, etc..)	2022 onwards	

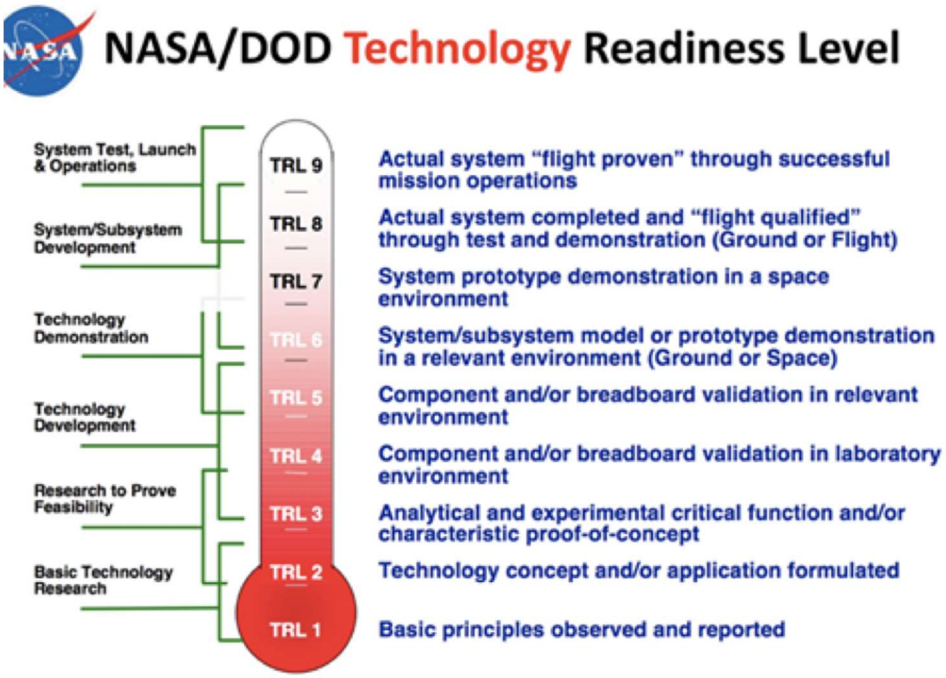
To support the development of this recommendation, the following indicators should be taken as an example to inform the development of a risk capital task force.

Name and description of indicator	Type of indicator
Task force setup, number of task force meetings, number of agreed actions, number of actions implemented, …	Recommendation indicator
Venture capital investment by stage / amount invested (OECD source)	Recommendation indicator
Conduct a regular survey (every 6 months) to a sample of investors and VCs to assess their appetite for Slovenian investment and what are the remaining barriers	Recommendation indicator
Venture Capital expenditures (Finance and Support)	System-level indicator (European Innovation Scoreboard)
State of inward FDI in GDP in Slovenia (in %),	System-level indicator
Value of inward FDI (in EUR million)	System-level indicator

4.3.3 Recommendation - Setting up the right instruments

VC is particularly missing at key stage of the start-up life, i.e. early- (pre-seed and seed) but also late- stage (growth) VC, post-TRL 9 and pre-commercial and innovation stages.

The various stages of development of a start-up according to the Technology Readiness Level (TRL) scale and VC stages are described below. TRL was initially set up by the NASA who first proposed the scale[148]. Today, this is a standard for the EU innovation policy.



To finance the various stage of development of start-up according to the TRL scale, the main five stages of VC funding are (their correspondence is illustrated below):

- **Stage 1: pre-seed and seed capita (idea):** at this point, the leaders of a start-up may not have any commercially available product yet and are instead most likely focused on convincing investors why their ideas are worthy of VC support. Seed funding rounds are typically small and are channelled toward research and development of an initial product. The money may also be used for conducting market research or expanding the team. There are seed accelerators out there, like Y Combinator, that accept applicants, provide seed capital and offer an opportunity to demo a solution to major investors.
- **Stage 2: Angel investment (start-up):** this stage is similar to the seed stage. With initial market analysis conducted and business plans in place, companies look to begin marketing and advertising the product and acquiring customers. Organizations at this stage likely have at least a sample product available. VC funding may be diverted to acquiring more management personnel, fine-tuning the product/service or conducting additional research.

[148] NASA, 2012, *Technology Readiness Level*. Available at: https://www.nasa.gov/directorates/heo/scan/engineering/technology/technology_readiness_level

- **Stage 3: Early-stage VC (development):** funding received at this stage will often go toward manufacturing and production facilities, sales and more marketing. At this point, the company may also be moving toward profitability as it pushes its products and advertisements to a wider audience.
- **Stage 4: Later stage (growth):** growth is often exponential by this stage. Accordingly, VC funding serves as more fuel for the fire, enabling expansion to additional markets (e.g., other cities or countries) and diversification and differentiation of product lines. With a commercially available product, a start-up at this stage should be taking in ample revenue, if not profit. Many companies that get expansion funding have been in business for two to three years.
- **Stage 5: Exit (maturity):** after reaching this juncture, the company may be looking to go public, given that its products and services have found suitable traction. Funds received here can be used for activities such as: Mergers and acquisitions, Price reductions/other measures to drive out competitors, Financing the steps toward an initial public offering. If all goes well, investors may sell their shares and end their engagement with the company, having made a healthy return.

The correspondence between TRL and stages of investment differs across sectors (and countries depending on the maturity of national risk capital). As a rule, Stage 1 might correspond to TRL 4-6, Stage 2 to TRL 7-8, and Stages 3 to 5 correspond to TRL9 and above.

The program StartupPlus+ is a very good practice in term of covering the various seed stages and early TRL levels but it lacks resources to reach a significant number of start-ups and SMEs (see box below): 40 SMEs for P2, 10 SMEs for SK75, and 10 SMEs for SI-SK per year.

Figure 18 - Good Practice StartupPlus+ program[149]

startupPlus+

StartupPlus+ is composed of three funding programs covering the main seed stages of the SMEs:

- P2 is a grant intended to co-finance the setting up of innovative enterprises, the development of a minimum viable product (MVP) and the launch of innovative products on the market.
- SK75 offers quasi-equity financing in the form of a convertible loan on very favourable terms to innovative enterprises that need a financial injection in the seed development phase to accelerate sales and market growth.
- SI-SK provides equity financing for innovative seed-stage enterprises that find it difficult to access financing from commercial banks or other classic forms of financing.

