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Co-Development of Use Cases of Mission Oriented Innovation Policies DELIVERABLE WP3 (D3.4)





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Table of Contents

1.		.6
2. TOP	USE CASE 1: "NAVIGATING THE DUTCH MISSION-DRIVEN INNOVATION POLICY AND SECTOR APPROACH IN RELATION TO THE EU MISSIONS"	.8
	1 Introduction	.9
	2 From top sectors to mission-driven innovation: 2012-2023	.9
	3 Evaluation and way forward: 2024-2027	11
	3.1 Dutch missions, KIAs and KIC	11
	3.2 Shared ambitions with the EU Missions	13
	4. Governance of the Dutch mission-driven innovation policy and the top sector approach	14
	4.1 Missions, top sectors, TKIs,	14
	4.2 Linking to the EU Missions	16
	4.3 Public-private collaboration	17
	4.3.1 Industry involvement	17
	4.3.2 Public-private partnerships	17
	5. Programmes and financial instruments	18
	5.1 Fiscal instruments	۱9
	5.2 Loans and credits	20
	5.3 Subsidies	20
	5.4 European financial instruments	21
	6. Monitoring, evaluation and impact	22
	7. Conclusions	22
	Annex I List of interviewees	24
3. ENG	USE CASE 2: IMPLEMENTING A MISSION-ORIENTED PARTICIPATORY APPROACH TO AGE CITIZENS IN THE DEVELOPMENT OF SOCIETAL AI APPLICATIONS	25
	1. Introduction	25
	2. Description of the Flemish TRAMI Use Case 'AMAI!'	25
	2.1. Context – why the AMAI! programme is of interest to missions developers	25
	2.2.The AMAI! methodology	26
	2.3. Lessons learned, highlights and future outlook	31
	3.Generalization and policy context	33





		3.1.Broad applicability of citizen engagement approach33
		3.2. Alignment with mission-oriented innovation policy
	4	Conclusion34
4.	ן 	JSE CASE 3: BUSINESS FINLAND R&D FUNDING PROGRAM FOR LEADING COMPANIES
VEI	U	36
	1	- Introduction
		1.1 TRAMI and Use Cases
		1.2 The national-level R&I missions/targets
		1.3 Companies involved through bottom-up approach
	2	- Description of the Business Finland Leading Company Initiative
		2.1 Context – why the initiative is of interest to missions developers
	3	- Feedback and messages by Veturi companies on the mission approach
		3.1 How do global companies conceive the Veturi initiative and Missions42
		3.2 Impact of Veturi funding – contributing to global challenges through a bottom-up approach
		3.3 Potential limitations of top-down missions and funding instruments
		3.4 Veturi companies' perceptions and comments on the EU Missions45
5.	ι	JSE CASE 4: STRATEGICALLY ESTABLISHING A MISSION ORIENTED APPROACH –
EXPE	RI	ENCE AND LEARNINGS FROM REGION BLEKINGE
	1	About Missions
	2	About the Project
	3	"Blekinge is an a Mission"64
	4	The Transition Journey68
	5	Insights
	6	Summary and Key learnings85



1. EXECUTIVE SUMMARY

The Deliverable *D3.4 Co-Development of Use Cases of Mission Oriented Innovation Policies* reports the four separate Use Case studies organized by the Work Package 3 of the TRAMI Project. Each Use Case comprises an individual piece of work, presenting a national and/or regional policy initiative considered to be of interest in the context of developing new ways to implement efficient mission-oriented policy programs. Each of the four sub-reports can be extracted from this summary report and be used individually.

The first use case, "Navigating the Dutch mission-driven innovation policy and top sector approach in relation to the EU Missions", focuses on the design and implementation of Dutch mission-driven innovation policy and the top sectors approach and how they relate to the EU Missions. In this paper we aim to describe the mission-driven innovation policy and top sectors approach and identify synergies between the Dutch and EU Missions, and how we could best make use of them to reach shared goals. It is therefore, both an analysis of the existing policy context and governance as well as an exploration of potential.

The second Use Case, "Implementing a mission-oriented participatory approach: engaging citizens in the development of societal AI applications", describes the observations and findings regarding the Flemish TRAMI Use Case 'amai!'. The case focuses on developing a mission-oriented participatory approach, especially centered on engaging citizens in the creation of new societal artificial intelligence (AI) applications. The initiative is run and coordinated by two partner organizations: Scivil, the Flemish center for citizen science, and the Knowledge center Data & society in Flanders. The key focus of the case is to provide insights in how to engage citizens in Missions – an engagement that has been identified as a particular challenge in implementing the EU missions.

The third Use Case, "Business Finland R&D Funding Program for Leading Companies 'Veturi'", displays an interesting example on how for-profit companies can be engaged in mission-type activities – an engagement which has been identified as a particular challenge in the practical mission work. In the Veturi programme, the leading company commits itself to a certain increase of its annual (Finnish) R&D expenditures. And, importantly, in a way that the company's R&D investments, together with the surrounding ecosystem's investments, contribute to the solution of a specific significant future challenge. It should be noted that although the Veturis are not directly called "missions", their background, planning and activities are strongly inspired by mission-oriented policy development. One of the key findings is that for-profit companies can take a strong interest in seeking solutions to societal and environmental challenges, given the chance to do so in a way that fits their strategies and capabilities as a company.

The fourth and last Use Case, "Strategically establishing a Mission oriented approach - experience and learnings from Region Blekinge", shows how regional and municipal actors can practically engage with a mission-oriented approach and more specifically the EU Missions. The core team in Region Blekinge





understand the former as an operational "Innovation Method" and the latter as a "Framework" that sets out the strategic direction.

Region Blekinge used methods from service design to approach the integration of challenges. This process began with an *exploration* phase followed by *anchoring* the missions regionally and initiating new collaborations by studying challenges together with local actors. A key decision during this process was to combine the Smart Specialization Strategy with the missions approach and EU missions, namely the Mission for Climate Adaptation and the Mission for Restoring Ocean and Waters. The Use Case provide insights into the challenges that arise when applying a mission-oriented approach on the regional scale.

A plenitude of policy initiatives exhibiting qualities of interest to implementation of EU and national mission policies already exist in the 27 EU Member States, as well as in their hundreds of regions. The four Use Cases presented here are just a few examples and cannot necessarily directly be implemented outside their original context. Anyhow, intensified exchange of ideas and experiences regarding efficient implementation of mission policies seems a worthwhile exercise. This is also why the main findings from these Use Case reports will reappear in the TRAMI Missions Playbook, widely disseminated online as hopefully inspirational and informative showcases of missions-oriented policy actions in practice.





2. USE CASE 1: "NAVIGATING THE DUTCH MISSION-DRIVEN INNOVATION POLICY AND TOP SECTOR APPROACH IN RELATION TO THE EU MISSIONS"

The Netherlands' TRAMI use case

We know our end goal, but how do we get there?

Navigating the Dutch mission-driven innovation policy and top sector approach in relation to the EU Missions

Laura Platenkamp, Saske Hoving





1. Introduction

The Netherlands Enterprise Agency (RVO) is partner in the Transnational Cooperation on the Missions Approach (TRAMI) project, a Horizon Europe project that aims to strengthen the implementation of the EU Missions at national, regional, and local level throughout Europe. It does so by gathering knowledge, facilitate learning and building new networks of key stakeholders, by means of, among other things, writing up use cases of relevant, national mission implementation experiences. These use cases help to understand drivers, obstacles, and processes contributing to EU Mission implementation.

This use case focuses on the design and implementation of Dutch mission-driven innovation policy and the top sectors approach and how they relate to the EU Missions. In this paper we aim to describe the mission-driven innovation policy and top sectors approach and identify synergies between the Dutch and EU Missions, and how we could best make use of them to reach shared goals. It is therefore, both an analysis of the existing policy context and governance as well as an exploration of potential.

This use case is timely: the first evaluation of the EU Missions at European level was completed in June 2023 and November 2023 marked the month in which the Dutch Knowledge and Innovation Agenda's for the period of 2024-2027 ((*Kennis en Innovatieagenda's*, KIAs), which describe mission-driven research and innovation goals) were finalized and <u>published¹</u>. The Netherlands also commits itself to link its mission-driven innovation policy to relevant EU programmes, including Horizon Europe and the EU Missions.

In Chapter 2 we give a brief overview of the background of Dutch mission-driven innovation policy and the top sector approach. In Chapter 3 we will describe the status of the policy and approach. In Chapter 4 we look at governance, in Chapter 5 at the programmes and financial instruments and in Chapter 6 at monitoring, evaluation and impact. We assume pre-existing knowledge about the EU Missions and will not explain them in detail. Throughout the document we look at how the Dutch mission-driven innovation policy and top sector approach (doesn't) take(s) the EU Missions into account and where the synergies are. Lastly, we will share our conclusions.

In the development of this use case we have done a desktop review of grey literature on Dutch mission-driven innovation policy, the top sector approach and the EU Missions. In addition, we have held interviews with Dutch stakeholders within the top sector ecosystem who play a key role in developing the KIAs implementation or who have given input on Dutch mission-driven innovation policy and/or implementation of EU Missions in the Netherlands. In total thirteen people were interviewed. All data gathered in the interviews has been anonymised. A list of interviewees is provided in Annex I.

2. From top sectors to mission-driven innovation: 2012-2023

The Dutch Top sectors approach was introduced in 2011 by the Ministry of Economic Affairs (now called Ministry of Economic Affairs and Climate) and Ministry of Education, Science and Culture. The aim was to strengthen the economy after the financial crisis and was essentially an industrial policy. The top sectors brought industry, the scientific community and government together to stimulate joint innovation. The top sectors were structured around nine economic sectors that are key to the Dutch economy: agriculture, horticulture, logistics, high tech systems and materials, life sciences and health, chemicals, creative industry, energy and water. A tenth top sector was added later (Figure 1). This sectoral approach meant that innovation was primarily aimed at the priorities existing within

¹ www.topsectoren.nl





those sectors at the time. The business communities were encouraged to invest in public research and development (R&D). For every euro that a company invested in R&D, the Ministry of Economic Affairs added $\notin 0.30$. This made investing in innovation much more attractive and companies were more closely involved in research.



Figure 1 Ten Dutch top sectors

The top sector approach was revised in 2018 to become the Mission-oriented Top sector and Innovation Policy' (MTIP), with an emphasis on societal challenges. The reform was triggered by a change of political majority at the general election of 2017. After a political and public debate about whether or not the top sector policy should be dismantled, it was decided to mix both the sectoral and challenge-driven approach. The approach was summarized as follows:

"The mission state a clear need for specific research and innovation. Scientist can extensively research diseases, natural resources and data, so we learn how to better treat and use them. With little waste or error. Subsequently, entrepreneurs play a key role in converting innovation to concrete applications and products. They also provide employment and economic opportunities in the Netherlands as well as abroad. The government promotes ground breaking innovation: by investing in research, amending laws and regulations, entering into public-private partnerships, socially responsible procurement, providing financial arrangements and creating new markets."²

In 2019, the top sectors developed four KIAs targeting societal challenges, and one targeting key enabling technologies. Within the four societal themes, the Dutch government defined 25 missions. These missions focused on ensuring a long and health life for citizens, sufficient clean water and safe food, reduced greenhouse gas emissions, affordable sustainable energy and a safe and secure country to live and work in. Ambitious for 2030, 2050 and beyond that challenged entrepreneurs and scientists to develop pioneering solutions and contribute to the competitiveness of the Netherlands. The novelty of the mission-driven approach was that the public and private top sector partners now were formulating the KIAs within the context of clear societal impacts as set by the government, meaning going beyond sectoral interests. The top sector thus played a central role in

² Factsheet, Dutch missions for grand challenges Mission-driven Top Sector and Innovation Policy: Government of the Netherlands, <u>Factsheet Dutch Solutions to Grand Challenges_EN | Topsectoren</u> (2019)





outlining implementation and subsequent activities of the missions and the formation of partnerships to support these.

The themes and 25 missions guided policy, programming and funding within all top sectors for the 2020 – 2023 period. The KIAs are be revised every four years. Linked to this, government, industry and the scientific community sign a framework commitment, called the Knowledge and Innovation Convenant (KIC), containing the financial commitment by public and private parties. The KIC 2020-2023 included commitment indications for a total value of €4.9 billion each year, €2.05 billion of which will come from private sources and €2.85 billion from public funds. The duration of the KIC is the same as that of the KIAs, i.e. four years, with the possibility of an interim adjustment after two years.

