Appendix I

SUPPLEMENTARY TABLE (APPENDIX 1) TO THE PAPER:

"How Fares the Entrepreneurial State? Empirical Evidence of Mission-Led Innovation Projects around the Globe" *

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Paper	B. Mission case	C. Mission description	D. Setting (Country)	E. Time period	F. Research question(s)	G. Grand challenge
1	1	Antibiotics	U.S.	1942-1945	How can private enterprise be leveraged to incubate new industries? How can private enterprise contribute to addressing mission-oriented grand challenges in the public sector? What are the strategies for promoting the incubation of new industries by private enterprise to tackle mission-oriented grand challenges? What are the potential benefits and limitations of involving private enterprise in addressing the public sector's mission-oriented grand challenges?	Address wartime needs to treat infection
1	2	ARPANET	U.S.	1963-1972		Address military needs for secure and sustained communications and connectivity
1	3	Human Genome Project	U.S.	1990-2003		Address the needs to understand the role of genetics in human health
1	4	Radar	U.S.	1941-1945		Address wartime needs for detection of distant objects
1	5	Artificial Heart Program	U.S.	1964-1988		Address the needs for heart disease treatments with a total artificial health
1	6	Molecular Manufacturing	U.S.	2000-2021		Address the needs to understand principles in nanotechnology and create nanodevices
2	7	Low-energy transitions policies	Finland	2014-2016	How does current policy mixes (creation versus destruction) engage or do not engage with processes argued to be crucial for low energy sustainable transitions?	Support energy efficiency and reduce energy demand

A. Paper	B. Mission case	I. Type of study (case study, experimental, observational data, etc.)	J. Main finding
1	1	Historical case study of the development of penicillin during wartime needs to treat infection. Secondary data including government archives, corporate websites, academic publications, news, and commercial archives.	While public-private partnerships in addressing mission-oriented challenges in the public sector can bring benefits, they come with fault lines and risks: potential use of public sector funding to further private agendas.
1	2	Historical case study of developing secure and sustained communications during Cold War, primarily for military needs. Spillover resulted in the commercial internet. Secondary data including technological and historical academic publications and books.	Wartime missions tend to be technological, resulting in spillover effects that benefit the commercial public. The public sector provided funding while the private sector completed the execution in the sense of conducting the clinical trials and experimentation.
1	3	Case study of the Human Genome project focusing on gene therapy, diagnostics, and complete mapping of human genome sequence. Data includes publicly available and pre-existing interviews with biotechnologists who worked on the project, and other secondary data such as scientific publications and government archives.	Some private firms started their own experimentation independent of the NIH's effort. This descredits the argument that the mission would not have been possible without the public sector by introducing the possibility that perhaps with this private firms' efforts, it may have been possible. This suggests private sector action rather than a public entrepreneurial state.
1	4	Historical case study addressing wartime needs for detection of distant objects, resulting in the mission outcome of delivery of radars. Archival data such as secondary data of interview with program director, retrieved papers from the radiation laboratory, and academic publications covering the case.	A need for real or perceived danger can increase the chances of MOIP success.
1	5	Historical case study of mission seeking a heart disease treatment with an artificial health, based on secondary data including program proceedings that contain its organization structure, interim outputs, and transcribed dialogues among conference participants. Also utilized books and government reports, commentaries written by	Heavy solution focus rather than problem focus may have attributed to its failure. A problem focused approach may have changed the focus of the mission to focusing more on finding a substitute for cardiac effects. Solidifies Mazzucato's argument of avoiding 'picking winners'

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		experts such as program's mission champion, program directors, and political advocacy group.	
1	6	Case study on ongoing mission on molecular that seeks to understand the principles of nanotechnology and create nanodevices. Data consists of technological publications, predominantly ones from the National Academies Press.	Success for missions are assessed through different metrics, from different stakeholders' views, and in different timelines. Therefore, extension of deadline, as was the case for this mission, may not particularly be a bad thing.
2	7	Case study of the low-energy transition policy in Finland, ranked among the top three countries in terms of progress in energy efficiency policy. Data consists of publicly available sources including four international data sources of 65 Finnish policy instruments and findings on the Finnish governmental websites.	There can exist several separate projects that overlap. However, without proper coordination, inconsistencies in layering of the projects can create a stacked mix that is overall ineffective.