[149] For reference see https://startup-plus.podjetniskisklad.si/en/#funding

The table below summarises the main VC available in Slovenia, and the TRL VC stages covered.

Name	Investment stage	TRL level	Type	Ownership	Investment range (ticket) €
SEGIP / KD Fund (Generali Growth Equity Fund)	Stages 3 to 5	Above TRL9	Equity / quasi equity	25% 75%	2-7 million (total unknown)
SEGIP / ALFI PE	Stages 3 to 5	Above TRL9	Equity / quasi equity	Controlling stake investment	2-10 million (total funds 180 million)
Startup+	Stages 1 to 2	4 to 8	Grant / quasi-equity / equity	-	54k (40 SMEs per year), 75k (10 SMEs per year), and 100-600 k (5 SMEs per year)
CEETTT (Central Eastern European technology Transfer)	Stage 1	4 to 6	-	-	-

In summary, the information collected through interviews and document reviews showed the following points:

- Sub-optimal availability of risk capital for innovation at key stages;
- The Startup+ program covers early TRLs, but is not sufficient to address the whole Slovenian market (P2 MVP €54k - 40 SMEs, SK75 €75k convertible loan to access market - 10 SMEs, SI-SK €100-600k doubling private investment - 5 SMEs);
- The Central Eastern European Technology Transfer (CEETT) also cover early TRL.
- The Central Europe Fund of Funds (CEFoF) is a fund-of-fund with no application from Slovenia at the moment, while SEGIP has selected two VCs focused on stages 3-5.

To respond to the third challenge, ***VC is missing for early- (pre-seed and seed) but also late- stage (growth)***, specific schemes are missing, or underdeveloped schemes should be increased both in size and reach.

This leads to the below sub-recommendation for setting up the right instruments:

a) Set up a financing scheme for early stage/TRL5 pre-commercial equity investment (€50k – €200k in blending);

b) Strengthen equity and guarantees for late TRL (6-8) & post-project;

c) Set up an Equity scheme for Post-TRL9 innovation scale-up (€700k to €2M tickets);

4.3.3.1 Action Plan

To implement the recommendation requires the following activities:

- Mandate the Risk Capital Task force to look developing a communication package for VC
- Set up a financing scheme for early stage/TRL5 pre-commercial equity investment (€50k – €200k in blending)
- Strengthen equity and guarantees for late TRL (6-8) & post-project
- Set up an Equity scheme for Post-TRL9 innovation scale-up (€700k to €2M tickets)
- Grow a coordinated portfolio of financial instruments focused on risk capital provision to innovative start-ups and SMEs active in early (pre-seed/seed) and late (growth) stages following the model of PMV

At the system level, this will ensure a strengthened portfolio of instruments at the correct scale for Slovenia. It will also ensure coordination at national level to provide a clear offer to companies. Furthermore, the pre-commercial and innovation stages (before commercial entry) but also post-TRL9 coverage needed (boosting sales) will be better served.

As a summary, there is a need to **grow a coordinated portfolio of financial instruments focused on risk capital provision to innovative start-ups and SMEs active in early (pre-seed/seed) and late (growth) stages** following the model of PMV (see below).

Figure 19 - Good Practice PMV

- PMV[150] (Flanders Holding Company), provides funding for promising companies, from the day they first open their doors, through their various growth stages and even on to operating internationally. PMV works with and for the government and other partners, to select projects bringing prosperity and wellbeing in Flanders, that includes entrepreneurship, that is crucial for the development of a prosperous future for Flanders and everyone who lives there. Every promising enterprise project in Flanders needs to

[150] For reference see https://www.pmv.eu/en and PMV, 2020, *In the Wheel of PMV*. Available at: https://www.pmv.eu/sites/default/files/publications/210531_pmv_racereport_2020.pdf

find funding while being profitable in order to be sustainable. Which is why PMV and the companies and projects in which it invests must be profitable in the end.

- Main PMV data for 2020 on side.
- Three main pillars: risk capital, loans and mezzanine finance.
  PMV is providing tailored financing solutions for any promising business project, from their very start, through the various growth stages and even on to operating internationally. Financing for entrepreneurs can take on a range of different forms. For example, a start-up facing a lengthy development process that means not generating an income for a while, the best thing an entrepreneur can do is let PMV have a share in their capital. Or maybe taking over an existing SME with an established customer base. In which case, a loan might be a better solution for the entrepreneur.

The stakeholders involved are mostly banks, VCs, SEF, and SID but also leading players of the start-up scene such as University TTOs, technology parks, incubators, etc.

Table 14 - Roles and responsibilities for implementation

SEF SID Banka	Intermediary organisations (TTO, SRIPs, incubators, accelerators, GZS, etc..)	Ministry of Economic Development and Technology	Ministry of Finance	SPIRIT	Slovenian potential rock stars but past receivers of investment
Provide advice	Provide advice	Provide expertise	Lead the task force should the agreement from the Ministry of Finance obtained.	Lead the secretariat of the task force Monitor KPI	Lead the debate and prevent unproductive conclusions

Table 15 - Implementation of setting up the right instruments

Timeline for implementation – Month 0			
Activity	Timeline	Cost (high)	Cost (low)
Set up a **task force** to: a) Propose how to strengthen the portfolio of instruments and bring	**During the next 6 months**	No financial resources needed at this stage. SPIRIT might lead the secretariat of the task force. The secretariat is mainly responsible for:	

them to scale, and coordinate at national level to provide a clear offer to companies with a particular focus on pre-commercial and innovation stages (before commercial entry) but also post-TRL9 coverage needed (boosting sales); b) Improve the communication and coordination on SI instruments to have a clear offer for SMEs.		- Ensuring meetings are effectively organised and minuted. Liaising with the Chair to plan meetings. ... - Maintaining effective records and administration. ... - Upholding legal requirements. ... - Communication and correspondence. The secretariat might also offer sound and trusted advice on the topics addressed by preparing issue papers. The Ministry of Finance might lead the task force should the agreement be obtained. Otherwise, Ministry of Economic Development and Technology.
Amend the law if needed and undertake action agreed by the task force, including HR and incentives.	Early 2022	
SPIRIT monitor KPI and convene the task force twice a year to review progress and provide amendments where needed (better coordination, etc..)	2022 onwards	

To support the development of this recommendation, the following indicators should be taken as an example to inform the development of a risk capital task force.