3. Evaluation and way forward: 2024-2027

3.1 Dutch missions, KIAs and KIC

Positive experiences were gained with the mission-driven top sector approach in the period 2020-2023, in particular with regard to the boost in innovation that resulted from the formation of public-private partnerships in combination with shared mission objectives. The missions give stakeholders a common language. But there are also opportunities to further strengthen the focus on valorisation and market creation. In addition to research programming and a strong knowledge base, innovation requires government efforts to create the right preconditions in terms of legislation and regulations, and for example innovative procurement. In this regard, more attention to scaling up of promising innovations was needed. This in turn, meant more cooperation between the ministerial departments and other government organizations, but also with companies, knowledge institutions and other organizations was needed to formulate appropriate actions.

In 2023 the missions were also reassessed. They are now five central missions, with several subgoals:

- Energy transition: the Netherlands climate-neutral by 2050;
 - A fully CO2-free electricity system;
 - A carbon-free built environment;
 - A future-proof build environment in 2050;
 - A climate-neutral industry with the reuse of resources and products;
 - Emission-free and future-proof mobility for people and goods.
- **Circular Economy**: the Netherlands fully circular by 2050;
 - All environmental effects of raw materials use in a circular economy (of all Dutch production and consumption) stay within planetary boundaries;
 - Decrease of raw materials use;
 - Increase percentage of renewable raw materials used;
 - Increase the life-span of products and parts;
 - Recycling of materials to their original value.
- Agriculture, Water and Food: a vital rural area and a resilient nature in a climateproof Netherlands. Water and soil are decisive. The agricultural and food system is sustainable and healthy, and the delta is safe;
 - Resilient nature and vital soil;
 - Sustainable agriculture and horticulture;
 - Vital rural area in a climate-proof Netherlands;





- Sustainable and valued food that is healthy, accessible and safe;
- Sustainable and safe use of the North Sea and other large waters;
- Safe and resilient delta.
- Health & Care: By 2040, people in the Netherlands live at least 5 years longer in good health, while the health inequalities between the lowest and highest socioeconomic groups will have decreased by 30%;
 - By 2040, the burden of disease resulting from an unhealthy lifestyle and living environment will have decreased by 30%;
 - By 2030, care will be organized 50% more (or more often) in one's own living environment, by one self and together with the network around people;
 - By 2030, the proportion of people with a chronic disease or lifelong disability who can participate in society according to their wishes and capabilities will have increased by 25%;
 - By 2030, quality of life of people with dementia will have improved by 25%;
 - By 2035 the population will be better protected against socially disruptive health threats.
- Security: The Netherlands is safe and resilient to external threats and undermining crime, both in the physical environment such as the digital domain;
 - Integrated approach to organized, subversive crime;
 - Cybersecurity;
 - Space: safety in and from space;
 - Maritime high-tech for a safe environment;
 - High-tech land performance.

Based on these five missions, five KIA's have been formulated. These agenda's concern the commitment to the missions, from R&D to valorisation and attention to market creation. Besides these five KIA's, three additional crosscutting KIAs have been developed (figure 2). The Key Enabling Technologies and Digitalization KIAs create important conditions for the realization of the five central missions and economic growth. The KIA Social Earning Capacity focuses specifically on what is needed to move from technological development to actual acceleration of transitions through scaling up innovation. This includes paying attention to the social side of innovation, sustainable design principles and the development of innovative business models.

The KIAs are now consistently applying the Theory of Change. This has made visible which challenges need further attention. Because of the complexity of societal challenges of the missions, a distinction has been made between fundamental knowledge (least predictable outcomes), applied science (somewhat predictable) and actions to implement knowledge and innovation.



Funded by the European Union





The KIC has also been renewed at the end of 2023. In the <u>KIC 2024-2027 (*in Dutch*)</u>, the joint commitment of companies, knowledge institutions and governments is €5.7 billion for the year 2024 to stimulate mission-driven innovations. Of that amount, €1.4 billion comes from companies and €4.3 billion from public funds. The intended financial contributions as formulated in this agreement are an indication of the financial resources that the partners expect to deploy in the coming years for innovation driven by the public-private partnerships in the eight KIAs. Every year, the KIC partners set priorities for the year ahead consider its contribution to the missions.

3.2 Shared ambitions with the EU Missions

There is significant overlap in ambitions and targets in the Dutch Missions and the EU Missions (see Figure 3) . The KIC states that the Dutch Missions and the KIAs complement the EU Missions well. Apart from the Dutch Mission on Security, all EU Missions are relevant, as can be illustrated below. The Mission on Climate-Neutral and Smart Cities has synergies and overlaps with the Dutch Missions on Energy and Circular Economy. The EU Mission on Cancer has synergies with the Dutch Mission on Health and Care. However, this mission also has some synergies with less obvious EU Missions, such as Climate-Neutral and Smart Cities (with regard to a healthy living environment). The EU Missions on Soil, Oceans and Climate Adaptation have clear synergies with the Dutch Mission on Agriculture, Water and Food. However, the targets are not always the same. For example, the Dutch aim to become climate-neutral is 2050, whereas the EU aims for the 100 front-runner cities to become climate-neutral in 2030.

Funded by the European Union



Figure 3 EU Missions (dark blue) and Dutch Missions (light blue) and their relationship

The Dutch Ministries are tasked with ensuring the Dutch mission-driven innovation policy is aligned with the ministerial priorities, such as sector-wide agreements on agriculture, climate, and healthcare, as well as the national scientific agenda. The Ministry of Economic Affairs and Climate and the Ministry of Education, Culture and Science are the formal delegates for the Netherlands in the overall Horizon Europe Strategic Program Committee. Other Ministries provide delegates for specific parts of the Horizon Europe program, such as the Clusters in Pillar 2. Hence all ministries are tasked to align Dutch mission-driven innovation policy to Horizon Europe. The Dutch missions are developed in conjunction with EU policies and global goals (such as the SDGs) and hence are influenced by these. However, the extent to which this is done in an explicit way is not clear. In addition, it was mentioned that alignment between Dutch and EU missions should first and foremost take place at national policy level, i.e. during the formulation of Dutch missions.

4. Governance of the Dutch mission-driven innovation policy and the top sector approach

4.1 Missions, top sectors, TKIs

The Dutch Missions are formulated by several Ministries and the Ministry of Economic Affairs and Climate has the final responsibility for developing and managing the mission-driven innovation policy approach. It means that ministerial departments are working together to formulate the missions, and given the complexity of the challenges this is very helpful. However, this is not an apolitical process so it isn't devoid on making some calculated decision on what instruments and programmes are considered part of the missions. Formulating the missions may appear as a very top-down approach, but given the frequent interaction of ministerial civil servants with stakeholders involved





in the top sectors, this is not done in splendid isolation. It involves an iterative process (top-down <-> bottom-up) where innovation needs from industry and government are combined with innovative ideas from knowledge partners and in which joint innovation agendas towards the Mission goals are being defined.

Figure 4 shows the governance of Dutch mission-driven innovation policy (or Mission-oriented Innovation Policy). The approach to the missions is exemplified by multi-stakeholder collaboration. The key benefit is the creation of a 'coalition of the willing' around common goals and the key to its success is to make sure this coalition consists of the vast majority of relevant stakeholders. For the Ministry of Economic Affairs and Climate this policy provides an opportunity to maintain focus on economic opportunities, while fulfilling the societal needs, foster public-private collaboration and stimulate impact-driven R&D. And for societal stakeholders, the missions help to provide confidence in policy consistency, making it easier for companies for example to take risks.



Figure 4 Governance of Netherlands' mission-driven innovation policy (MIP)³

Whilst the mission are set by the government, in the implementation of Dutch mission-driven innovation policy, the top sectors play a key role (see also Figure 4). Each Top sector consists of a Topteam of high-level representatives from science, industry and policy, the so-called triple helix. The Topteams are regulated by the Ministry of Economic Affairs and Climate, which also organizes and chairs a half-yearly steering group meeting of all the KIC partners. The Top sectors have one or more TKI; the 'Topconsortia for Knowledge and Innovation'. Together, the top sectors are responsible for creating and implementing the Knowledge and Innovation Agendas (KIAs) in which stakeholders articulate their visions on the directions in which they want to develop. Although important decisions are mostly taken by the Topteam members, The TKI have a staff of multiple people (part of which are also active in their main jobs), which have the capacity to engage with

³ Janssen, M. 'Adviesnota monitoring en evaluatie missiegedreven innovatiebeleid', Utrecht University (2023).





stakeholders and coordinate the writing of the KIAs. Taking a rather systemic perspective on innovation, the top sectors also deploy initiatives for supporting human capital development, export activities, and reconsideration of regulatory barriers. The development of the KIA is exemplary of the top sectors' role of bringing together industry, government and the scientific community (see also Figure 5).



Figure 5 Implementation of Dutch missions through KIAs

The governance of mission-driven innovation policy with the top sector approach is quite complicated, and there is quite a bit of overhead involved. For all TKIs foundations have been established. And, for example, the KIA on Land, Water and Food involves three top sectors and five TKIs. As such formulating a KIA can be a rather lengthy process. However, the opportunities for cross-over, the facilitation of societal networks, sharing knowledge and supporting innovation ecosystems is critical.

4.2 Linking to the EU Missions

There are no deliberate linkages between the governance structures of the Dutch mission-driven innovation policy and top sector approach and the governance of the EU Missions in the Netherlands⁴. Instead the linkages are mainly there because of an overlap in stakeholders that are involved in both Horizon Europe and/or EU Missions governance or projects, and because stakeholders within the top sectors and TKIs stay informed about ongoing EU processes.

RVO is not only the administrator of many of the national level financial instruments and subsidies in the Netherlands, it also hosts the National Contact Points for European financial instruments, including Horizon Europe and the EU Missions. In this role RVO has established consultation communities (Klankbordgroepen) with a wide range of stakeholders that apply to Horizon Europe calls and are involved in the EU Missions. Here, there is quite some overlap in stakeholders that are part of those groups and that are also part of TKIs or part of the wider top sector ecosystem. The TKIs use the KIAs to provide input through the Klankbordgroepen into for example Horizon Europe

⁴ For an overview of the governance of the EU Missions in the Netherlands, please view the TRAMI Mission Data platform (<u>TRAMI - Mission Data Platform (mission-data-platform.eu)</u>) or the TRAMI Mapping Analysis Report (<u>Mapping analysis report | TRAMI (trami5missions.eu</u>)).



draft working programmes. The TKIs use the KIAs as input to the Horizon Europe work programs, however input isn't always provided as it takes capacity and staff are often busy.

There is quite some variation in the level of information that TKIs have on Horizon Europe and the EU Missions. Some stakeholders are very familiar and stay up to date, but this is mostly dependent on their role in European projects or because they proactively do so, rather than there being a formal link. Here, it is noteworthy that the TKIs don't have an overview of who from their network plays an active part in European projects.

There is also a difference between the type of stakeholders: the scientific community and other knowledge institutes are very aware of European opportunities, but for smaller stakeholders and for industry this is more difficult and less of a natural fit. However, for many stakeholders in the top sector ecosystem it would be interesting to get a sense of how the Netherlands is doing in relation to other European countries. Here the top sectors and RVO could play a role to point out the relevant stakeholders the opportunities in Europe and to the outcomes of interesting projects on European level.

4.3 Public-private collaboration

4.3.1 Industry involvement

It isn't necessarily easy to involve industry and also not to the same extent in all TKIs. In formulating the KIAs there are several ways of involving industry, for example through regional or sectoral branch organisations. There are a number of factors that play a role in this. One is that in the end, the missions are formulated by government. Another is that KIAs are drafted by the top sectors, which for some topics means an emphasis on a rather scientific approach, putting industry focus more to the background. And there are some sectors that are inherently more difficult to involve, given that there may be less business opportunities or less financial carrying capacity, which is key to creating willingness to collaborate ('what's in it for them?'). The missions create common goals, which are often aligned with industry, however at the end of the day, a company does need to make a profit. For example with regard to biodiversity or resilient nature related research areas the commitment of industry is lower than in energy related projects. And it is visible in the context of applications for funding, in which knowledge institutes more often take the initiative to apply.