A. Paper	**B. Mission case**	**K. Policy recommendations**	**L. Degree of mission success**	**M. Future research suggestions for the case**	**N. Future research suggestions for mission policy/research**
1	1	MOIP have to appeal to the why of the private sector to attract their collaboration and therefore relevant knowledge and expertise. These can be financial motives such as advance purchase agreements or nonfinancial motives such as social welfare. From these historical case examples, the public sector should bear this responsibility. Champions and prior success serve as triggers for MOIPs. In the cases studied, champions were academics who then sought-after public-sector agencies to sponsor the mission. Success is more likely when the public sector identifies the problem and details the time, goals, and other specifications. Formal knowledge exchange platforms are needed and space for continual assessment and amendment of alignment between the private and public parties also improves chances of success. Moreover, caution is advised: the private sector may in disguise lobby and influence public officials to promote their own self-interests and the public sector.	Success	Authors of the paper encourage scholars to build on to the knowledge of market-driven and nonprofit initiation of industry incubation, with attention to the process through which each of these actors articulates the mission, leverages relevant other actors, and governs the incubation process.	Future research can examine similarities or differences between grand challenges issued by private, public, and nonprofit organizations. Additional studies can deploy the use of diverse empirical approaches to systematically conduct a cost-benefit analysis of public sector grand challenges; Such studies will help ascertain not only the true success rates of grand challenges but also enable rigorous identification of the causal mechanisms and comparisons of effect sizes, adding to the understanding of factors that are most critical for success of grand challenges offered by the authors of the paper. Moreover, further research should focus on grand challenges in other country contexts. The Human Brain project mentioned briefly in the paper is set to end by March 2023 and there can be analysis of the mission then.
1	2		Success		
1	3		Success		
1	4		Success		
1	5		Failure		
1	6		Success		
2	7	Gap in the policy mix for transport, heating of buildings, and electricity regimes. No policy changes or key actors were identified in policy instrument databases and overall, the Finnish policy mix demonstrates an imbalance between creation and destabilization policies.	Ongoing	Additional studies focusing on fewer instruments for the target group; Use econometrics to analyze the combined impact of policy mixes from the perspective of creative destruction.	Further empirical studies on destabilizing policies to provide insights into the actual content and nature of destabilizing functions and the resulting new governance arrangements.

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A. Paper	B. Mission case	C. Mission description	D. Setting (Country)	E. Time period	F. Research question(s)	G. Grand challenge
2	8	Low-energy transitions policies	U.K.	2014-2016	How does current policy mixes (creation versus destruction) engage or do not engage with processes argued to be crucial for low energy sustainable transitions?	50% reduction in green- house gas emissions 1990 – 2027, and reduction of 80% by 2050.
3	9	Economic growth in the US	U.S.	1947-2018	How did different types of fiscal policies, particularly MOIPs (proxied by defense R&D spending), impact US economic growth 1947 and 2018?	N/A
4	10	UK's mission to use Artificial Intelligence (AI)	U.K.	All info in GtR's API database until 2019	To create prototype indicators to use data analytics for prevention, early diagnosis, and treatment of chronic diseases. Eight specific research questions listed.	Prevention, early diagnosis and treatment of chronic diseases using AI by 2030
5	11	German biotechnology and bioenergy innovation policy	Germany	1995-2015	Whether mission-oriented innovation policy actually follow a strict top- down logic, or whether the policymaking process rather resembles a certain evolutionary scheme is questioned	Establish a vital and innovative biotechnology landscape in Germany
6	12	Dutch Green Deal	Netherlands	2018-2020	To identify systemic barriers that inhibit a well performing Mission-oriented Innovation Systems (MIS); Do the mission arena's governance actions adequately target systemic barriers in the respective MIS?	20% reduction in CO2 emissions per maritime short sea shipping operation by 2024 and a 70% reduction in absolute CO2 emissions in the sector by 2050.
7	13	Mission-oriented Top sector and Innovation Policy	Netherlands	July 2020-September 2020	What is the current form of governance? Does the mission actually guide the various activities? Do the governing arrangements offer a suitable range of instruments for researchers and innovators?	A carbon-free built environment by 2050
7	14	Mission-oriented Top sector and Innovation Policy	Netherlands	July 2020-September 2020		A sustainable, fully circular economy by 2050