Name and description of indicator	Type of indicator
Task force setup, number of task force meetings, number of agreed actions, number of actions implemented	Recommendation indicator
Venture capital investment by stage / amount invested (OECD source)	Recommendation indicator
Venture Capital expenditures (Finance and Support)	System-level indicator (EIS)
State of inward FDI in GDP in Slovenia (in %),	System-level indicator
Value of inward FDI (in EUR million)	System-level indicator

5 Conclusions and next steps

This report has outlined a set of recommendations and tailor-made measures for improving the innovation policy of Slovenia. In particular, the measures have addressed commercialisation of innovative products and services and coordination of different national and international programmes to provide systemic support to innovation. The report also provides suggestions for measures to improve the performance of Slovenia on the Innovation Scoreboard and other similar rankings. A summary of the recommendations can be found in Table 16 overleaf.

The next steps for the recommendations, as part of the overall project has been to build capacity within implementing institutions. This was done via study visits, training, and job shadowing. The study visits countries selected were Belgium and France. The visits tackled each of the priority areas and aimed to operationalise the recommendations. To this end, precise specifications were defined during the visits and key strategic but also operational aspects were borne in mind during the implementation of a recommendation.

More specifically, the concrete recommendations in this document will be used to support the redesign of an existing instrument(s) or design of a new (pilot) instrument. To this end, the Context, Mechanism, Outcome approach, already partially elaborated as an intervention logic at the beginning of this document, will be used. The consultative features of the design process are key considerations and the operational building blocks will be refined one by one based on the recommendations in this report, from process and governance, roles, checks and balances, to activities, resource allocation, risks, measurement, and other managerial aspects. The next activity for the project, Activity 5, will action this via workshops and through a dedicated survey with MEDT and SPIRIT to target training material and collect questions and feedbacks from training targets. Further steps in terms of implementation are the provision of job shadowing for staff in MEDT and SPIRIT. A dedicated coach ("shadow-partner") will be named for each SPIRIT and MEDT staff member in receipt of training. A final report will be drafted by Shadow-Partners which will compile key lessons and takeaways. This report will include coaching targets from SPIRIT and MEDT and will draw broader conclusions on the contribution of the coaching sessions and also provide recommendations for future capacity building or other aspects relevant to strengthening the Slovenian Innovation Ecosystem.

Table 16 - Summary of Recommendations and Measures

Recommendations	Resource estimate	Activity leaders
Priority Area - Setting innovation collaboration		
Recommendation: Upgrade the national entrepreneurial skills ecosystem Action plan: ● Creation of three distinct enterprise skills portfolios in MESS, MEDT and SPIRIT ● Creation of a national entrepreneurial skills platform (potentially a working group as SRIP platform) ● Pilot hackathon by 2022 ● Implement KETGATE 2021 recommendations for public researchers ● Creation of a National Action Plan for Entrepreneurship skills by 2022	1.75-3.5 FTE 15-40K Euro capital outlay for pilot action	SPIRIT SIPO Chamber of Commerce and Industry
Recommendation: Rationalise and re-structure roles and responsibilities of actors Action plan: ● Upgrading and revitalising the existing ad-hoc strategic-level group of State Secretaries for S4. It should align with the activities of the Development Council in its operations. ● Expanding the roles of the Slovene Rector's Conference and Coordination of Independent Research Institutes ● Preparing more technical feasibility studies on topics which require more elaborate and focussed analysis than has been possible to do under this study	2.7 FTE – 3 FTE	MEDT MESS Ministry of Finance GODECP Slovenian Rectors Conference Coordination of Independent

			Research Institutes Programme Committee, The New Development Council
	Recommendation: Reinforce SRIPS and establish a single RTDI platform with SRIPs Action plan: ● Secure the SRIPs funding based on a clear business plan, and private sector leadership ● Initiate a constitution-building process for the platform by inviting all relevant stakeholders to the table ● Establish new regional coordinator roles ● Establish platform working groups ● Launch joint action to reform existing online resources	3-6 FTE Performance linked element: Total salary range 135K-360K per year	Chamber of Commerce and Industry SRIPs Group of State Secretaries
	Recommendation: Build a monitoring and evaluation system Action plan: ● Appointing one staff member in MESS, MEDT, SPIRIT, ARRS and SEF to establish a dedicated joint implementation, monitoring and evaluation team (possibly within Programme Committee), in consultation with and supported by the Government Council for Science and Technology (new Development Council), that would look at the Monitoring and Evaluation design and implementation on a strategic policy level and monitor results and impacts of RRI activities. Individual M&E to be done at the level of line ministries. ● Developing a list of instruments that should be prioritised for review or a full evaluation in a Strategic Plan ● Agreeing on effective offline and online ways to periodically consult with stakeholders on the goals of the Strategic Plan ● Drafting a short-term Action Plan focused on the activities which are required in order to achieve the longer-term goals	5 FTE and 2-5% of the combined budgets of the main support instruments	Programme Committee, in consultation with Government Council for Science and Technology – new Development Council

	Priority Area - Support systems for piloting, demonstration and commercialisation		
	Recommendation: A new instrument (combination of instruments) for productive cooperation between science and business Action plan: ● Commissioning a study SS to analyse suitability of the CD Laboratory instrument ● Appointment of MESS and MEDT as leads for policy development. ● Drafting a transfer plan by MESS and MEDT with guidelines and policy orientation from the Government Council for Science and Technology (new Development Council) ● SPIRIT/ ARRS consulting stakeholders to validate transferability plan ● Recruiting dedicated staff under collaborative SPIRIT/ ARRS undertaking to prepare the programme launch	2.5-5 million Euro for CD Lab instrument	MEDT
	Recommendation: Voucher expansion and modernisation of R&D tax support Action plan: ● Re-programming the current prototyping voucher, delivered by the Slovene Enterprise Fund, to increase its maximum size to 15K ● Introducing a 50% co-financed two-step voucher for piloting, demonstration and export innovation ● Commissioning a review of differentiated tax credit, R&D wage tax exemption and patent boxes, including stakeholder consultation	3 x increase in envelope for prototyping voucher 50-150 million EUR per year for the patent box. 150-450 million EUR for Tax credit system.	SEF MEDT SPIRIT
	Recommendation: Stabilise the Technology Transfer landscape and include a proof-of-concept funding mechanism. Action plan:	Rec 3 – 3.4-4 FTE and costs 2-3	MESS MEDT