This raises the question if a change in mindset is required. There is a multitude of financial instruments that can be used for mission implementation (see section 5), however should there be a stronger focus on asking companies what their questions regarding innovations are? One of the TKIs put out a call for SMEs in which companies could decide their focus (of course fitting within the KIA) and this received a very large number of applications. For companies, such a bottom-up approach to calls can be more interesting. There is also potential to learn here from the Business Finland case study and the Finnish approach Veturi.

4.3.2 Public-private partnerships

Within the top sectors, government and knowledge institutions (public) work closely with companies (private) on a joint project. These public-private partnerships (PPP) often exist over the course of a longer period of time. One of the advantages of this is to try and ensure that scientific knowledge that is developed is considered and applied to tackle the societal challenges of the missions. Applied scientific research plays an important role in the development of knowledge and innovation. New products and services are created by linking the knowledge of knowledge institutions to the practice and application of companies. Without that collaboration, it takes longer to achieve the same result. If that even works. Through the top sectors, entrepreneurs can investigate innovation opportunities



and make use of scientific knowledge in the Netherlands. Besides this collaboration, the long-term programming of the KIAs helps the companies to take the risks of investing in research and innovation. They have a kind of guarantee that the government is not changing policy within the next few years and this helps them to take the risk to invest in new technologies and also to educate and hire new people. One of the difficulties in tackling societal challenges, is that it is not known upfront which of the innovations will eventually lead to impact. Especially in this period of uncertainties it is important that the government gives the opportunity and space to all actors to invest in exploring several new technologies and not focus on a single technology. Next to that, there is an important role for social innovation, since not all societal challenges can be solved by technology alone. A good ecosystem is important so that all actors can perform optimally. The government has a facilitating role in developing these ecosystems.

5. Programmes and financial instruments

The Dutch governments has several programmes and financial instruments to stimulate innovation, in addition to funding for institutes for applied science. The KIC, which is a non-binding instrument (covenant), includes an overview of the financial contribution to the themes included in the mission-driven innovation policies for the period of 2024-2027. A total amount of €5,7 billion for 2024 is committed, however, given the non-binding nature of the KIC these amounts are not necessarily completely final. In addition, it remains somewhat unclear to what extent the amounts mentioned in the table are exclusively committed because of the KIC and its implementation, or if they would have otherwise been spent as well and are now earmarked as also contributing to the mission-driven innovation policy. Only some parts of the KIC financial table amounts are easily traceable, and these are the ones that are exclusively linked to project financing.

Most of the KIAs make use of Meerjarige Missiegedreven Innovatieprogramma's (MMIP's), or *multiannual mission-driven innovation programmes*, which specify specific activities that need to be undertaken to reach the goals. These activities pertain to R&D, pilots and implementation. There are no financial instruments that are created exclusively for the mission-driven innovation policy. This was done purposefully, in order to make better use of what is already existing (overviews of these are often included in the KIAs). These instruments are administered by the Netherlands Enterprise Agency (RVO). However, there are specific instruments that are used by the top sectors which are dedicated to implementing the missions. The existing instruments have quite a bit of variation in terms of Technology Readiness Levels (TRLs) that are targeted (see Figure 6). The national instruments include fiscal instrument, loans and credits and several subsidy schemes and are described in the next paragraphs. Most of the instruments are generic for all innovations, but some subsidies are specific targeting one of the Top sectors, e.g. the MOOI subsidy of the Top sector Energy. The majority of the instruments have a national focus, although there are some Public Private Partnership (*Pupliek-Private Samenwerkingen* (PPS) in Dutch) projects with an international scope and international partners.





Figure 6 Selection of key funding schemes

5.1 Fiscal instruments

WBSO

The <u>WBSO</u> (R&D tax credit) is a tax incentive scheme that offers compensation for part of the research and development (R&D) wage costs, other costs, and expenditures. Self-employed persons are granted a fixed tax-deductible item for their R&D. In addition, start-up entrepreneurs benefit from a supplementary credit. Every entrepreneur working in any business field planning to carry out R&D can submit an application for a WBSO tax credit.

MIA/Vamil

Entrepreneurs investing in environmentally-friendly technology can benefit from two tax schemes. Through Environmental investment deduction (MIA), deduction up to 45% of the investment costs for an environmentally friendly investment on top of regular investment tax deductions. With Arbitrary depreciation of environmental investments (Vamil), entrepreneurs can decide when to write off 75% of the investment costs. This gives an advantage in liquidity and interest.

EIA

The Energy Investment Allowance (EIA) is a tax deduction for businesses for clearly defined investments (specific) and for tailor-made investments (generic) that result in substantial energy savings. The EIA offers opportunities for entrepreneurs in various sectors, such as construction, greenhouse horticulture, livestock farming and industry.





5.2 Loans and credits

Proof-of-concept Funding (VFF)

Startups and SMEs can use a loan from the <u>Proof-of-concept funding scheme</u> to examine whether their idea is potentially feasible in the market. The loan plus the interest have to be repaid.

Innovation Credit

The <u>Innovation Credit</u> is intended for the development of innovative development projects with considerable technological risks and an excellent market perspective. It is a risk-bearing credit on which interest is charged. Both start-ups and established companies (large or small) can apply for Innovation Credit.

5.3 Subsidies

NWO-PPS

A consortium of knowledge institution(s) and public and private parties submits a research proposal to answer a knowledge and development question. The project proposal arises from a self-chosen knowledge and/or development question that fits within one or more KIAs.

PPS

Research organizations and companies are encouraged to jointly invest in research & development (R&D) with the aim of developing sustainable innovative products and services within one of the Top sectors, while simultaneously strengthening competitiveness of the sector.

MIT

SME Innovation Stimulus for Regional and Top sectors (MIT) supports SMEs in setting up innovative projects. The subsidy scheme consists of three different financial instruments: feasibility studies, knowledge vouchers to engage expert support by a knowledge institution, and R&D collaboration projects of at least two SMEs that collaborate to innovate or develop a new product, production process or service.

MOOI

The Mission-driven Research, Development and Innovation (MOOI) scheme is part of the Top sector Energy. MOOI supports large projects with integrated solutions that contribute towards achieving the climate goals in the categories electricity, built environment and industry. Various parties in the chain work together across sectors, and preferably also include end users.



DEI+

The <u>DEI+</u> is a grant for projects in which new innovations in a range of categories, from a circular economy, energy systems and energy efficiency to carbon capture and storage are tried out in the form of a pilot or demonstration project. The applying companies usually act as 'first users' of the innovation in question, for which most of the research has already been completed.

SDE++

The Sustainable Energy Production and Climate Transition Incentive Scheme (SDE++) provides subsidies to companies and non-profit organisations that generate renewable energy or reduce CO2 emissions on a large scale. The organisations are active in sectors such as industry, mobility, electricity, agriculture, horticulture and the built environment.

National Growth Fund

The National Growth Fund invests in large projects that contribute to, among other things, the energy transition, the digitalization of the economy, circular economy, healthcare, education and the development of knowledge and innovation. These projects often support innovation ecosystems with an integral approach on technological, social and economic challenges, including the shortage of skilled personnel, and will make the greatest possible contribution to sustainable and structural economic growth. The National Growth Fund does this together with initiators and other investors. Within the frame of the National Growth Fund, the government is allocating €20 billion for projects between 2021 and 2025.

5.4 European financial instruments

European financial instruments are explicitly named in the KIC as contributing to the Dutch missions. The financial overview of the contributions to the mission-driven innovation policy themes for 2024, includes an estimate of the Horizon Europe contribution as well. This estimate is based on the participation of Dutch stakeholders in European projects that thematically align with the Dutch missions. The KIC also names other European funding for Dutch stakeholders that pertains to research and innovation: the Netherlands receives €506 million from the European Regional Development Fund (ERDF) for the period 2021-2027, mainly for SMEs; and the Netherlands receives €623 million for the period 2021-2027 from the Just Transition Fund (JTF), which is aimed at regions that are more severely affected by the climate transition. Hence the KIC emphasizes the need to seek out synergies and alignment in the implementation of the KIAs with the research and innovation strategies for smart specialization (RIS3).

Through the Klankbordgroepen, calls and other relevant information on Horizon Europe and EU Missions is being shared and reaches stakeholders within the TKIs. And some of the TKIs are proactive in sharing this information within their network. On the other hand, the TKIs do try to follow the European programmes and, where possible, point out the opportunities to Dutch organizations. RVO assists them in this. Identifying opportunities is also relevant because completion of a project within the framework of a TKI can also be a starting point to continue at the European level, with European partners and perhaps scaling in additional countries of further developing products.

It is difficult to get track on all the projects that are running in Europe, while the outcomes could be very relevant to the Dutch private sector. Improvements are needed to ensure that the innovations



that have been developed on European level actually reach and are implemented by Dutch companies. This knowledge flow is crucial in reaching the mission goals. It is not always easy for SMEs, horticulturists and farmers to translate thick research reports and scientific articles into daily practice. In order to ensure that the results of research can be used to penetrate into the capillaries of the agriculture, horticulture and food sectors, the Top sectors Agri & Food and Horticulture & Propagation Materials, together with the Ministry of Agriculture, Nature and Food Quality and research institutes, introduced the 'Customised Knowledge' programme in 2020. This scheme offers scope to unlock and disseminate existing knowledge from research in a targeted manner so that entrepreneurs in the field of agriculture, water and food can get started with it themselves.

6. Monitoring, evaluation and impact

Achieving the innovation goals, but also providing insight into the results of the Mission-oriented Top sector and Innovation Policy, benefits from a clear problem definition and a well-thought-out approach. Drawing up a Theory of Change is extremely relevant both during the implementation phase and for monitoring and evaluation of the KIC. Subgoals of the missions have been elaborated in the Theories of Change and here is described how knowledge and innovation will contribute to achieving the goals of the innovation programs and thus also contribute to the mission goals. Monitoring, providing direction and accelerating a desired transition is quite an art. Not only does the KIA contribute to the mission goals, but there is also policy and numerous other instruments from the government, provinces, regions and private sector that contribute to the same mission goal. This makes it difficult to measure at impact level how the KIA's knowledge and innovation policy contributed to achieving the mission goals. There is no causal relationship.

Monitoring the progress of the missions is the responsibility of the national government, while the responsibility of monitoring the progress of activities within the KIAs lies with the thematic teams of the TKIs. The monitoring of the progress of projects lies with the executors of the projects.

RVO started designing an Innovation Monitoring Unit (IMU) and innovation KPIs together with the Top Sectors. RVO is responsible for several of the innovation programs and is able to collect relevant data of the projects. It is possible to gather information about the budget on project, program or mission level and by innovation phase. More difficult are measurements on outcome level; how many new collaborations have started due to these programs, how many patents have been filed, number of new products and technologies, increase in export, how many startup have emerged from these collaborations, etc. Even more difficult is the contribution of these projects on impact levels, although there are differences between sector. E.g. energy saving in the built environment can be quantified according to the energy labels.

There are also many projects, initiatives and activities that contribute to the missions, without being part of the programming of the top sectors or without being funded by any of the instruments that are labelled as mission-relevant. This is perhaps a complication that is inherent when formulating missions for broad, societal challenges, and is also visible in the EU context.

7. Conclusions

The Dutch mission-driven innovation policy and top sector approach has evolved significantly from its inception to its latest 'refresh' for the period of 2024-2027. In line development in policy formulation at the European level towards a more mission-oriented approach, the Dutch



government (in collaboration and consultation with societal stakeholders) has reformed its industry policy to become focused on solving pressing challenges of our time. This has resulted in the institutionalization of an ambitious and also complex governance structure and range of thematic ecosystems, which in many ways, works. In this document we have tried to shed some light on how it works and also, importantly, considered how these national missions and the top sector approach relate to the EU Missions. Given that there is considerable overlap in stakeholders and thematic focus, we felt that there must be synergies that are used and perhaps can be used even better.

We have found that the synergies indeed exist and that there are, mainly informal, governance mechanism that enable some alignment to take place. However, it does appear that this alignment is still rather limited and in many ways dependent on the partaking of organizations or even individuals in both the top sector and the EU Mission ecosystems.