A. Paper	B. Mission case	I. Type of study (case study, experimental, observational data, etc.)	J. Main finding
2	8	Case study of the low-energy transition policy in England (selected of due to English strategy for improving energy efficiency). Data: publicly available sources (four international data sources of policy instruments). A total of 73 policy instruments were identified in England. Information on the identified policy instruments were complemented by searches made on governmental websites.	Even with the existence of several separate missions that overlap somewhat, if there exists a Key Actor that oversee them all, as is the case here with the Climate Change Committee, the missions may succeed in avoiding competing with one another.
3	9	SVAR models estimating macroeconomic effects of fiscal policies (generic or mission-oriented, the latter proxied by defence R&D spending) on private R&D and GDP growth. Data from the Bureau of Economic Analysis for 1947-2018.	Defense R&D spending generate larger positive effect on GDP and private R&D investment as opposed to generic public expenditures. Increase in government expenditures is found to create a positive and permanent effect on the level of output and private investment in R&D.
4	10	Case study of UK Grand Challenge Mission to 'Use data, Artificial Intelligence and innovation to transform the prevention, early diagnosis and treatment of chronic diseases	Number of projects related to chronic diseases in AI-related projects grew rapidly. High degree of interdisciplinary crossover suggests different bodies of

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		by 2030'. Data on all projects funded by the ministries, coded based on the BMBP Classification using topic models.	knowledge are combined as AI is deployed in treatment of chronic diseases. Organizations in the mission tend to be younger and specialized, and research such as patents, software, and spinouts are more AI-based.
5	11	Case study of German biotechnology and bioenergy innovation policy by building a distinct database containing 16,500 projects funded by the federal ministries of Germany from 1995-2015. Through a broad search of the term bioeconomy, the authors garnered database of number of funded projects to analyze the changes in the structure of bioeconomy R&D.	The change in policy strategy papers from biotechnology to a broader bioeconomy does not follow a linear sequence. Biotechnology funding was reduced as part of the change of leitmotif while R&D increased in the agricultural sector. Further, the issue of "missing output markets" was confirmed. Little effort in the practical application of bio economical knowledge behind slower transition towards bio-based economic activities.
6	12	Data consists of (a) 27 interviews (b) a database of publications, newspaper articles, trade magazine articles, websites, reports, and policy documents. Semi-open coding was applied to the database, guided by the diagnostic questions. These data were analyzed by semi-open coding, resulting in 1403 coded textual fragments.	Socially innovative solutions is not the only difficulty in mission achievement. Other difficulties such as the grand challenge becoming more wicked and transforming, its temporality, systems embedding, etc. may pose challenges.
7	13	Case study of two missions in the Dutch "Mission-oriented Top sector and Innovation Policy" from 2018 that contains 25 missions. Data consisted of (i) 19 interviews and (ii) database of letters sent to parliament, publicly available descriptions and agendas relating to the mission, as well as internal documents and public presentations shared by the ministry of EZK and other stakeholders.	Governance of missions varied, MI teams positioned to drive change activities for completing missions, coordination mechanisms put in place to interlink stakeholders, confusion given the high number of missions concerned, missions and thus governance structures were overlapping causing complexities, fear of being overruled by ministries responsible for the mission makes the guidance by MTIP limited.
7	14		