	• Pursue the KTT funding under a permanent budget for the TTO instead of a project-based budget. This would improve the performance and focus of the TTO. MESS will monitor the performance of the funding though performance indicators. • Establishment of a joint fact-finding mission to understand the state of play in local knowledge transfer practices • Commissioning of a feasibility assessment of funding a pilot call via MEDT, ERDF, Recovery and Resilience Facility (RRF) and CEETT venture capital fund of funds • Launching a pilot scheme, via MEDT in close cooperation with MESS, to make competitive funding available for two technology transfer projects delivered by a consortium of local stakeholders	million Euro for pilot tech transfer call (excluding co-financing)	TTOs SIOs
	Recommendation: Increase physical presence abroad Action plan: • Establish a working group with SPIRIT, MEDT, the Ministry of Foreign Affairs (MoFA), SID Banka, the Slovene Enterprise Fund, the Chambers of Commerce and SRIPs to begin preparations for opening an international office abroad. • Establish a dedicated Internationalisation Relationships Manager within SPIRIT • SPIRIT/ MEDT to start holding monthly meetings with Chambers and SRIPs and quarterly meetings with MoFA representatives in Austria, Croatia, Hungary, and Italy on internationalisation promotion • Launch a public/ private partnership with SRIPs/ GZS/ SPIRIT to provide a tailored support programme to SMEs who want to internationalise	1-4 FTE 565-820K for set up and first year of operations.	SPIRIT Chamber of Commerce and Industry Chamber of craft and small businesses SRIPs
	Priority Area - Building the Risk Capital Ecosystem		
	Recommendation: Address the Information and Coordination Asymmetries Action plan: • Set up an internal risk capital task force or steering group at director level to discuss political ground • Conduct a scoping exercise: risk capital for companies, blending finance, ecosystem, structures, etc. • Start consultations using the momentum to get a solid consensus among the task force or steering group: ministries or the Economy and finance, SPIRIT, SID BANKA, and SEF. Build upon individual measures. Clarify	No financial resources needed immediately, resources to be determined after tax force and work programme	Ministry of Finance SPIRIT Individual successful companies

	the role allocation/priority points: e.g. awareness raising versus specific regulatory topics. Propose a consultative Roadmap. ● Conduct the task force work. Involve independent experts to conduct analysis where needed. ● Amend the law if needed and undertake action agreed by the task force, including HR and incentives. ● Improve coordination of the current public offer, drawing inspiration from the "start-up plus" initiative with a focus on scale-up following the model of foreign agencies such as Bpifrance ● SPIRIT to monitor KPIs and convene the task force twice a year to review progress and provide amendments where needed		
	Recommendation: Reform the system level Action plan: ● Engage in a regulatory review that can lead to adjustments to the legal framework, requiring strong political leadership and a comprehensive consultative approach following the model of UK Seed Enterprise Investment Scheme (SEIS) tax relief ● Mandate Risk Capital Task force to investigate how to provide incentives to invest. ● Review the act passed in June 2021 and propose amendments if needed	No financial resources needed immediately, resources to be determined after tax force and work programme	Ministry of Finance SPIRIT Individual successful companies
	Recommendation: Setting up the right instruments Action plan: ● Mandate Risk Capital Task force to look developing a communication package for VC ● Set up a financing scheme for early stage/TRL5 pre-commercial equity investment (€50k – €200k in blending) ● Strengthen equity and guarantees for late TRL (6-8) & post-project ● Set up an Equity scheme for Post-TRL9 innovation scale-up (€700k to €2M tickets) ● Grow a coordinated portfolio of financial instruments focused on risk capital provision to innovative start-ups and SMEs active in early (pre-seed/seed) and late (growth) stages following the model of PMV	No financial resources needed immediately, resources to be determined after tax force and work programme	Ministry of Finance SPIRIT Individual successful companies

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— ANNEX 1 – Roundtable Summary

Strengthening the Innovation Ecosystem in Slovenia:

Roundtable Discussion on Recommendations

6 August 2021, 10:00 to 12:30

Summary

BACKGROUND

About this workshop

The **aim** of the roundtable was to discuss the recommendations and tailor-made measures for efficient innovation policy development to key stakeholders of the innovation ecosystem.

Introduction to the project

The roundtable was a part of the one-year EU-funded project *Strengthening the Innovation Ecosystem in Slovenia*. The aims of the project are:

- To perform research and analysis on the barriers and drivers in the Slovenian innovation ecosystem.
- To benchmark the Slovenian state of play against relevant international best practices.
- To draft recommendations and implementation activities.
- To carry out capacity building via trainings and workshops.

The project's Steering Committee

The project is organised in cooperation with the Ministry of Economic Development and Technology (MEDT), The Public Agency for Entrepreneurship, Internationalization, Foreign Investments and Technology (SPIRIT), and funded by the European Commission's DG REFORM. The project Steering Committee also features representation from the Ministry of Education, Science and Sport and the Government Office for Development and European Cohesion Policy.

For more information, please see here.

The team carrying out the project is from

— Valdani Vicari & Associati (VVA), based in Belgium.
- Laura Todaro
- Jordan Hill

- Malin Carlberg

— Oikos, based in Slovenia.
- Jurij Kobal
- Mojca Hrabar

— N-Able, based in France.
- Pierre Padilla
- Emmanuel Boudard

— KPMG Slovenia, based in Slovenia.
- Damjan Voje
- Valeska Gaber

ATTENDEES

Name and Surname	Organisation
Alenka Rožaj Brvar	SIS EGIZ, Slovenian innovation hub
Anton Habjanič	TechnoCenter, University of Maribor
Damjan Makuc	EN-FIST center odličnosti
Dolores Modic	Nord University
Dragan Mihailović	Jožef Stefan Institute
Emmanuel Boudard	N-Able
Gregor Umek	MEDT, Ministry of Economic Development and Technology
Hermina Ogrič	COBIK
Jordan Hill	VVA Europe
Karin Žvokelj	SPIRIT
Malin Carlberg	VVA Europe
Marjana Majerič	CCIS, Chamber of Commerce and Industry of Slovenia
Marjeta Trobec	Jožef Stefan Institute
Marko Jaklič	Faculty of Economics, University of Ljubljana
Martina Knavs	Jožef Stefan Institute and Nanocenter
Miha Bobič	Danfoss
Mojca Hrabar	Oikos
Nataša Vrhovec	MEDT, Ministry of Economic Development and Technology
Peter Alešnik	Knowledge and Technology Transfer, University of Maribor
Peter Glavič	University of Maribor
Petra Medved Djurašinović	CCIS, Chamber of Commerce and Industry of Slovenia
Pierre Padilla	N-Able
Robert Repnik	ARRS, Slovenian Research Agency
Robert Šipec	Ministry of Defence
Rudi Panjtar	SRIP
Sabina Žakelj Pediček	SPIRIT
Simona Kneževič Vernon	TECOS
Simona Rataj	CCIS, Chamber of Commerce and Industry of Slovenia