Therefore, opportunities for alignment lie in strengthening these already existing links, formalizing them to make sure that they can be relied upon to connect European and national ecosystems and on a regular and structural basis. Concretely, for example, this could mean ensuring representation from relevant actors in all TKIs in the Horizon Europe Klankbordgroepen, sharing results from European calls with Dutch partners on a thematic level with TKIs, and for TKIs to play a more distinct role in making the opportunities that Europe offers in terms of financing and achieving the Dutch missions, more known to its ecosystems.





Annex I List of interviewees

Name	Organisation
Huub Keizers	TNO / TKI Bouw en Techniek
David van Petersen	TKI Urban Energy
José Vogelezang	WUR / TKI Horticulture & Starting Materials
Annemarie Breukers	TKI Agri & Food
Jan van Esch	Ministry of Agriculture, Nature and Food
	Quality
Maita Latijnhouwers	Ministry of Agriculture, Nature and Food
	Quality
Floris den Boer	Ministry of Infrastructure and Water
	Management
Maggy Sallons	Health Holland
Twan Kerssens	Health Holland
Michiel Blind	Deltares / TKI Delta technology
Katja Primozic	Ministry of Economic Affairs and Climate
Aline van Veen	Ministry of Economic Affairs and Climate
Ineke Hoving-Nienhuis	Ministry of Economic Affairs and Climate





3. USE CASE 2: IMPLEMENTING A MISSION-ORIENTED PARTICIPATORY APPROACH TO ENGAGE CITIZENS IN THE DEVELOPMENT OF SOCIETAL AI APPLICATIONS

The Flemish TRAMI Use Case

Implementing a mission-oriented participatory approach to engage citizens in the development of societal AI applications

Enid Froeyen, Peter Spyns

1. Introduction

This document describes the observations and findings regarding the Flemish TRAMI Use Case 'amai!'. The case focuses on developing a mission-oriented participatory approach, especially centered on engaging citizens in the creation of new societal artificial intelligence (AI) applications. The initiative is run and coordinated by two partner organizations: Scivil, the Flemish center for citizen science, and the Knowledge center Data & society in Flanders. The key focus of the case is to provide insights in how to engage citizens in Missions – an engagement that has been identified as a particular challenge in implementing the EU missions.

1. Description of the Flemish TRAMI Use Case 'AMAI!'

2.1. Context – why the AMAI! programme is of interest to missions developers

In the dynamic landscape of Artificial Intelligence (AI) in 2024, the AMAI!⁵ programme stands out as a significant initiative in Flanders, complementing the broader aims of the Flemish AI Policy Plan. Adopted on March 22, 2019, the Flemish government's AI Policy Plan strategically positions Flanders to harness the potential of AI, with an annual investment of 32 million euros. This comprehensive plan consists of three pillars:

- Pillar 1: Strengthening strategic basic research: Focused on enhancing top-tier AI research in Flanders, this component fosters synergy and knowledge transfer between research teams and users in various sectors, with 12 million euros allocated annually.
- Pillar 2: Encouraging AI use by companies: Administered by VLAIO, this segment dedicates 15 million euros annually to promote AI adoption across businesses, emphasizing awareness, advice, and support for initial experiences with AI technologies.

⁵ 'AMAI!' is a Flemish exclamation equivalent to 'wow!' in English, denoting surprise or astonishment. Interestingly, the letters 'AI' in 'AMAI!' can also be playfully interpreted as a reference to 'Artificial Intelligence', which is a central theme of the AMAI! programme.





 Pillar 3: Awareness, training, and ethical framework: With an annual budget of 5 million euros, this section is designed to educate the broader population about AI and address its ethical and legal implications, featuring initiatives like the Knowledge Center Data and Society and the Flemish AI Academy.

As an outreach component of the third pillar, the AMAI! programme, executed by Scivil, the Flemish knowledge centre for citizen science, and the Knowledge Centre for Data & Society, and funded by the Flemish government's Department of Economy, Science, and Innovation, plays a crucial role in disseminating AI knowledge and promoting public understanding and engagement. Launched in 2021 AMAI! undertakes the mission of involving citizens in AI development, reflecting a commitment to broadening participation in AI idea generation and project development.

AMAI!'s innovative approach to AI dissemination is characterized by its comprehensive model of citizen engagement, closely aligned with the participation ladder, which includes:

- Inform: This initial step is about creating public awareness and understanding of the projects and decisions at hand.
- Consult: The second level involves actively seeking public opinions and factoring their feedback into the decision-making process.
- Involve: Here, the engagement deepens, with citizens entering into a dialogue that incorporates their input into the development process of the projects.
- Collaborate: This stage signifies a partnership with citizens to co-develop solutions and make collective decisions.
- Empower: The most substantial level of engagement where citizens are entrusted with the decision-making authority for the projects.

This multidimensional engagement strategy positions AMAI! uniquely in the context of missionoriented policies. Its methods resonate with the principles outlined by Mariana Mazzucato, emphasizing the need for citizen engagement not only in the implementation but also in the definition, selection, and assessment of missions. By integrating these levels of participation, AMAI! ensures an inclusive approach to AI development, reflecting the programme's dedication to meaningful citizen involvement.

The following sections will delve deeper into AMAI!'s distinctive approach to engaging citizens in AI development.

2.2. The AMAI! methodology

To establish a project with a mission-oriented participatory framework, the developers of the AMAI! programme have outlined a four-step methodology. This approach is structured as follows:

- Step 1: Defining a project's goals.
- Step 2: Identifying the target audience.
- Step 3: Designing the process.
- Step 4: Implementing the project.

This chapter provides a detailed examination of this methodology. It not only discusses the general approach but also examines how this framework is specifically tailored and implemented within the AMAI! programme.





The initial step is to establish clear and tangible goals, which involves a comprehensive three-part strategy. Firstly, it is crucial to identify and articulate the central theme of a project in ways that are both relevant and engaging to the general public. The aim here is to transform complex subjects into relatable and meaningful content. This approach is intended to spark interest and encourage active participation from the community, ensuring that the theme resonates with a broad audience. Secondly, capturing public perception and encouraging involvement are paramount. Understanding and integrating the public's viewpoint is essential. This part of the process focuses on gathering the public's ideas, concerns, and aspirations. It's about ensuring their involvement in all stages of the project, making their voice an integral part of the project's development. The goal is to foster a sense of ownership and investment among the public, ensuring that their perspectives are reflected in the project's progression. Lastly, the strategy involves translating this involvement into tangible impact. This means establishing mechanisms, such as interactive platforms or feedback loops, that effectively convert public input into actionable results. The objective here is to demonstrate the value and effectiveness of public participation in shaping the outcomes of the project. By doing so, the project not only benefits from a diversity of perspectives but also reinforces the importance of community engagement in achieving meaningful results.

In the case of the AMAI! programme, the goal was to make AI accessible and impactful for citizens. The first step involved making AI relevant to everyday life. This was achieved by illustrating how AI is already integrated into daily activities. Such an approach helped demystify AI, underscoring its practical benefits and making it more relatable. The second aspect of the strategy centred on capturing public perception and encouraging involvement. The AMAI! programme actively sought citizens' insights, specifically their desires and ideas regarding AI applications. These discussions were framed around four societal themes – health, mobility, climate, and work – providing a familiar context for citizens to consider the potential of AI in their lives. This engagement was crucial in ensuring the program resonated with the public's real-world concerns and interests. Finally, the programme focused on translating citizen involvement into tangible impact. This was exemplified by a funding call initiated by the AMAI! programme, which encouraged the development of citizen-suggested AI ideas into concrete applications.

Once you have defined a project's goals, the second step is to identify the target audience. It's essential to understand that 'the general public' is too broad a category for effective engagement. To truly connect with the audience and foster meaningful participation, the focus needs to be on a more specific group. This group should be one that can genuinely benefit from and contribute to the project. The goal is not to cater to those who are already knowledgeable about the topic, but to reach out to those who can be impacted by the project and can offer fresh perspectives. The ideal audience is one where real change and impact can be achieved - a group where the project's goals are both feasible and useful.

For the AMAI! programme, the target audience was in the first place 'societal implementers' – individuals who may not be well-versed in technology or AI but are curious about its applications in societal themes like mobility and health. The program's approach is to engage this group by contextualizing AI within these familiar areas, transforming it from a high-tech concept to a practical tool for addressing real-world issues. This method not only makes AI relatable, but also sparks curiosity about its potential benefits in everyday life. Additionally, the AMAI! programme prioritizes the involvement of various stakeholders, including societal implementers, civil society organizations, researchers, AI professionals, and policymakers. The project fosters interactions among these groups, creating a collaborative platform for exchanging ideas and insights. This diverse engagement aims to build a comprehensive understanding of AI, ensuring that its development and implementation are





informed by a range of perspectives and expertise. By following this approach, the AMAI! programme effectively narrows down its audience to a group that can most benefit from and contribute to the project's goals, while also ensuring a diverse and inclusive participation.

Once your target audience and goals are defined, you can move on to designing and implementing the process, which are step 3 and step 4 respectively. The design phase is about creating a structured plan to actively engage your target audience from the beginning to the end of the project, with each stage tailored to deepen their engagement and contribution.

In the AMAI! programme, this process was meticulously structured into four phases:

- Phase 1: Collecting research questions from citizens, focusing on their insights and ideas about AI within the four societal themes.
- Phase 2: Co-creating solutions and methods, which involves co-creation sessions to collaboratively develop approaches and solutions.
- Phase 3: Launching an open call for proposals, also known as a project call, which includes citizen participation in the selection process.
- Phase 4: Developing solutions or conducting research, which employs a citizen science approach in the selected projects, involving citizens as integral parts of the project teams.

Step 4, putting the planned process into action, the AMAI! programme takes these four phases and brings them to life, with a focus on engaging the audience, gathering data, and working towards the project goals.

In the first phase, the AMAI! programme set out to connect citizens with Artificial Intelligence (AI), targeting those previously unexposed to or unfamiliar with the technology. This phase combined raising awareness with gathering public insights, using various innovative methods such as:

- Interactive booths: These booths featured large, interactive screens with an AI-powered quiz. Visitors interacted with the quiz through intuitive hand movements, controlling the screen and engaging with AI in a direct, accessible manner. This setup was not only a showcase of AI technology but also a catalyst for discussions and curiosity about AI's role and potential.
- Al card game for children: Designed to introduce Al concepts through play, this game catered to different age groups and was suitable for both home and school environments. Accompanied by a teacher's package, it facilitated an educational approach to AI, making it a valuable tool for integrating Al concepts into school curricula.
- Online storytelling: The AMAI! website featured stories that simplified AI concepts, like a narrative explaining a spam filter as an AI application. These stories broke down AI into understandable elements, helping demystify the technology for the general public.
- Media collaborations: By partnering with national broadcasters and media houses, AMAI! created short films and media segments featuring well-known personalities discussing AI. These collaborations broadened the program's reach, bringing AI discussions into mainstream media and making the topic more accessible to a wider audience.

In addition to these methods, the AMAI! programme focused on two primary platforms for idea generation and dissemination:

• AMAI! online platform: This platform functioned as the central hub for the programme, where citizens could find informative AI stories, submit their AI development ideas, and engage with the community. It played a crucial role in educating the public about AI and soliciting their input for potential applications.



• Media campaigns: Large-scale campaigns in collaboration with major media partners directed the audience to the AMAI! platform and its activities. These campaigns were instrumental in informing the public about AI and encouraging their active participation in idea generation.

The programme also emphasized collaboration with civil society organizations, especially those in key domains like health, mobility, and climate. This strategy leveraged the organizations' networks for wider outreach and more diverse idea collection. Through these efforts, the AMAI! programme successfully gathered over 900 ideas from the public, which were then organized into 35 thematic clusters based on the four societal domains. This organization of ideas laid the groundwork for the programme's subsequent phases, ensuring a structured approach to developing these concepts into actionable AI solutions.