A. Paper	**B. Mission case**	**K. Policy recommendations**	**L. Degree of mission success**	**M. Future research suggestions for the case**	**N. Future research suggestions for mission policy/research**
2	8	The paper identifies one identified policy instrument that addresses significant changes in regime rules from 2008. There also is an imbalance between creative and destructive policies, acknowledged by the government stating the existence of a wide range of programs and lack of policy integration.	Ongoing	Further analysis of the links between changes in regime rules and changes in networks and replacement of key actors with impacts on niche support functions would need more detailed case studies with a more limited scope of policies than analyzed in this paper.	Further empirical studies on destabilizing policies to provide insights into the actual content and nature of destabilizing functions and the resulting new governance arrangements.
3	9	Private investment in R&D is positively related to public expenditures targeted MOI policies. The paper argues that governments should implement expansionary fiscal policies that target MOI, which will in turn improve GDP and economic growth.	Ongoing	Other forms of expansionary fiscal policy in the form of spending on other fields than public defense can be of aid.	The study is to "characterize" not "evaluate" policy initiatives, but can serve as a stepping stone for evaluation, in the future.
4	10	The active mission field may have been expanding before the public sector formally launched its mission, which is important when evaluating the impact of the challenge.	Ongoing	Why some disease areas such as aging, obesity, and pregnancy-related issues have low levels of activity in the mission field and policy implications? E.g. network analysis to study structure and evolution of topic and organizational networks in mission fields and how they respond to policy changes.	In collaboration with a donor, an experimental policy approach could be done that would allow for comparison of fundamentally different policy approaches

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5	11	Due to resource and capacity constraints, it is impossible for one organization (country, union, region, etc.) to specialize in all sectors and pathways. This, plus that future endeavors are dependent on existing structures and knowledge, highlights the path dependencies. Mission history resembles an evolutionary process which ensures continuity and long-term envisioning of all concerned actors.	Ongoing	Analyze the actual output of said R&D projects by Germany; To go more in-depth into each individual project in future research for better grasp; General additional studies to understand innovation policy.	Further studies could investigate what organizational conditions might support fruitful collaborations in teams.
6	12	The "wicked" problem can transform and become more wicked/the mission can evolve/devolve; Following the initial mission action with taskforce can be beneficial; Individual firms should be more involved in the mission arena	Ongoing	Since planned mission governance actions effectively target systematic barriers and therefore its impact can be assessed some years afterwards. Hence, a follow-up assessment.	Examine how innovation systems components are mobilized and combined; Other papers can also conduct a longitudinal analysis, studying clusters of solutions separately in the context of the broader MIS.
7	13	Coordination is important in MI given participation by various stakeholders. However, streamlining governance by having the MI team as an advisory board would ensure that decisions are made within more levels.	Ongoing	Regular reporting on the progress of the missions (not just administrative data but also on the content, development tag and participants involved in the projects).	Additional papers studying the governance and instruments already deployed (but ongoing) 'mature' missions can be particularly helpful.
7	14	Aligning the TKI with the missions, less with the top sectors they were originally associated with (or proposed by).	Ongoing		

A. Paper	**B. Mission case**	**C. Mission description**	**D. Setting (Country)**	**E. Time period**	**F. Research question(s)**	**G. Grand challenge**
8	15	Bio Innovation and Resource	Sweden	2016-2018	To what extent and how can instruments such as the strategic innovation programs stimulate institutional entrepreneurship? Should policy focus on mediation and brokering in networks, and how can this mediation – if at all – influence development and direction of shared vision and institutional change?	Support a complete transition to a bio-based economy in Sweden by 2050; Make Sweden a world-leading circular economy minimizing and reusing waste
9	16	Inclusion of Children's Perspectives (Danish daycare and frontline workers)	Denmark	2019-2020	How do professional actors engage in the translation of a new organizational mission into their everyday practices and what are the processual implications of this work?	Increase children's influence in childcare facilities; Support children's democratic competences.
10	17	Mobility-as-a-service (MaaS)	Finland	Historical data from 1990s; 2017-2019	How did MaaS in Finland develop? (with particular focus on its public governance)	Support Finland's growth and expertise in the transport and mobility sector and get international attention.
11	18	Circular Agriculture in the Netherlands	Netherlands	2011-2019	What policy assemblages around the Dutch circular agriculture mission formulation and enactment can be distinguished, how do they affect mission directionality?	Make Dutch agricultural landscape a frontrunner in Circular food systems by 2030