Špela Stres	Jožef Stefan Institute
Tanja Kožuh	Primorska Technology Park
Tilen Erman	Novartis
Tomaž Kostanjevec	SPIRIT
Uroš Rošer	Dewesoft
Urška Zupin	MEDT, Ministry of Economic Development and Technology
Valeska Gaber	KPMG Slovenia
Vojka Žunič	National Institute of Chemistry
Žiga Lampe	CCIS, Chamber of Commerce and Industry of Slovenia

Total number of attendees: 37

DISCUSSION

Priority Area – Setting Innovation Collaboration

Main discussion points during the roundtable

1. Include international members in evaluating committees.

2. Several times universities are mentioned, however, big knowledge providers are also institutions like research institutes, which would be useful to add.

3. Evaluators should be trained and educated, to be able to evaluate projects in a better way and to set up these programmes in a way that would be more applicable. In the fall, the Slovenian innovation hub organised a workshop on setting innovation ecosystem in Slovenia, and one of the recommendations was to set up an innovation council, headed by the prime minister. The role of the council would be really to have something with long-term orientation of the country and set a better environment. Having such a council would give higher responsibility and higher priority to the policies' orientation in the future.

4. The staff should be relieved from the administrative burdens, to better use their capacities. This would enable evaluators to focus on results and KPIs and not on timesheets for example. There was also a mention of previous successful instruments: for example - A Technological Innovation Agency (TIA). It is important to enable and empower SPIRIT staff to continue and improve that work. Another instrument that most companies praise is Young researchers in companies. This was set in place in the previous programming period. There were some "abnormalities" but for the most part, it was highly praised and appreciated.

5. About entrepreneurship education, one thing is to also consider one of the interesting approaches such as the venture creation programmes. You can have them done as a course, or as a master's programme (they have it at NORD University).

6. There was a lot of mention of entrepreneurship but not a lot of intrapreneurship. However, a number of people working on exciting, innovative projects, could really benefit from further training and educational opportunities.

7. Evaluation is not just "evaluation of projects" but also of programmes/policies. For a good evaluation, you need a quality monitoring system. Evaluation of the project is a challenge; evaluation of policy is a challenge of challenges. The evaluation of projects and instruments should not just focus on "abnormalities" of individual projects, but on the effect and impact, that good projects and good policies can achieve. That would bring continuity in the innovation ecosystem. The added value of a project/policy/strategy/measure during the evaluation process also needs to be identified.

8. Signposting between different players in the support system is crucial.
- SICRIS databases
- ARRS infrastructure databases
- KTT database of TOs
- EEN database of TOs
- SRIPs database

9. Creating an extra agency (as TIA) does not solve the problem. EC went for a unified agency EISMEA - the key is in collaborating, not in formal organization... Empower what already exists, without new instruments, institutions.

Poll – First Question Results

Which collaboration recommendation do you feel is the highest priority? (25 responses)

a) Upgrade the national entrepreneurship education system. 12% (3)

b) Establish a single platform for R&I, where all stakeholders would be present. 40% (10)

c) Rationalise and re-structure roles and responsibilities of key stakeholders in the system. 32% (8)

d) Build a monitoring and evaluation programme at both the systematic level and instrument level. 16% (4)

Comments on the results

- Most people (40 %) voted for *Establish a single platform for R&I, where all stakeholders would be present*. The participants coming from the industry have pointed out, that they do not have a clue about what is going on regarding research at the University of Maribor for example or where to find such information. Having a single platform with complete transparency would be very helpful in finding partners for future projects.
- On the other hand, some participants believe that there is no need for a platform, as there are so many different databases regarding R&I in Slovenia (SICRIS - *Slovenian Current Research Information System*, JSI, KTT bases, EEN bases, etc.) that have the information that the platform would have and are covering research groups from universities, companies, etc. Information about all research infrastructure is also available on ARRS web pages, with info on usage and contact points.

- Platform would be useful if it would bring all those databases under one roof. There should be a certain degree of ongoing consolidation and coordination in creating oversight. A true demonstration platform should bring all the key players organising true innovation processes on-site, that are potentially making links with the risk capital community. For example, it should connect researchers with SMEs through SRIPs.
- Embassies should add information about scientific research in Slovenia. Currently, there is a lot of information about economy in Slovenia, but nothing about research.
- One of the key issues is sign posting between different players in the support system. Obviously not everyone can know everything, therefore, an interconnected system that would closely work together is needed.
- Many participants (32 %) voted for the second recommendation – *Rationalise and re-structure roles and responsibilities of key stakeholders in the system.*
- A participant that is working within the system pointed out that there are a lot of different ministries that should daily cooperate on innovation, research, and other connected policies, but they do not. Each of the ministries has their own standpoint and is not very prepared to collaborate outside the creative nature. Even though they have the same goals, and are willing to participate, when they sit down, differences of opinion come out and active collaboration stops. If all ministries would collaborate more, even the legislation could change toward the end goal of innovation ecosystem.
- This participant also pointed out the legislation on public tenders in Slovenia. Apparently, Slovenia has several legislations acts that cover that topic with a lot of differences between them.
- Job rotation recommendation should be reconsidered. Between the Ministry of Science, MEDT and SPIRIT it is more about cooperation. They had a good agency – TIA, that was dismantled. It is about getting the collaboration between agencies and ministries going. Will job rotation programme really make them collaborate if they don't want to collaborate?

Priority Area – Building the Risk Capital Ecosystem

Main discussion points during the roundtable

1. There is a lack of private risk capital. You need to have something attractive to foreign investors, and to have enough to retain and support your start-ups.