In phase 2 of the AMAI! programme, the emphasis was on the meaningful transformation of collected citizen ideas into refined AI concepts, a crucial step in the journey from raw input to actionable solutions. This phase was marked by a series of co-creation sessions, each tailored to ensure the comprehensive development of ideas. These co-creation sessions were designed to bring together a diverse mix of participants from the quadruple helix - citizens, civil society organizations, AI companies, knowledge institutions, and local governments. The diversity in this mix was crucial, providing a range of perspectives and expertise that were instrumental in unpacking and enhancing the citizen-generated ideas. The evolution of these co-creation sessions over various editions of the program showcases the AMAI!'s commitment to refining its approach:

- First edition campfire sessions: These sessions were characterized by their collaborative nature, bringing together diverse groups to refine a large pool of 350 citizen ideas into 17 detailed concepts. The focus was on fostering a creative atmosphere, akin to a campfire, for free-flowing idea development. However, this method later appeared to limit the diversity of ideas for the project call.
- Second edition omission of co-creation phase: In an attempt to keep a broader spectrum of ideas for the project call, the co-creation phase was omitted. This decision, while intended to preserve idea diversity, resulted in challenges in fostering connections and collaborations among potential project partners.
- Third edition refined co-creation sessions: Responding to past insights, the co-creation sessions were reintroduced with a more open-ended format. These sessions allowed participants to explore a wider range of ideas beyond those developed in the sessions, addressing the limitation observed in the first edition. This change was aimed at enhancing the dynamism and inclusivity of the idea development process.

Each co-creation session followed a structured yet creative process. It began with the selection of citizen ideas for further development. Once the ideas were chosen, they were refined into clear problem statements, setting the stage for the creative phase. In this phase, participants brainstormed and developed the AI concepts, using tools like the AI ideation toolkit to guide their creativity. This toolkit was developed to assist participants in the co-creation sessions in thinking critically and creatively about how AI can be applied to real-world problems. It provided structured guidance and frameworks to help conceptualize AI solutions, ensuring that the ideas were not only innovative but also practical and feasible. The sessions culminated with presentations of the different AI concepts, providing a glimpse into their potential as practical solutions.

Phase 3 of the AMAI! programme marked a transition from ideation to realization, focusing on the open call for project proposals. This phase was pivotal, transforming citizen-generated AI ideas into tangible projects with real societal impact. Central to the project call were specific mandatory





elements: firstly, each project had to be rooted in citizen ideas collected earlier in the program. Secondly, there was an emphasis on continuing citizen engagement, ensuring their active involvement throughout the project's execution. Additionally, the selection process for these projects involved two critical stages. An expert panel initially assessed the feasibility and impact of the projects. Following this, projects that passed were subject to the judgment of a citizen panel and an online public vote, emphasizing the program's commitment to citizen involvement at every decision-making level. Financial support was a significant aspect of this phase. In the first two editions, projects could receive up to 75,000 euros, which increased to 125,000 euros in the third edition. The submitting consortia were required to be collaborative, involving at least two different types of organizations, such as AI companies, non-profits, governments, research institutions, or citizen movements. This collaboration was not just a prerequisite but a core principle of the AMAI! programme, fostering a comprehensive approach to developing the AI idea and incorporating a citizen science perspective. The dual role of these projects was crucial. They were expected to develop AI solutions that addressed key societal areas like health, mobility, work, or climate and environment. Simultaneously, they served an educational purpose, enhancing public understanding of AI systems by involving citizens in the project and providing regular updates through AMAI!. The approach to project selection and the structure of the call underwent refinements across different editions of AMAI!. Initially, an interdisciplinary expert jury evaluated the project proposals on various dimensions. The highestscoring projects were then presented to the citizens for their final say, either through a public vote or, in later editions, a citizen panel informed about the projects over two days. To aid the formation of effective project consortia, matchmaking and information sessions were organized. These sessions provided vital opportunities for potential project partners to meet, exchange ideas, and find collaborators with complementary interests and capabilities, thereby enhancing the potential for impactful and innovative AI solutions. In essence, phase 3 was a blend of structured evaluation, citizen participation, and collaborative innovation. It played a crucial role in realizing the potential of citizendriven AI ideas, ensuring that the projects not only addressed societal needs but also contributed to a broader understanding of AI and its applications.

In the final phase of the AMAI! programme, the selected projects, having been meticulously chosen in the previous phase, moved into the development and implementation stage. This phase was about bringing the citizen-inspired AI ideas to life, with a strong focus on societal impact and collaborative learning. The selected projects, which involve the development of AI systems, received funding to turn the ideas into reality. These projects represented a diverse collaboration between AI companies, research institutions, citizen movements, non-profits, and local governments. Each project, with a maximum duration of two years, was carefully designed to ensure that citizens played a crucial role in the development process.

The AMAI! programme provided extensive support to these projects:

- Community of practice: A community was formed for the funded projects, allowing them to share experiences, challenges, and learnings. This community fostered a collaborative environment where projects could benefit from each other's insights and experiences.
- Guidance and ethical framework: Projects were guided on the societal impact of AI innovations, using a "guidance ethics" approach. This framework emphasized considering the user, the environment, and the technology itself to mitigate any potential negative effects.
- Citizen science advice: Projects received advice on effectively involving citizens, whether in data contribution, refining AI project questions, or modelling solutions. The AMAI! team was available for consultation on incorporating citizen science elements into the projects.



Intervision moments were organized several times a year. During these sessions, projects shared their challenges and solutions with each other, creating a valuable exchange of experiences and insights. These moments were instrumental in assisting the projects to navigate any hurdles and successfully complete their initiatives.

In addition to project development, an essential aspect of phase 4 was to demystify the process of AI development for the general public:

- Transparent reporting: Regular updates on the progress of the projects were provided, ensuring that even those not actively involved had insight into how AI systems are developed. This information was disseminated through the AMAI! website, newsletters, and other channels.
- Showcasing projects: The projects were also highlighted in various AMAI! activities, such as science festivals and information markets in libraries. Demonstrations and showcases at these events allowed the wider public to see the tangible outcomes of the projects, further enhancing the understanding of AI systems.

By the time of reporting, 14 projects had been funded through the AMAI! trajectory, each contributing to the broader goal of creating societal impact through AI innovations and clarifying the AI development process to citizens.

2.3. Lessons learned, highlights and future outlook

Throughout its journey, the AMAI! programme has navigated various challenges and learned valuable lessons about engaging the public in AI development, particularly under changing circumstances like the pandemic.

Initially, in 2021, with the constraints of lockdown, the programme's shift to an online format highlighted the necessity of making information both accessible and engaging. In this digital realm, competing for the public's attention required creative strategies. A notable success was an online interactive quiz, "How Artificially Intelligent is Your Supermarket Visit?". This fun format, linking AI to a routine activity, effectively captured public interest. The experience underscored the importance of presenting AI in relatable and engaging ways, particularly when limited to virtual interactions.

However, 2022 brought a significant shift with the easing of pandemic restrictions. The program's transition to in-person events marked a notable change in public engagement. Face-to-face interactions at festivals and events proved more effective than the online approach. Guided conversations became a key tool, helping to demystify AI for the general public. These conversations highlighted that a direct, personal approach was essential in fostering a deeper understanding of AI, as simplistic queries often led to blank responses due to a lack of familiarity with the subject.

Building on these insights, in the following year, AMAI! expanded its outreach to the educational sector. Engaging with schools proved highly effective; reaching out to teachers opened avenues to impact a larger number of students. This strategy not only expanded the program's reach but also tapped into the inherent enthusiasm for new technology and learning in educational settings.

Looking ahead, the AMAI! programme plans to continue blending online and offline engagement methods. The combination of wide-reaching digital strategies and impactful face-to-face interactions will likely be the cornerstone of future public engagement efforts. Additionally, the success in schools points to a promising avenue for continued expansion, leveraging educational settings as platforms for spreading knowledge and fostering a deeper understanding of AI.





The journey of the AMAI! programme, with its challenges and adaptations, illustrates the evolving nature of public engagement in technology. It reinforces the idea that flexibility, creativity, and a deep understanding of the target audience are crucial for successfully involving the public in scientific and technological developments.

Following the insights gained from public engagement, another critical lesson emerged in the project management aspect of the AMAI! programme. Managing the project within a one-year cycle presented considerable challenges, particularly due to the funding structure and tight timelines.

Initially, the program faced a rigorous schedule. The process of gathering ideas began in March, followed swiftly by co-creation sessions in June, then moving into the open call and selection process, all culminating by November for the commencement of new projects. Despite hopes that the second year would bring more ease due to experience, the team found that the timeline remained demanding and compressed.

This tight schedule highlighted the need for a more efficient approach to managing the different phases of the project. In response, during the third year, the AMAI! team implemented a significant strategic shift: a parallel track system. This new approach allowed different project phases to progress simultaneously, rather than sequentially. For instance, the project call was opened in March, concurrently with the idea gathering phase and ongoing support for the funded projects. This concurrent progression of phases not only alleviated the time pressure but also provided each segment of the project more room to breathe and develop effectively.

The introduction of parallel tracks marked a substantial improvement in the program's overall efficiency and effectiveness. It demonstrated that flexibility and adaptability are essential in managing large-scale citizen science projects, especially those with tight timelines and complex, multi-phase structures. This change in strategy not only enhanced the operational aspect of AMAI! but also provided valuable learnings for future project management in similar initiatives.

The experience of the AMAI! programme in navigating these project management challenges reaffirms the importance of evolving strategies and structures in response to practical realities. It underscores that in large-scale, time-bound projects, innovative management approaches are crucial to maintaining efficiency, meeting timelines, and ensuring the successful execution of each project phase.

However, a key to AMAI!'s success has been the involvement of citizens at various participation levels, supported by a cascade funding model. This approach enabled the program to cater to different motivations and engagement preferences, from one-time interactions at events to ongoing participation throughout the project lifecycle.

Looking ahead, AMAI! is focused on furthering its impact. A significant step is the development of a comprehensive toolkit, initially in Dutch and later in English, to guide similar citizen science projects. This toolkit will encapsulate the AMAI! methodology, offering scripts and materials used in the program, adaptable for different societal themes. It aims to serve as a blueprint for other initiatives, illustrating how to effectively involve citizens.

The toolkit will include a wide range of activities, training materials, and tools for engaging the general public and educators in AI narratives. It encompasses everything from on-site activities for interactive engagement to workshops and lectures for deepening AI understanding.





In addition to the toolkit, AMAI! plans to strengthen its network by linking with other programs and initiatives. This expansion is aimed at increasing the program's influence in the AI landscape and fostering broader public involvement in AI development.

3. Generalization and policy context

3.1. Broad applicability of citizen engagement approach

The AMAI! programme, while focused on AI, primarily exemplifies a successful model of citizen engagement. The methodologies and strategies developed for facilitating public involvement are universally applicable, transcending the specific subject of AI. This adaptability is crucial in various fields of science and technology, where public understanding and participation can significantly impact the outcomes and stimulate innovation. The project demonstrates how complex themes, typically perceived as the domain of experts, can be made accessible and engaging for the general public. This inclusive approach to citizen science can be a template for future projects aiming to integrate public insight and creativity into scientific and technological advancements.

That's why, given the good experiences with the AMAI! programme, the idea came to mind to also apply parts of the citizen involvement methods and process in another setting, this time explicitly aiming at incorporating a more mission-oriented approach. The setting is the main research pillar of the Flemish AI plan (FAIR). Remember that, the AMAI! programme is part of the societal pillar of that same Flemish AI plan, so it would also contribute to a better synergy between the various pillars of the Flemish AI plan.

In fact, FAIR fits the OECD definition of a mission. It is a targeted R&I endeavour that aims at increasing the AI uptake in the economy. Therefore, it combines strategic research with a demand driven approach by industry. Research themes and industry needs to come together in the set of use cases. The use cases are managed as a portfolio: some last longer than others, some are started (and also discontinued) earlier than others, depending on the moment the goals have been reached or the interest or relevance has disappeared. In short, the OECD would call this an accelerator mission, as the overall goal is to speed up the development and uptake of AI in Flanders.

For the second five-year cycle of FAIR, the set of use cases has already been determined based on interviews, round tables and other forms of consultation with industrial players and some societal actors (such hospitals, the Flemish employment agency, ...). One of the characteristics of a mission as defined by Mazzucato, namely the involvement of citizens and civil society organisations (CSOs) is still lacking. Therefore, the plan is to apply the citizen involvement techniques and processes of the AMAI! programme to the set of FAIR use cases in order to have the citizens "assess" their societal needs and relevance and rank them accordingly. This assessment (including the ranking) is handed over to the AI steering board that can take this into account when decisions are to be made about extending or discontinuing certain use cases.