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12	19	Covid-19 Plasma	Canada, the US, Argentina, UK, India, and China	2020-2021	What are the respective roles and interests of public, academic, and private entities within the context of global market in clinical trials, their interrelations, and the implications for health equity and research integrity?	Creation of convalescent plasma and hyperimmune immunoglobulin against SARS-CoV-2 ASAP

A. Paper	**B. Mission case**	**I. Type of study (case study, experimental, observational data, etc.)**	**J. Main finding**
8	15	Case of two policy initiatives among total of 16: (i) Bio Innovation and (ii) Resource. Data consists of database created consisting of documentaries, digital materials, press releases, newspaper articles, previous versions of the innovation agenda, internal policy documents, internal working papers from SIPS themselves and participating universities and other public sector agents. Upon review of these materials, notable individuals for interview were identified, and total of 9 interview conducted (4 for a, and 5 for b).	Studying the two cases found that conflicting interests were not dealt with, shared visions were broad with lack of actionable objectives, and addressing one transformational challenge may have led to negative effects for another; More emphasis needs to be placed on institutional change and institutional entrepreneurship.
9	16	Case study of translating MOI as an abstract idea into concrete practice in the project "Inclusion of Children's Perspectives." Data was collected through the mission plan of ten months in five Danish childcare facilities' frontline workers. Interviews with project members conducted before and after the innovation. Interview responses were coded and thematically analyzed.	Actors edit new ideas to fit local context by engaging in reflection and negotiation of interpretation of the mission. Varying levels of collaboration and closeness with colleagues may affect level of engagement. How much and in what way workers are willing to involve themselves in the editing of the change varies and also varies over time.
10	17	Case study on the development of mobility-as-a-service (MaaS) which provides transport peer-to-peer services with specific focus on public governance studies. Interviews with different stakeholders (researchers, businesses, civil servants from innovation and transport domains) 2017 and 2019.	Publicly funded organizations and the public-private networks has been essential for MaaS-ecosystem development. Numerous interviewees acknowledged the way in which several ministers from different political parties guided the agencies, has enabled the discussion regarding new mobility services.
11	18	Case study of recent circular agricultural mission in the Netherlands, part of the Dutch Mission-oriented Top sector innovation policy. This mission was analyzed based on an analytical framework proposed by the authors of the paper with pointers that is intended to analyze mission directionality. Semi-structured interviews were conducted.	Mission dominated by incumbents and old infrastructures, pulls mission back into current regime. Innovation systems and policy structures that enact it would also need transformation to fully enact this sort of policy with transformative goals.
12	19	Case study of clinical trial processes of convalescent plasma to treat Covid-19. Other clinical trials of convalescent plasma in six countries were analyzed. Public sector predominantly funded and led it. Data collected by keywords search in databases. Information on regulatory applications, approvals, trial protocols, preprints, publications, ancillary documents, editorials, participant materials, first-person accounts, articles (blogs, news, journals) collected.	The case study illustrates the ability of public sector actors to take on risks of fading, downcutting, and disseminating the clinical trials, a form of health innovation, which challenges the dominant discourse that drug R&D is best conducted by the private sector.