2. One of the key issues (from the interviews) is the corporate tax rate and expenses related to employment and social security contributions. Employee stock options, for example, are not the same as in other countries. Corporate pension funds can't invest in risk capital. And Slovenian pension funds, in general, invest far less than in other countries.

3. Another issue is the regulation on changing capital: establishing a company is easy but to change capital is too complex (the notary, the costs, owners presence, etc.) These regularities are blocking the investors to make funds in the country. A task force should be established and take care of this.

4. Venture capital is the most important (not only for cash but also expertise you get from mentors). Seed and pre-seed stages need to be covered more. Later stages are currently covered better.

5. A first step is to develop a methodology, that will determine which start-up has a possibility for long-term growth. Generating start-ups just per se and having 5 % success rate is not good. The methodology would help with supporting the ones with bigger potential. This is the very "raison d'etre" of venture capitalists.

6. Recommendations talk mostly about foreign capital, but building trust within local community is also important. Make them invest not only in banks but also in start-ups.

7. Slovenian innovation deficiency depends strongly on the efficiency of the research system and the transition of knowledge to SMEs. Currently, the improvement depends strongly on the share of hi-tech exports. REACT EU is a huge opportunity to improve this situation.

8. Do not focus only on start-ups but also on spinouts and spinoffs.

9. The public research organisations still can't have capital shares in companies.

10. Two good examples were pointed out: 1) The European Investment Fund (EIF), part of the European Investment Bank Group, joined forces with Slovenia's SID Banka, and the Croatian Bank for Reconstruction and Development (HBOR) to launch the Central Eastern European Technology Transfer — CEETT — platform, a new regional platform worth at least €40 million for investment in technology transfer. This was a huge step forward for Slovenia. 2) Coordinated assistance of European Commission from European Innovation Council (Accelerator & Pathfinder) which includes Invest EU (mainly VCs) funding. It is very important that the instruments that are being put in place are interconnected and intertwined with high-level professional support in innovation management.

11. The topic of the barriers to capital shares by universities has been here for a long time, but unfortunately there never seems enough motivation to make a change in this area.

Poll – Second Question

Which risk capital recommendation do you feel is the highest priority? (22 responses)

a) Address the Information and Coordination Asymmetries. 9% (2)
b) Reform the system level (administration and taxation). 40% (9)
c) Setting up the right instruments. **50% (11)**

Comments on the results

- Risk capital is crucial for boosting the research and innovation, as it is lacking for more decades in Slovenia. However, the recommendations seem to be one step ahead. Looking from the perspective of Chamber of commerce, that has an overview of investments planned of companies, most companies will require additional financial support and SMEs are constantly looking towards a new funding scheme. They are raising issue on how to get proper investments from abroad. Firstly, legislation needs to be done and then we can proceed with other steps. Through that we can see how to make further steps.
- Another problem, as already mentioned before, is that local community is not investing. People have 24 billion euros in bank accounts as deposits, not willing to invest them in risk capital or normal shares capita. A reason behind that might be, that the government (under the pressure of EB and ECB) erased 1000 investors in the banks.

- Setting up the right instruments: the first step would be government office for structural funds. Regarding the reform of the system and taxation/regulation, the first step would be to wake up the Ministry of Finance. Research in Slovenia is mostly funded by structural funds, since the national budget is very limited and unstable.

Priority Area – Support Systems for Commercialisation

Main discussion points during the roundtable

1. If you differentiate between large companies and small companies with R&D tax breaks, it quickly becomes the state aid. If you generalize it and make it available for everyone under the same condition, then it is not being a tax state aid.

2.Industrial PhD programme was already set in place a few years ago and it should be renewed. However, industrial placements (for example in UK) should also be put in place to allow for a year or so of a researcher working in the industry partially supported by the state and with the option to return to Slovenia.

3.Academic progression needs to be changed. It should not only be tied to papers published, but also reward those who work in the industry.

4. A waste of time of public research being funded by public money is that there is limited trust level between SMEs and public research organisations. A good solution would be to create a research voucher. It would allow to build trust further (50K is good value).

5. Tax benefits for researches would be welcome because researchers are very expensive. This would help small and medium size companies to employ researches because currently they are too expensive.

6. Slovenia should thrive to have big projects, not small ones. This would unite researchers, bring more money, and achieve bigger goals. It would improve the quality of work and help Slovenia orient towards the future.

7. Vouchers should be a priority because they are the easiest/quickest to implement and effective.

8. Support for the introduction of 2-step vouchers: First step – would support product development, second step – would support the selling part (otherwise there are countless “useless” prototypes).

9. There are two levels of support: administrative-financial and innovation-content-related support. Emphasize to address how vouchers are implemented. Research institutions and infrastructure should also do the administration, and the companies only the substance/scientific/innovative issues. If you are a small company, you don’t want to do administrative work, but you know there is an institution that does that for you, you will do it. Infrastructure should then provide all the necessary support in a long-term.

10. The start-ups from the R&D sectors are underestimated and not supported enough.

11. Slovenia is too centralised. Regional point is a thing to re-consider and should be included in the final proposals. And Regional chambers with all infrastructure, experts, and trustful network (all

innovation stakeholders of regional=micro ecosystem) can help to achieve the KPI's for Slovenian benefit. When S4 was created there was a proposal that Ljubljana and Maribor would closely collaborate and coordinate the functioning of SRIPs. This had not happened but would be welcome in helping with uniform development and decentralisation. However, it is important to not focus only on Ljubljana and Maribor, but the whole country.

12. Internationalisation and commercialisation of innovations are very important. Innovating is not an issue; the problem is how to commercialise the innovations, especially for SMEs and start-ups.

13. Regarding prototyping – especially for micro and small companies access to prototyping - demonstration infrastructure is costly. That is why several SRIPs have proposed demonstration and prototyping centres.

14. Within SRIP FOF, Ministry for economic development and TECOS, High impact action (HIA) for industrial transition was implemented, where they had a selection process of 5 companies, given 50k to develop new solutions, together with pre-certified solution providers. It was done within Factories of the future. Simple, tested and easily upscaled. In order to have pilots and start-ups in the area of Factories of the future, there is a need for proper infrastructure, which will enable innovation and demonstration of new technologies. This requires proper investment. Scaling up HIA is a clear path forward, or the combination of HIA and IJS experience.
15. Connecting with existing infrastructures, including digital, is also important – there are supercomputing capacities, which could be used by those needing such capabilities, e.g. the RIVR (https://www.hpc-rivr.si/home_en/). However just having them, does not mean that people will be able to take advantage of it – but it does allow Slovenia to be prepared to engage also in 'new' trends, such as digitalization, or others such as circular economy (e.g. Horizon Strategic Plan is talking about the ' first digitally enabled circular, climate-neutral and sustainable economy'.