The future contribution of various FAIR use cases to the societal development goals and/or the Horizon Europe missions will have to be specified on beforehand. This description (qualitatively and/or quantitatively) can also serve as a performance indicator for that use case, which will be useful when FAIR is evaluated again after five years.

The AMAI! method as applied in the AMAI! programme cannot be simply copied/pasted, but will be customised and fine-tuned for this new context. This will not be an "only once" experience. The most important Flemish strategic research centre, imec, organises its own calls for cooperative projects for





industry and research, called imec-ICON projects. The planning process starts with rounds of consultations between imec, industrial partners and academia, resulting in preliminary ideas for imec-ICON projects. By default, ICON projects include a user board consisting of other interested parties, usually enterprises, (not participating in the project itself).

The citizen involvement process applied to AI research pillar can probably be re-used without major modifications to the set of preliminary ICON proposals. A next step would be to include citizens or representatives of CSOs in the user board so that also they can monitor the progress of the project, and even better, involve them already at the ideation phase.

A next potential step is to extend this method to the ICON calls organised by another strategic research centre (Flanders Make), and maybe eventually to the general ICON calls of Innovation and Enterprise Flanders, which is the innovation funding agency of Flanders. A drawback is that all this is still basically anchored in the policy area of R&I (except for some "users" of the use cases), and not really integrating f.i. regulatory aspects. For financial instruments or support by investors, the regular channels are supposed to do the job.

3.2. Alignment with mission-oriented innovation policy

The AMAI! programme aligns well with mission-oriented innovation policies by demonstrating how public participation can be a core component of scientific and technological development. This alignment is reflective of a growing recognition in policy circles of the importance of involving citizens in shaping the trajectory of innovation. By actively involving citizens in the ideation and development phases, AMAI! has established a participatory model that resonates with the objectives of such policies. These policies aim to ensure that technological advancements are not only driven by scientific possibilities, but are also responsive to societal needs and ethical considerations.

4. Conclusion

The AMAI! programme emerges as a noteworthy case in the landscape of Flemish artificial intelligence, not just for its original goal of making AI more comprehensible and relevant to the public, but also for its alignment with mission-oriented policy principles, especially those emphasized in Horizon Europe missions. This alignment manifests in several ways:

- Citizen engagement: AMAI! embodies the principle of citizen engagement, a core aspect of mission-oriented policies as outlined by Mazzucato. By involving citizens in every phase of the AI development process, from idea generation to project implementation, AMAI! mirrors the mission-oriented approach of integrating public perspectives in shaping innovation trajectories.
- Addressing societal challenges: Although AMAI! initially focused on AI dissemination, its methodology inadvertently aligns with mission-oriented policies that emphasize tackling significant societal challenges. By soliciting public input and ideas on AI applications in areas like health, mobility, and climate, AMAI! contributes to addressing broader societal concerns.
- Comprehensive participation levels: AMAI! stands out for its implementation of all levels of the participation ladder. The programme moved beyond mere information dissemination, engaging citizens in consultation, active involvement, collaboration, and even empowering them in decision-making processes. This approach highlights AMAI!'s commitment to a deeply democratic and inclusive model of technology development, where citizens are not just passive recipients of information but active contributors to the AI innovation process.





In summary, AMAII's approach, although not initially framed as part of a mission-oriented policy, resonates with such principles in its execution. Its effective communication strategies, inclusive engagement model, and comprehensive implementation of the participatory ladder set a precedent for integrating citizen science in technological and policy development. Its methodology not only supports the Flemish AI landscape but also offers valuable insights for mission-oriented initiatives across Europe, emphasizing the transformative power of citizen involvement in shaping the future of innovation.





4. USE CASE 3: BUSINESS FINLAND R&D FUNDING PROGRAM FOR LEADING COMPANIES "VETURI"

The Finnish TRAMI Use Case

Business Finland R&D Funding Program for Leading Companies "Veturi"

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1 - Introduction

1.1 TRAMI and Use Cases

<u>TRAMI</u>, the TRAnsnational cooperation on the MIssions approach, is an EU funded project focussed on Making Missions Work by creating Communities of Practice, exchanging knowledge and offering mutual learning. As part of TRAMI four Use Cases are produced. The Use Cases complement mutual learning in TRAMI through focused mini studies with co-development aspect. The Use Cases

- Identify already successful national initiatives that are interesting in view of developing EU missions and the mission approach in general.
- Study the initiatives more closely.
- Learn and share info about the experiences, both good and bad.
- Provide feedback to further improve the example initiatives.
- Produce Use Case reports to support dissemination.

This paper describes the observations and findings regarding the Finnish TRAMI Use Case. The case has as a real world ongoing example Veturi-initiative (Funding for leading companies and ecosystems). The initiative is run and coordinated by the Finnish Innovation Agency, <u>Business Finland</u>, which is also the main provider of public funding to Veturi activities. The key focus of the study is to provide insight how for-profit companies can be strongly engaged in mission type actions – an engagement which has been identified as a particular challenge in the Mission work in Europe.

In the report, the Finnish term Veturi (Locomotive) is being mainly used about the initiative.

1.2 The national-level R&I missions/targets

The Finnish Government-level mission is to increase the volume of R&D investments in Finland at least to 4% of the GDP by 2030. The latest figures (2020 -22) are 2,9 - 3,0%. Of the total amount of the 4% R&D investment, at least two thirds should come from the private sector. This means that the



substantial increase of public R&D investments must be met with a corresponding increase of private R&D investments. This again cannot be achieved without the big companies, which as a general trend in recent years have not been expanding their R&D operations in the country.

The 4 % goal can be considered a national-level top-down mission. The importance of the mission is highlighted by the fact that it has been approved through a wide parliamentary consensus and written into law, thus aiming to exceed single electoral periods. Veturi concept is one important means to execute this national mission in a bottom-up way.

The national 4 % target has a clear obliging connection to Veturi funding. Meaning that the Veturi company together with its ecosystem commits, in a binding manner, to invest X euros more in R&D in Finland. Another clearly measurable requirement connected to Veturi scheme is a substantial increase in money return from EU R&D programmes. In the Programme of the Finnish Government the aim is to double the funding received by Finnish organisations.

In the Veturi initiative the large companies are undeniably in the lead. However, in a crucial role to achieve both the business and larger societal objectives is also building up and developing ecosystems, i.e. groupings of relevant SMEs and research organisations, around the Veturis.

The above-mentioned obligations (increase in R&D expenditure and more money from EU programmes) are meant for the whole ecosystem together to strive for.

It should be noted that although Veturis are not directly called "missions", their background, planning and activities are at least strongly inspired by mission thinking, including that of Professor Mariana Mazzucato's. The projects suggested by the companies must provide solutions to major future challenges, either to missions or significant technological challenges, in addition to having a significant impact on Finland's competence, competitiveness and investment in R&D.

1.3 Companies involved through bottom-up approach

A strong private sector engagement to mission type activities is essential in order to deliver solutions that truly are adopted into use to tackle the global challenges.

Thus emerges the essential/fundamental question: how to combine a strive for greater good with opportunistic yet inevitable endeavour to reach business targets? In Veturi concept the approach can be summarized as 'bottom-up'. Business Finland as the innovation agency arranges regularly bottom-up *challenge competitions* which open the door to globally active export companies to themselves define the mission they are seeking to provide solutions with, related business and export ambitions as well as a roadmap for a successful implementation.

Under the leadership of the Veturis, their ecosystem partners get to intensively participate to these major cooperation undertakings by bringing in their expertise and driving for their own capability building and business aims.

Since 2022, so-called Challenger companies have also their own challenge competitions. In the same line with their big brothers, the Challenger companies are solving a smaller or more focused challenge and develop new businesses, with their respectively somewhat smaller ecosystems. Challenger companies are only growing to become global players, are solving a smaller or more focused challenge, or are developing new businesses or strengthening the role of a larger international business group specifically in Finland.



Funded by the European Union

2 - Description of the Business Finland Leading Company Initiative

2.1 Context – why the initiative is of interest to missions developers

"Milton Friedman is dead ... if he lived today, ... Friedman would now see that the best way to build shareholder value is to take care of all your stakeholders." this widely known and provocative discussion opener, vividly presented by Paul Polman, the former CEO of Unilever, is a strong statement, but depicts nicely the change of thinking major businesses have experienced in the past few decades. Friedman, one of the most influential economists of modern times, was and is known for his doctrine of shareholder primacy, summarized in his famous New York Times article in 1970 by the sentence "The Social Responsibility of Business Is to Increase Its Profits".

Indeed, it seems that <u>nobody</u> in the corporate world today would express themselves like Friedman in 1970. Companies pay attention to their overall operating environment, and a presumption that they by rule want to offer solutions rather than create problems, should not sound overly naïve to anyone. Furthermore, at least in the context of this Use Case, the question is not that much of where the *primacy of corporate social responsibility* really lies. Instead, the right question is how we can create an enabling environment for private and public development work that brings into service the interest of businesses to contribute to the solution of global issues; perhaps even to spearhead joint initiatives within the realm of mission oriented innovation policies.

The Leading Company Initiative, Veturi, by Business Finland is partly an attempt to do this. It is in much implementing the traditional bottom-up principle, meaning that the funding organization doesn't define the content of the work, or even the exact problem formulation. But it comes with a novel twist, as the program invites leading Finnish companies to present their proposals on how they would like to contribute to the solutions of major ecological and societal challenges. And in addition to their own R&D, act as a "locomotive" for a larger national ecosystem development with matched actions and targets. Out of the proposals, those best meeting funding criteria will be selected for funding. It seems that this kind of a spearhead role is much appreciated by companies and yields a new way to organize industry-academia and industry-SME collaboration in comparison to the dominating consortium model. Public R&D funding, both national and EU, to large companies is mainly channelled through projectized R&D, often implemented by extensive project consortia. The model suits well solving predefined R&D tasks but struggles to unleash the potential of many major companies to actually initiate a positive development "bottom-up". All public-private dialogue, and, e.g., co-programming prior to the execution of calls, can be seen to tackle this issue. Recently, also in search for new ways to implement the EU missions, MEP Christian Ehler called in a Research Europe article for the creation of "(...) new types of 'spaces' for industry, academia, and the society to come together". Albeit run in a different context, the Leading Company Initiative offers here some food for thought as a reference, how to engage major companies in defining agendas shared by a larger group of actors.

With the initiative, so far 17 leading Finnish companies have intensified their R&D activities, at the same time pursuing an outspoken impact on mainly societal and/or sustainability goals. In the ecosystem networks, hundreds of other players are involved, and the total R&D expenditure is



expected to be in excess of 1.5 billion € during the project lifespan. The program content is not planned centrally, and probably doesn't cover all relevant areas (like key SDGs). However, impacts clearly are to be expected, and the programme has been well-received by all key stakeholders in Finland.

2.2. the Leading Company Initiative

Background of the initiative

The Leading Company Initiative, "Veturi", has rapidly gained traction in Finland, and is today one the most important arenas for public-private R&I collaboration in the country. The inception of the programme took place in 2020, after a period of less focus on innovation partnerships with the corporate world from the policy-makers' side. The main policy focus was for many years dominantly on start-ups and scale-ups, and you must go back to 2012 to find a major programme design targeting big companies. Between 2008 and 2012 a programme called SHOK, Strategic Centers of Science, Technology and Innovation, was run by Tekes, the predecessor of Business Finland. This programme with 800 million € total budget successfully defined strategic research agendas for a number of technology fields in a co-programming modus operandi between the main Finnish industries and academia. However, the programme got a somewhat mixed response amongst stakeholders, and with diminishing government overall appropriations of R&D, it was rather quickly drawn to a close. (see, e.g., the evaluation report by the Ministry of Employment and the Economy, "Licence to SHOK?"). Amongst the reported key issues were difficulties in the selection process, and difficulties in bridging and balancing the long-term and short-term innovation goals. In addition, one of the issues companies reported was that they couldn't open the more competitive part of their R&D portfolio for collaboration in the SHOKs. Interestingly, the Venturi initiative seems to succeed in handling some of the issues that led to the termination of the SHOK programme.