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A. Paper	B. Mission case	K. Policy recommendations	L. Degree of mission success	M. Future research suggestions for the case	N. Future research suggestions for mission policy/research
8	15	Addressing one transformational challenge may lead to negative effects on another. Policy mix should be addressed with caution.	Ongoing	Institutional analysis conducted in this paper only covered a couple of years while such a change requires a longer time frame. Hence, the same mission can be studied for a longer period of time.	Empirical study on the extent to which the involvement of broad actor groups leads to better results as opposed to a variety of competing experiments of more narrowly defined stakeholder groups; Whether and how need for broad involvement differs at different stages of the policy design and implementation process, and how active involvement of different stakeholder groups can be secured and sustained.
9	16	Translation a process rather than an outcome. Even with carefully designed project, meaning of a translated innovation – or mission – cannot be set in stone but will be subject to continuous interpretation and negotiation. Attention to individual change agents / institutional entrepreneurs in innovation policy.	Ongoing	General consensus from interviewees seemed to be that they have not reached the finish line as such but would continue to work with the new mission alongside whatever else they would engage with in the future.	Varying levels of collaboration and closeness with colleagues may affect intensity with which employees engage, and further studies could investigate what organizational conditions might support fruitful collaborations in teams.
10	17	The case emphasizes that the impact of transformative policy mixes happens over time. Thus, directionality and consistency of policy mix across administrative sectors is crucial.	Ongoing	Too early to say how the policy experiments and institutional changes influence mobility transition. Further follow-up studies needed.	Additional papers focusing on policy mixes in the context of transformative innovation policy are needed.
11	18	Missions being "captured" by incumbents, resulting in accelerator missions instead of transformative missions show how difficult it is to enact MOIP.	Ongoing	Follow the actors, institutions, and policy processes over time and track how missions evolve.	Paper propose MOIP scholarship to move beyond studies that aim to identify the right policy frameworks for MOIP and put faith in rational design and coordination.
12	19	Knowledge governance in public sector innovation that ensures accountability and transparency while maintaining scientific independence (free from political exploitation). Clinical trials vulnerable to complicated political influences. For "risky" projects, knowledge governance is delicate.	Success	Each theme presented in the paper require further research and policy deliberation.	Further research that relies not only on publicly available documents but more data harvested specifically for the paper would be of aid.

A. Paper	B. Mission case	C. Mission description	D. Setting (Country)	E. Time period	F. Research question(s)	G. Grand challenge
13	20	Electronic Road Pricing (ERP)	Singapore	1989-2018	What or who are sources of innovation in ERP and what is the story behind such policy? What are the drivers for the implantation of ERP? What problems did Singapore encounter in implementing the ERP, with what unintended consequences, and how were these addressed?	Curb traffic congestion rates;

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14	21	Kalimantan Forests and Climate Partnership	Indonesia	Nov. 2020 – Sept. 2011	Essentially, why did this mission of protecting and planning forest area in Indonesia by the Indonesian and Australian governments fail?	Reduce deforestation and CO2 emissions.
16	23	Key Enabling Technologies	Netherlands	2013-2018	How do proximity dimensions impact the formation of collaborative R&D ties across different knowledge and mission categories in terms of facilitation and hindrance?	Create nine top sectors to strengthen the Dutch innovation system; facilitate a collaborative R&D.
17	24	Palidiculture for sustainability	Germany	2018	How can paludiculture be studied and treated as a critical sustainability innovation mission?	95% of the mires rewetted by 2050.

A. Paper	**B. Mission case**	**I. Type of study (case study, experimental, observational data, etc.)**	**J. Main finding**
13	20	Case study of the innovation in land transport management that has revolutionized public and private transport in Singapore on the sources, drivers, barriers and risks of the system; The Electronic Road Pricing (ERP). 6 semi-structured interviews conducted along with review of articles, technical and news reports. The studied mission succeeds in by combining the technological, social, and economic drivers for holistic transport sector management.	This mission highlights how mere social and economic drivers alone is not enough but rather the intensive use of advanced technology and infrastructure is vital in solving public sector problems. Sources of innovation can be classified to social, economic, and technological factors which depends on the social context.
14	21	Case study on Kalimantan Forests and Climate Partnership (KFCP) between Indonesia and Australia where Australia provided aid for Indonesia. Data consists of interviews with individuals relating to the project such as government personnel, district officials, and officials at the two project locations. All publicly available information regarding the project such as the proposal and public announcements and commercial coverages through the years were gathered.	The mission did not come true since consent and efforts by the local community was not fulfilled, Indonesia law requiring completed environmental impact assessment not met, relationship between project group and Ministry of Forestry was turbulent, reluctancy from local scientists. Hence, the project was delayed, with even longer extensions suspected. Lack of transparency about the process of the project could have undermined the project's prospects, as downsizing of the mission little by little occurred in silence since initial announcement.
16	23	Case study of firm-level tie formation in collaborative R&D projects in the Netherlands. Data consists of (i) data from the Dutch Public-Private Research allowance scheme, which includes majority of private-public R&D projects from 2013-2018 and (ii) data sets provided by the Netherlands Enterprise Agency. Each project coded based on KET and the mission theme.	Both geographical and cognitive proximity and has little influence on tie formation in KEPT projects at the aggregate level. However, at the individual KET level, cognitive and geographical proximity does have differing levels of positive and negative influence on tie formation depending on the theme of the mission
17	24	Case study of paludiculture, focuses on the river Ryck in north-east Germany, with the goal of wetland restoration. Data consists of literature review and 12 interviews with stakeholders in public, market, and civil society. Results discussed in policy workshop that focused on the EU level. In total, 56 individuals persons in forms of interviews, workshop and statements.	Ecological aspects and restoration of wetlands are important and interesting, but they need to be complemented by studying the human factors that shape the approach to wetlands and their restoration. Other findings presented in the paper concerns the specifics of paludiculture and agricultural science.