Poll – Third Question

Which support systems recommendation do you feel is the highest priority? (24 responses)

a) Design and implement an industrial PhD programme in Slovenia. 8% (2)
b) Voucher expansion and modernisation of R&D tax support. 41% (10)
c) Stabilise the Technology Transfer landscape and introduce of a proof-of-concept funding mechanism. 41% (10)
d) Increase physical presence abroad to boost internationalisation of innovation 8% (2)

Comments on the results

- Two things are needed, money and professional support.
- Vouchers should be professionalised and interconnected, but the voucher scheme is the best thing to do now, as it is easily and quickly implementable. There are 150,000 companies out there in Slovenia, and this is a way to incentivise them to cooperate.
- One good practice is to have a cluster in charge – use people that are familiar with research and companies and can translate the business needs (cascading model).
- SRIPs are strong for export innovation (internationalisation). They are trying hard to bring companies to international market and develop themselves and their technologies on international market.
- Another important thing that was pointed out, was to make a simulation of the process of application for all measures, to see if it is bureaucratically demanding to implement them. Very often administrators design measures to suit their viewpoint. A simulation about how

it is going to proceed (which forms need to be filled, who needs to fill them, do people need to be present,…)is a practical measure helping to implement only the most efficient measures rather than some theoretical, hypothetical good ideas, which eventually fall flat because they are simply to administratively demanding.

Final comments

- Clear rules which mechanism or which institution has a role of a coordinator. Slovenia support mechanisms are too fragmented. Sometimes there is also overlapping of support activities. This is not good because also from the scope of financing they are overlapping. We can make this disappear with clear rules and roles for each key player.
- European commission tried the one stop shop, and this has later developed into the principal of sign posting. There is little use of making list of responsibilities that are going to change soon anyway. Is more about knowing who to turn to when you need information.

Conclusions

— Academic progression should not be tied solely to papers published, but also to commercial participation and active involvement in the industry.

— Bring back the industrial PhD programme with certain improvements (industrial placements – UK).

— Relieve the staff from the administrative burdens, to better use their capacities for evaluation of projects and policies.

— Work towards decentralising Slovenia and at the same time build a uniformed development agenda on a national level.

— Focus on attracting foreign risk capital but do not forget on building trust with the local community, who is too reserved for investing in risk capital.

— Venture capital is the most important (not only for cash but also expertise you get from mentors). Seed and pre-seed stages need to be covered more. Later stages are currently covered better.

— Thrive for bigger projects that would unite researchers, bring more money, and achieve bigger goals.

— Tax benefits for researches would be welcome because researchers can be very expensive, especially for small and medium sized companies.

— One of the key issues is sign posting between different players in the support system. An interconnected system that would work closely together is needed.

— There is little use of making list of responsibilities that are going to change soon anyway. What is important is knowing who to turn to when you need information.

— Platform is a good idea if everything will be under one roof. Use the databases that already exist.

— Make voucher scheme a priority, as vouchers are the easiest/quickest to implement and very effective. Start with improving what we already had in place; introduce two-step vouchers, which would support the innovation and the selling part.

- With the help of simulation, try to only implement the most efficient measures rather than some theoretical, hypothetical good ideas, which fall flat because they are to administratively demanding.
- Access to infrastructure, established and maintained in a long-term, is a crucial element of any improvements to the system.
- Research institutions and infrastructure should do the administration, and the companies only the substance/scientific/innovative issues.
- Develop a methodology, that will determine which start-up has a possibility for long-term growth and focus on supporting those.

— ANNEX 2 – AmCham Instrument[151]

Partnership for Change – the national cooperation platform

Partnership for Change is a national platform for collaboration, a program dedicated to innovative cooperation between the public and private sector with the aim of transferring of best practices, methods and principles and exchange of employees. It is one of the rare public-private blended programmes where both parties participate in the programme set up, planning and implementation. The platform is being managed and implemented by **AmCham Slovenia** and the Ministry of Public Administration. Origins of the platform date back to 2015 when Snežna kepa (snowball) think tank and then the minister of public administration searched for solutions for better integration of public administration and the economy and came up with the employee exchange. First exchange was launched with the participation of 27 employees, 23 companies and the Ministry of Public Administration cracking stereotypes on "lazy public administration". Besides employee exchange that takes place every year, Partnership for Change addressed several topics and solved several challenges that different stakeholders in Slovenia recognized as important. **To date Partnership for change connected over 180 Slovenian and international companies, over 30 ministries and other public bodies and over 500 employees from business and public administration[152].**

The success lies in the open and transparent approach to identification of a challenge to be addressed with open innovation methods, joint selection and design of the approach solution fining tools and co-working principles embedded in the process.

The Partnership for Change program has also received awards abroad. In 2016, the program received a Creative Network Award for Best Practice from the AmChams in Europe network, which connects 43 countries and 45 AmChams from Europe and Asia. In July 2016, Partnership for Change program also run in the OECD call for innovation in the public sector, where they are looking for globally interesting stories. Among more than 150 applications received, they managed to be shortlisted and presented at one of the largest annual government conferences in Dubai. In 2020 Partnership for Change was also part of the global OECD event "Governments after Shock" [153].

Partnership for Change and similar instruments have a potential to become a widely used exchange and learning tool for various topics which need to be addressed by the public administration and business and citizens. The instrument may be used to develop other platforms to be used in various topics and verticals and for the development of cooperation among quadruple helix partners.

Table 17 - Summary of Instrument Partnership for Change

Instrument	Quality
Aim	Intensification of innovation/development cycle, improvement, and exchange of knowledge
Impact	Changed management, better knowledge and employee management, Intensification of collaboration with others

[151] Evaluation taken from State of Play report, completed as part of Activity 2 for the project.

[152] AmCham, (2021) Partnerstvo za spremembe - Nacionalna platforma sodelovanja. AmCham, Ljubljana, 2021

[153] Ibid.