In 2020, Business Finland launched the Veturi Initiative. The main objective was to build a programme, that would incentivize major companies to increase their R&D investments in Finland, and simultaneously also contribute to the development of the whole Finnish business and research ecosystem in relevant field(s). To these basic goals, an element of challenging the applicant companies to explicitly solve a meaningful and significant future challenge was added. The applicants define their challenge themselves, but in most cases they are clearly sustainability related, containing an outspoken environmental and/or societal goal. This was, in much, a way to implement the (already by then) topical mission-oriented thinking into the programme. Possibly as a surprise to some, this element was well-received by the applicant companies.

For all Veturi initiatives, the volume of ecosystem collaborations was from the beginning designed to exceed that of corresponding in-house work, much emphasizing the importance of business-academia collaboration and that of LE-SME collaborations. New Veturi initiatives have been approved in annual challenge competitions, with main selection criteria based on domestic R&D investments, and the relevance of the challenge to be solved together with the Veturi ecosystem.

The Veturi Initiative: leverage from leading Finnish companies

Since 2020, Business Finland's Veturi initiative has each year challenged global companies active in Finland to take a leading role in the execution of up to 5-year development road map defined by themselves. The road map must contribute to the solution of significant environmental and societal challenges. In addition to increasing their own RDI investments in Finland, the applicants commit themselves to take a leading role in a national ecosystem development that supports this public development roadmap. These ecosystems must comprise relevant actors like other companies,



universities, RTOs etc., and they are expected to be gradually forming adjacent to the leading company's own RDI activities during and after the ramp-up of the project. So far, the winning companies are committed to increasing their RDI investments in Finland cumulatively by amounts that are significant on the level of the national economy. The investments by their ecosystem partners are expected to be even larger, and altogether these additional activities are expected to have a clear impact on reaching the RDI target of 4% and the employment target of 75% laid down in the Government Programme.

Since one single company is taking the driver's seat on behalf of the industry, the scheme is quite different compared with the old SHOK model, or with most co-programmed programmes in general. Nevertheless, the public funding comes with clear public targets. Firstly, the open competition model supports the selection of best and most mature proposals. And, most importantly, each contract for public funding is accompanied with a detailed set of KPIs, that are a prerequisite of instalment payments. This means that even though the leading company is issued the full grant "upfront", it only receives full instalments if all KPI conditions, for example towards the development of the ecosystem around the Veturi, are fulfilled. The KPIs are specific for each grant agreement and are not in focus of this use case. Business Finland's funding has been a maximum of 20 million Euro for the leading company. Ecosystem funding comprises numerous individual projects that Business Finland funds using its normal funding criteria and aid intensities. However, the projects need to meet the following criteria for inclusion in the partnership model:

- How well does the applicant consortium's proposal address the competence and technology gaps identified in the theme?
- How is the applicant consortium committed to the objectives of the subject area's ecosystem roadmap and to building cooperation?
- How relevant is the role of the applicant consortium in the development of the ecosystem in the theme?
- The commitment of the leading company

The leading company must actively participate in sparring and the preparation of the partnership project. In this way, the leading company can give its views on the project from the roadmap's perspective and define their commitment to the cooperation. Business Finland can provide funding for a project that meets Business Finland's funding criteria even if the project is not accepted as a partnership project in the leading company's ecosystem. If the project is closely linked to the roadmap but does not meet Business Finland's funding criteria, Business Finland can also decide not to fund the project.

In practice, the annual calls for new Veturi initiatives are complemented by 4 annual calls for ecosystem projects supporting the existing Veturis, that already have been selected for funding. These Ecosystem Calls are characterized by:

- The call is targeted at the themes and the road maps of the leading companies that have won the challenge competition. The aim is to create an open ecosystem with a critical mass for themes where the best conditions for creating new business and jobs nationally have been identified.
- Companies and research organizations can apply for funding for RDI projects related to the roadmap themes. Road maps communicate the visions of the leading companies whose solutions, technologies and know-how are needed to achieve the defined missions.





Key competence and technology gaps needed to achieve the ecosystem objectives have been identified during the challenge competition.

- Funding can be granted both to project consortia and individual applicants, in line the normal Business Finland funding rules.
- Leading company has already received funding for the subject area, the call is only aimed at other relevant actors in the ecosystem defined by it. A necessary prerequisite for the Partnership model projects is that they clearly implement the roadmap described by the leading company.
- Partnership applicants should be in contact with the contact persons from both the leading company and Business Finland. In order to be able to make a decision based on as much information as possible, Business Finland requires the leading company to have a view on the significance of the proposed projects from the perspective of promoting the roadmap. However, the leading company does not decide who gets the funding. This will be at the discretion of Business Finland. Belonging to or not belonging to a leading company's roadmap does not affect the funding of the project. It only has an effect on whether a project will be connected to the leading company's ecosystem as a Partnership model project.
- The projects in the partnership model comply with the normal terms and conditions for Business Finland's financing.



Picture 1: The Veturi collaboration model, including a shared development road map and shared goals for the leading company and its ecosystem partners.

Leading Companies and Ecosystems approved for funding in 2020 -2023

While a comprehensive description of the extensive leading company projects, even a short one, isn't within the scope of this Use Case, synopses of their mission policy relevant content and goals are briefly presented in Appendix 1 at the end of this use case report. Looking at these, it becomes clear that the Veturi companies have in a self-directed manner organized their R&D activities, and the corresponding ecosystem's activities, in a way that contributes to mitigating and solving key future challenges.





Each Initiative is allocated 20+50 M€ funding from Business Finland, except the "Challenger" projects that have a more limited scope, and a funding allocation of 10+20 M€.

3 - Feedback and messages by Veturi companies on the mission approach

As was outlined in the introduction, this report portrays a Use Case, which focuses on providing insights of private companies' engagement in a mission-oriented R&I funding programme through Business Finland's Veturi initiative. In the previous section, the background of the Veturi initiative, as well as its structure and relevance to the concept of mission-oriented policy-making were untangled. In the following section, as complementary observations of private companies' engagement in the Veturi initiative, this report lays out insights based on semi-structured interviews carried out between the authors of this report and representatives of two (2) different Finnish companies engaged in the Veturi initiative.

The interviews and discussions with the Finnish Veturi companies were primarily guided by the following question: *How do large and globally operating companies perceive Business Finland's Veturi initiative, as well as mission-oriented R&I policy-making in general?*

Against this backdrop, the key insights and observations derived from the interviews are presented below under the three main thematic areas:

- General overview of companies' perception of the Veturi initiative and missions
- The impact of the Veturi funding from a mission-oriented perspective
- The companies' perception of the EU Missions

3.1 How do global companies conceive the Veturi initiative and Missions

The companies appreciate that in the Veturi initiative they genuinely have a leading role. This concerns all the key aspects: defining the actual challenge/mission, creating the roadmap for the implementation and inviting their ecosystem to come along. This is different from the traditional Business Finland requirements how consortium projects between industry, large and small, and research world should be planned and conducted. In Veturis a true win-win situation has been achieved to include company's ecosystem actors independently but still in an aligned manner to develop their competences. Also, unlike in some other ecosystem or cluster schemes, Veturi concept thanks to its clear leadership role is not a vague amoeba kind and weak-willed creature.

The obliging targets set in the funding decisions for the R&D expenditure and the money return from the EU programmes are well understood by the companies and they are fully committed to them. Targets are seen as an integral part of the 'Veturi Deal'.

Some criticism has been raised about the obliging targets being mere input (monetary or other) objectives. On the other hand, and this comes from the writers of the report your are currently reading, pure money metrics does not in any way prevent the companies and their ecosystems doing extremely clever things.

The Mission approach means that the company and its staff are working for a *greater good*, instead of merely for opportunistic business goals. This is considered inspiring and motivating not only for the





leadership but also for the engineer in the lab or on the floor of the factory. Motivation means better results.

Dropping a mission with its objectives and collaboration structures high from an ivory tower just does not work in order to engage enterprises (for researchers seeking funding this might be different). The industry values that the missions are actually a manifestation of their very strategies. It was clearly stated in the interviews that the companies will not change their focus due to an existence of a politically decided mission. So an obvious way to achieve the private sector commitment is a strong bottom-up approach defining the mission, which again is the key feature of the Veturi concept, hence the popularity. It is hard to envisage other competing philosophies with same results. Actually, if a company engages in a top-down activity for the reason that there is public money available, the outcome most likely will be more or less disappointing.

Even though we talk about large and financially robust companies, Veturi funding is an important risk sharing tool for big and uncertain projects. Public funding offers an in-house selling argument as does the Business Finland label. For instance, to convince separate and often fiercely independent divisions to work together.

3.2 Impact of Veturi funding – contributing to global challenges through a bottom-up approach

As was described previously on the structure of Business Finland's Veturi initiative, this specific funding instrument's guidelines stipulate that the projects pursued with the Veturi funding need to contribute to solving significant future challenges, hence including a clear mission element. However, the future challenges that are addressed in the Veturi projects, have not been predetermined in the funding calls by the provider of the funding. In the case of Business Finland's Veturi initiative, the public funding available is not intended to straightforwardly direct the private companies to address a specific mission, nor does the funding aim to serve as an incentive to transfer the companies' operations towards a certain thematic area. Rather, in this context, the beneficiary companies are invited to propose and embed the missions into their Veturi projects according to the companies' own strategy, expertise and field of operations. Due to this structure, it is possible to describe and conceptualize the Veturi initiative as a mission-oriented R&D funding instrument, which is implemented through a bottom-up approach.

From a private company's viewpoint, the aforementioned bottom-up principle was noted as crucial both for the attractiveness of funding instruments addressing global challenges and the achievable impacts with public R&I funding. The funding made available through the Veturi initiative was perceived as a motivating factor to start pursuing R&I projects that contribute to achieving a broader mission, which, in a thematic sense, is also relevant and corresponds with the operations and strategy of the company. In particular, the Veturi funding was perceived to encourage the large companies to clearly link the targets of their R&D projects with a global challenge and offer solutions to it.

While the Veturi funding was perceived as attractive and serving its purpose in incentivizing the companies to contribute to a global challenge, the funding was also noted of having to have an accelerating impact within the companies in adopting a mission-oriented approach in their R&D operations. This includes that the funding and projects pursued through the Veturi initiative intensified the exchange of information and cooperation within the large companies by bringing together the staff members, leadership and different divisions to work towards achieving a mutual



goal linked to a large-scale global challenge. Lastly, an interesting remark was made by one of the companies interviewed when further addressing the impact of a mission-oriented R&D project among the staff members: "At best, a mission can be extremely motivating (...) A long-term goal, to which many different actors can link themselves to". In this context, it was noted that connecting an R&D project to contributing to a global challenge, in addition to being driven by technological or commercial targets, was perceived as a motivating factor and meaningful opportunity by the company's staff members.

Moreover, the Veturi funding was also observed of having an impact on the cooperation between external stakeholders and within the so-called ecosystems of the Veturi companies. In particular, the Veturi funding had accelerated the leading companies' cooperation and creation of new initiatives with relevant SMEs and research organizations, such as universities, in order to generate progress towards the broader societal targets defined for the Veturi projects.

3.3 Potential limitations of top-down missions and funding instruments

As described in the section above, the added value of the Veturi funding from the private companies' perspective was encapsulated in the bottom-up structure of the initiative. Thus, the companies interviewed agreed that public R&I funding instruments might not succeed in incentivizing large and globally operating companies to drastically change their focus, nor could the public funding available direct large companies to align with missions that are not relevant to their commercial operations. However, it was also noted that the incentive as well as the directional impact that the public funding generates can be varying, and the incentive might appear differently, e.g., to smaller companies, which are still evolving and not yet fully tied to a specific field and customers.

In specific, in the context of this Use Case, the companies perceived that mission-oriented funding programmes that are tied to specific predetermined challenges do not possess a sufficient incentive for large and established private companies to change the focus of their operations and might not succeed in directing companies to contribute to missions that are not fully relevant to their strategy. In the case of smaller and emerging companies, such mission-oriented funding instruments could succeed in directing companies towards specific thematic areas that have been defined through a top-down approach and, for example, by the governmental or political leadership. However, in the context of SMEs and other smaller companies, the directional impact of top-down mission-oriented funding instruments would need to be further assessed by interviewing the representatives of such companies.

With regard to missions that are tied to specific national or regional targets, it was observed that from the perspective of globally operating companies, the thematic area of a mission would need to be sufficiently broad, and identifiable at a global scale, in order to correspond with the operations of large companies. Moreover, the companies interviewed indicated that such mission-oriented initiatives and public funding instruments that aim to direct large companies to contribute to a specific national or regional goal, might appear as too limited for companies operating globally. Thus, sufficiently broad formulation of a mission, as well as overarching targets that can be identified with and appear as relevant to customers as well as staff members across different continents, were observed to correspond with the needs and interest of large globally operating companies.