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A. Paper	B. Mission case	K. Policy recommendations	L. Degree of mission success	M. Future research suggestions for the case	N. Future research suggestions for mission policy/research
13	20	Together with technological advancements and economic and social drivers, and through a top-down approach, the mission was executed in a way that its outcomes can be considered a success.	Success	ERP system has been replicated in other cities including London, Toronto, and Milan. Moreover, a new ERP 2.0 system is planned to be launched late 2023. Hence, further research on ERP missions can be conducted.	Additional papers on investigating sources and drivers, barriers and risks (both intended and unintended) of public sector innovation can be of aid.
14	21	If a mission in a developing country is funded by foreign aid, careful and transparent use of the budget, either by internal auditors or foreign, may be required to ensure success of the mission without also jeopardizing flexibility and bottom-up experimentation.	Failure	Mission studied here has been de-scaled incrementally over time. Therefore, additional analyses on the case until complete termination or revival (perhaps with additional funding or new form of governance) would be of aid.	MOIPs conducted primarily through foreign financial aid or based on international cooperation (hence additional layers of complexity in governance of the mission) can be studied.
16	23	Paper suggests that if actors are left to be, at least in the Dutch innovation system, R&D projects would find collaborations only within similar themes and of geographical proximity. When, unusual collaboration patterns from different actors seeking each other out in their attempts to develop novel solutions is required.	Ongoing	Future studies on why boundary spanning results vary per KET and mission type can be of aid.	Future evaluations can take findings like the paper as the ex ante situation when examining to what extent mission policies have altered collaboration patterns.
17	24	The pro-active role of government is very important, but the authors of the paper also acknowledge the importance of an existing discussion concerning a mission objective. Palidulculture, studied in this paper, would be misunderstood within the image of 'old' technological missions.	Ongoing	Ongoing discussion of the mission is required to explore and adjust its potential in context.	Future research could focus on paludiculture as a CSIM across the world and to consider the variety of actors, institutions, sectoral (‘conversion’) options as well as tensions in ‘new’ sustainability missions and their coordination.

A. Paper	B. Mission case	C. Mission description	D. Setting (Country)	E. Time period	F. Research question(s)	G. Grand challenge
18	25	Wheat in Mexico	Mexico	1940-1968	Despite the fact that both the percentage of the population working on farms reduced while demand for of plant products have increased, how is it possible that the world’s current population is larger and better fed?	The "Green Revolution" in Mexico.
18	26	Rice at the International Rice Research Institute	South Asia (India, Pakistan, Philippines)	1950-1970s		The "Green Revolution" in South Asia.
19	27	Footwear Industry in Northern Portugal	Portugal	2011-2020	What is a conceptual analysis of smart specialization systems and why talk about MOPs in connection with it?	Develop new forms of flexible automation in the footwear industry for the region to be a leading producer in the world.

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20	28	Clean Energy in EU	EU (focus on Italy, U.K., Denmark, Netherlands, Germany)	2013-2022; 2017-2022	How have the EU commission and EU member states exerted leadership in the two organizations Clean Energy Ministerial (CEM) and Mission Innovation (MI)?	Reach global net-zero carbon dioxide emissions.
21	29	Bioga; Sustainability	Sweden	2006-2021	How are mission oriented policies enacted in local practice?	300 GWh of production by 2030.