Target group	Public administration and business
Size of funding	No funding per beneficiary, the value of the knowledge of high value, job rotation.
Knowledge sharing	Among participants, potential for more intensive sharing of co-working principles and tools
Lessons learned	There is a lot of space for the open innovation and co-working methods in blended public-private environments where new approaches to challenges may be developed for the benefit of all in the process.

— ANNEX 3 – KETGATE 2021 Recommendations

Source: https://gapr.pl/wp-content/uploads/2021/03/Recommendations-for-qualification-measures-targeting-RTO.pdf

Recommendations

Investment in research capital is essential to ensure that Central Europe has the best available resources to stimulate industrial growth, especially SME growth. Industry benefits greatly from capital investment through access to advanced facilities as well as access to world-leading scientific and technical expertise. Therefore, KETGATE recommends concrete activities in four working areas: 1) Trainings and further education, 2) Mentoring, 3) Infrastructure and 4) Joint Initiatives

1) Training and further education

Scientist in applied research are the shapers of innovation. However, they are under more strain than ever before, with mounting job insecurity and ever-increasing pressure to not only have skills on the industrial areas of the future, but also on business models and management. Technology centres, governments and policy makers are in a key position to help alleviate some of the problems faced by scientists working in applied research. The most important training recommendations are described above.

a) English Language Training

Working on a European level demands mastering English to be able to communicate faster with your customers. For that reason, it is essential, that technology centres offer English courses to their employees, especially the courses oriented to professionals and scientist.

b) Training on Business Skills

To be able to support a company to put a product into the market, it is not enough to be a technological expert. It is imperative, that scientist also understand and use business language, and can implement business concepts to their developments. Some courses recommended by KETGATE are:

- Business model development
- Product profitability
- Equity finances
- How to pitch in front of investors?
- Acquisition skills: how to approach industrial clients?

c) Training on Industry 4.0

The trend towards industrial automation and Industry 4.0 will change production significantly in the

future. Therefore, it is imperative to ensure that scientists are highly skilled in the principles of

automation and Industry 4.0. Scientists need to be highly competent in using such instrumentation, be adaptable to different types of equipment and be able to interpret results that may significantly enhance industry competitiveness. Some relevant topics to meet the challenges, that production companies will face in the future are:

- Introduction to Automated Production Systems
- Sensors, Controls and Drive Technology
- Handling Systems and Industrial Robots
- Automated Quality Control#
- Manufacturing and Assembly Technology#
- Multi Machine Systems
- Design and planning of automated production facilities
- Use Cases: Industry 4.0 in Industry

Learning by doing and using are the principal drivers of incremental innovation. In almost all fields of production of goods and services, the repetition of production tasks leads to a gradual improvement in the efficiency of production processes and product/service design and performance. The importance of such 'learning by doing' processes has long been recognised, as has the central place of direct production workers in innovation as sources of work-based learning. Such work-based learning is highly recommended by KETGATE. This can be done in learning factories or fab labs.

2) Mentoring

Mentoring is a relationship between people or organisations with different levels of experience. Its main goal is to enable learning and growth. The more experienced mentor guides the mentee for a certain duration of time. It was proved during KETGATE that mentoring is a great tool for unexperienced RTOs to learn how to work with SMEs and understand their needs. In KETGATE, this mentoring will be further promoted, so we all members can benefit by working with SMEs and complement each other.

3) Infrastructure

CE research community requires a range of leading-edge capabilities and technologies to support its research programmes to serve SMEs. The most important infrastructure needed are described below:

a) New and transformative equipment for world-leading research

Early acquisition of new and transformative equipment is a major requirement of the research base to maintain research and innovation capability. Researchers require access to state-of-the-art instrumentation to underpin cutting-edge research and support industry to develop innovative products and services. Facilities in CE needs to invest in this area to retain, foster and develop their capabilities.

b) E-Infrastructure

In addition to keeping pace with necessary upgrades of laboratory resources, developments in instrumentation technology, IT and automation are producing a constant stream of new

tools that transform the speed, resolution and accuracy at which research can be accomplished. Instrumentation in its broadest definition is a key building block of collaborations at a multidisciplinary level – where ground breaking technologies that change how we live and interact are often discovered – and more importantly, at the industrial level, where exploratory research is required to overcome commercial challenges.

Moreover, research across a wide range of disciplines requires an ecosystem of computational resources (e-infrastructure) that can allow distributed collaboration and computation, large scale simulation and analysis, and fast access to data and facilities. Investment in infrastructure to capture data flows, convert data to information and derive new knowledge and understanding will liberate the potential of 'big data' to benefit business, provide better public services and to advance research.

4) Joint Initiatives

In order to meet the challenges of today's and tomorrow's innovation systems, it is not enough to simply stay on top of existing approaches to innovation research; we also need to explore new, cross-disciplinary avenues. With this in mind, KETGATE recommends the following activities to improve the services offered by RTOs for SMEs in CE:

a) Excellence through complementarities and synergies

KETGATE recommends RTOs to create a distinct scientific profile to encourage collaboration aimed at dovetailing excellence in applied research for SMEs. Therefore, KETGATE will support RTOs to promote the competitiveness and stellar scientific achievements of all its RTO members. At the same time, KETGATE strives to forge new paths in innovation research and integrate complementary competencies within the network to better support SME to solve technological challenges

b) Visibility through transparent competencies and services

According to the point above, KETGATE recommends that all RTOs in the network creates a profile of competences, services and infrastructure that is visible to all members in the network. KETGATE thus serves as a central point of contact for its target groups and enhances the visibility and transparency of the services provided by the various RTOs.

c) Future orientation through cooperation and agenda setting

Moreover, KETGATE recommends making common strategies among the RTO members to be able to identify future-relevant challenges and technological developments early on and expand their services portfolio in the field of innovation research to reflect the new demands. KETGATE will facilitate this process by acting as a central point, where strategic approaches will be discussed regularly.

5. Conclusions and Recommendations

Investment in research capital is essential to ensure that Central Europe has the best available resources to stimulate industrial growth. Industry benefits greatly from capital investment through access to advanced facilities as well as access to world-leading scientist with the high-quality skills. Technology centres, governments and policy makers are in a key position to help better qualify scientists working in applied research, to invest in the much-needed cutting-edge infrastructure and to work on joint initiatives to shape the future of industrial innovation.

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