3.4 Veturi companies' perceptions and comments on the EU Missions

Based on our discussions and interviews focusing on the Finnish Veturi companies' perception of the EU Missions, three main observations can be extracted.

First, as described in the previous section, the relevance of mission-oriented policies, such as the EU Missions, to large companies, depends on how a mission is formulated, including how it corresponds with the companies' operative scale (national/regional mission vs. global mission), how the mission fits into the company's strategy and how the mission relates, in practice, to the products and services that the company is focusing on in its R&I work. In the context of the EU Missions, the formulation and overarching targets were perceived of lacking clarity in order to be considered as compatible, as well as in order for the companies to justify why they should adopt a specific EU Mission to lead or have an impact in their R&I operations. Similarly, as was indicated in the previous section, the notion of tying missions with specific regional and geographical targets, or more specifically, constructing the EU missions to generate results mainly at EU level, was not perceived as relevant by the companies operating globally, even though EU funding would be available and act as an incentive to contribute.

Secondly, as a more general note, in addition to focusing on the creation and implementation of funding instruments, the companies raised up the importance of the broader regulative framework surrounding the EU Missions. In order for private companies to invest in research, development and implementation of new technological solutions that can contribute to the achievement of missions, the role of an appropriate regulative framework that clearly directs and encourages towards achieving a specific mission's goals was considered as important.

Thirdly, with regard to eventually achieving and successfully completing a mission, the companies agreed that synergies between various public funding initiatives and instruments should be strengthened. During the discussion on how private companies could be more closely engaged and contribute to the achievement of the EU Missions, the companies perceived that R&D funding and projects can act as the starting point, it but does not provide the sufficient support system to implement new solutions at a broader scale. Due to this, from the private companies' perspective, further support actions are needed in order utilize the results of R&D projects, and eventually bring the new discoveries from the research lab to the market.

Deriving from the discussion with the Finnish Veturi companies on the EU Missions, these three points can be connected and looked at in a linear manner. Moreover, this rather simplified linear approach can be seen as a relevant consideration in the context of mission-oriented policy making more broadly, as well on national as on EU Missions level. In order to increase the engagement of private companies in mission-oriented R&D initiatives, and to facilitate the required support to actually solve significant global challenges, the missions should be considered as a comprehensive and synergized ensemble, consisting of a set of funding programmes and regulative framework complementing each other and aligned with achieving missions. In specific, this ensemble starts with the establishment of appropriate R&D initiatives and provision of R&D funding, plugged in to investment-related funding programmes that are clearly linked with the R&D programmes and provides leverage for scaling up the developed solutions, complemented simultaneously by the appropriate regulative and policy framework, which together then form a composition that can support the achievement of missions.





ABB: GREEN ELECTRIFICATION 2035

Finland's goal is to be a pioneering carbon-neutral country by 2035, which means it must foster a massive growth in the share of renewable energy. ABBs Green Electrification 2035 program will create system-level solutions for a new energy system based on green electricity and will help to make carbon-neutral society a reality. The five-year program addresses ecosystems that connect business and research, and solutions are being sought in five focus areas, covering the hydrogen sector, energy networks, industry, transport, and cities. The ecosystems work together to develop new integrated technology platforms for optimal electricity generation and use, and to find answers to specific questions, e.g., about the future of the hydrogen cluster or urban energy maintenance.

BITTIUM: SEAMLESS AND SECURE CONNECTIVITY ("Challenger" Project)

Seamless and Secure Connectivity program aims at enabling trustworthy, secure, and resilient end-to-end connectivity architectures and products including life-cycle services in various domains. The Program ecosystem will develop seamless digital structures, infrastructure, systems, and processes as well as cyber resilience suitable for the current, advanced 5th generation (5G advanced) and future 6G environments. Technologies for highly secure connections and encryption for the basis for the development of trustworthy services in many areas, including public services, medical applications and IoT applications.

BOREALIS POLYMERS: SPIRIT – SUSTAINABLE PLASTICS INDUSTRY TRANSFORMATION

The objective is to transform the entire plastics value chain sustainable, addressing the three key industry challenges together with ecosystem partners: 1. Transform the fossil feedstock into renewable and recycled feedstock; 2. Establish efficient systems for the large-scale mechanical and chemical recycling; 3. Carbon neutral production of plastics. Renewable raw materials like biomass from waste streams, and their use in the chemical industry are a particular area for research and development. Also, e.g., the capture of industrial CO2 emissions and utilization as raw material for polymer products is studied.

DANFOSS: FOSSIL FREE FUTURE ("Challenger" project)

The mission of the Danfoss initiative is to lead, guide and support an ecosystem in which power electronics form the basis for developing fossil free solutions for electric transportation at all levels. Smart power electronics, smart energy storage and charging infrastructure, digitalization and sustainability, off-highway vehicle electrification, and efficient green hydrogen production are the key components of the development agenda. The goals are set, e.g., to reaching a cost level < $2 \notin$ kg for green hydrogen, and a 25 % decrease in vehicle energy usage.

FORTUM AND METSÄ GROUP: EXPANDFIBRE





ExpandFibre is an R&D collaboration and an Ecosystem launched by Fortum and Metsä Group to accelerate the development of sustainable bioproducts. It focuses on upgrading pulp fibres, hemicellulose and lignin from renewable and sustainable sources of straw and northern wood into new bioproducts. It strives to meet the growing demand for sustainable bioproducts by developing ground-breaking materials and technologies and smart business concepts for a range of different product categories like textiles, biocomposites, and packaging.

KONE: THE FLOW OF URBAN LIFE

The mission of The Flow of Urban Life ecosystem is to develop smooth and sustainable services and solutions for the next 1 billion people moving into cities by 2030, helping to ease some of the major challenges caused by urbanization and climate change. Co-innovation with Kone's ecosystem partners is divided into the following focus areas: Innovations for sustainability; Smart construction; Smart buildings and cities; and Smart and green field services. Overall goal is to create more sustainable, resilient and inclusive cities.

KONECRANES: ZERO4

The mission of Zero4 is to create a common material flow platform that optimizes material and information flows. The four themes of the program are: Information barriers, Safety incidents, GHG emissions, and Wasted energy. Material flows are responsible for 5.5 % of global GHG emissions, and 40 % of work-related injuries in manufacturing industry. Related equipment and activities can be made less energy consuming and safer for humans.

MEYER TURKU: NECOLEAP - CLIMATE NEUTRAL CRUISE SHIP

The NEcOLEAP research and development project brings industry trailblazers together to build a climate-neutral cruise ship. Cruise ships play an important role in the tourism industry, and Meyer Turku's share of the global cruise ship construction market is about 15%. The content of the programme is built on innovative technologies throughout the life-cycle of a ship, and aim at developing a climate-neutral cruise ship concept by 2025, and achieving carbon neutral shipbuilding by 2030. The results of the 160 M€ NEcOLEAP programme provide a direction for the shipbuilding industry in terms of long-term environmental responsibility actions.

MIRKA: SHAPE, SHAPING THE GREEN TRANSITION – WITH NET CARBON NEGATIVE SURFACES ("Challenger" project)

SHAPE is an ecosystem launched by Mirka to accelerate the development of new solutions for the (re)manufacturing industry. It focuses on reshaping life cycles of products and materials by boosting circularity, finding sustainable material solutions, piloting new business concepts and by optimizing sustainable processes. Circularity, sustainable materials, repair, refurbish and remanufacture, and intelligent solutions throughout value chains lead to extended product lifespans and carbon neutral or even carbon negative solutions in the manufacturing industry.

NESTE: NOVEL SUSTAINABLE & SCALABLE SOLUTIONS FOR TRANSPOTATION AND CHEMICALS



Neste is targeting to become a global leader in renewable and circular solutions. Their Veturi programme develops sustainable fuels and chemicals from renewable and recycled raw materials that have been difficult to utilize so far. New solutions decrease the use of crude oil and tackle climate change. Focus areas of Neste Veturi include forestry residues, municipal waste, algae, waste plastics, carbon dioxide and hydrogen, novel vegetable oils, and novel catalysis technologies. The aim is to produce sustainable fuels and products for road transportation, aviation, and polymers and chemicals industries.

NOKIA: COMPETITIVE EDGE

As modern networks continue to evolve towards 5G and the Internet of Things (IoT), there is an essential need to manage very rapidly increasing data transfer and network capacity requirements in a sustainable way. Nokia's Veturi program is built on the following three pillars: Sustainability and competitiveness; Network scalability and operability; and Solution focus. Edge computing, Machine learning, IoT and related communication solutions are examples of technologies applied to render competitive solutions with low latency times and low power consumption.

ORION: DATA AND AI-BASED PHARMACEUTICAL RESEARCH ECOSYSTEM

Orion is a pharma company whose in-house R&D focuses on pain and oncology. Orion Veturi programme aims to reduce time to market for novel therapies by several years by optimal use of data and AI. Work is concentrated on three areas: Data access and insights, Active learning laboratory, and Connecting data science providers and consumers. Population and patient-level datasets, disease models and AI for predictive modelling, and research data platform development are examples of R&D themes.

PICOSUN (APPLIED MATERIALS): CHIP ZERO ("Challenger project")

Picosun is a semiconductor equipment company that provides advanced ALD (Atomic Layer Deposition) thin film coating solutions for global industries. Their Chip Zero Programme is set to form a semiconductor ecosystem with a mission to develop chips with zero lifetime emissions. The aim is to lower the deposition emissions of semiconductor manufacturing by 50% and increase the handprint of chips by double digit percentages by 2030, thus leading to an overall zero lifetime emission. Resource-efficient manufacturing equipment, processes, and materials; boosting circularity by linking value chains to closed resource cycles; and environmentally positive characteristics of semiconductor components like increased efficiency and lifespan, are all included in the ecosystem R&D portfolio.

PONSSE AND EPEC: FORWARD'27 ("Challenger project")

Ponsse and Epec will implement the FORWARD'27 together, developing intelligent, aimin to develop zero-emission off-road and commercial vehicles and infrastructure for extraction, processing, and transport of raw materials in challenging environments. To fulfil the set mission and commercialize co-innovative solutions, other companies and research partners are invited to join the ecosystem. RDI work is conducted on autonomous and data driven solutions and sustainable power and supply chain solutions.





SANDVIK: SHIFT '25

SHIFT '25 will develop sustainable and globally scalable solutions for mining industry. The aim is to improve productivity and working conditions, and to reduce emissions throughout value chains. Wireless digitalization and novel electrification technologies are used to enhance autonomy, safety, and efficiency of heavy machinery in harsh mining conditions.

TIETO-EVRY: TRUST-BASED DIGITAL SOCIETY

The mission of the Tietoevry Veturi programme is to develop affordable, accessible, and trusted digital services for citizens. Together with ecosystem partners, collaborative research is conducted both in horizontal enabling themes, like Trustworthy AI or Secure Communication, and in focused vertical topics Banking, Health & Care, and Energy & City. The project is expected to create hundreds of new jobs and generate substantial new business by 2030.

VALMET: BEYOND CIRCULARITY

Beyond Circularity aims to transform waste and emissions into valuable resources for sustainable growth and accelerating green transition. Circularity is at the core of the program, which develops process technologies, automation and services for value creation by utilizing renewable and recycled materials, industrial side stream rejects and waste.

WÄRTSILÄ: ZERO EMISSION MARINE

The compelling goal of the Zero Emission Marine Veturi initiative is to reach 60% greenhouse gas (GHG) reduction in the maritime by 2030. In addition, all Veturi ecosystem products will be carbonneutral or carbon-negative by 2050. R&D is conducted within the usage and production of green zero-carbon or carbon-negative fuels, automated and optimized operations, and outcome based business models driving the green transition of the marine sector and its business ecosystem.





5. USE CASE 4: STRATEGICALLY ESTABLISHING A MISSION ORIENTED APPROACH – EXPERIENCE AND LEARNINGS FROM REGION BLEKINGE

The Swedish TRAMI Use Case

Strategically establishing a Mission oriented approach - experience and learnings from Region Blekinge