A. Paper	**B. Mission case**	**I. Type of study (case study, experimental, observational data, etc.)**	**J. Main finding**
18	25	Historical case study of the mission in Mexico by the Rockefeller Foundation. Data for the mission relied on secondary and archival sources, with Borlaug's (key mission agent) biographical interview being a key source.	Main findings include breeding of rust-resistant, early maturing seeds of wheat, corns, and beans as well as innovation in pollination which resulted in substantial increases in yields of these crops for Mexico, India, and Pakistan. Program was able to achieve substantial increases in yields; Wheat breeding was the most successful, especially in creating rust-resistant varieties. Various actors (some unexpected) played key roles in innovation that allowed for the program to be successful, including an assistant in the program and Mexican bureaucrat. The program, governed strictly top-down, led to the establishment of the International Center for Maize and Wheat Improvement in Mexico.
18	26	Historical case study of the developments in rice production in Southern Asia. Data consists of secondary, archival data including Rockefeller and US government uploads. Mission objective was “How can rice production be increased by at least 25%?”	Main findings include high-yielding semi-dwarf rice, IR-8. Despite tension with the Indian government and other setbacks, the Ford and Rockefeller foundations along with the newly established research institute produced the first widely planted high-yielding semi-dwarf rice, IR-8. IRRI subsequently bred a series of better-adapted high-yielding rice varieties with higher grain quality that transformed the global rice-supply situation over the next decade.
19	27	Discussing the case of the footwear industry in Northern Portugal led by the public innovation agency to achieve an integration of engineering knowledge from local university with experimentation with automation in companies to increase design variety and capacity in responding rapidly to small orders.	The capacity of regional governmental agencies in Europe in relation to launching smart specialization systems was considerable, especially considering that no trial or pilot phase was tested. A new mindset regarding policy-making, one in terms of flexibility and self-discovery rather than central planning is being adopted. The paper expands on the first cross-border research and innovation strategy in the EU.
20	28	Both CEM and MI began operating workstreams in "co-leadership" arrangements. Using descriptive statistics and cluster analysis, the two workstream reports utilized by collaborating countries;; 136 observations for CEM and 66 for MI were collected.	The EU Commission has been more active in MI than in the CEM (even surpassing the U.S.) EU member states have been more active in CEM than EU commission. Lastly, Italy, U.K., Italy, Netherlands, Denmark, and Germany have been most active in terms of co-leading workstreams in both CEM and MI.
21	29	Case study of the Swedish Kalmar region's No Oil campaign. Data consists of document analysis of data from 2006-2020, followed by observation of long networking events. Semi-structured online interviews with those who had participated in the system.	A No Oil campaign gained momentum, followed by convergence around biogas as a solution. Involvement of many private and public actors reduced contestation and led to procurement of biogas. In 2021, the region hosted a conference called "The Biogas Goldrush," which cele brated the success of biogas development and advocacy.

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A. Paper	B. Mission case	K. Policy recommendations	L. Degree of mission success	M. Future research suggestions for the case	N. Future research suggestions for mission policy/research
18	25	"Green Revolution" in Mexico started in the 1940s by a visit from then US Vice President. The Rockefeller Foundation sent experts to assess the situation and recommended the establishment of the Mexican Agricultural Program.	Success	In this mission, a top-down approach was successfully implemented. In the actual experimentation part of the process, however, it was more bottom-up (pg. 1721). Because it was rather unprecedented, the shuttle-breeding program showed to be unsuccessful on reports initially. Due to the top-down approach, it was then rejected for being too risky and costly. However, partly because of persistence from the secondary official, the plan was adopted, leading to successful creation of two new varieties of seeds that were rust-resistant and early maturing.	Laws governing foundations in the US have changed, reducing their independence and response speed. Land-grant systems are also experiencing cuts in funding. Paper also makes the claim that funding budgets are overall decreasing greatly in the Western world. With this combination of weaking of major players that yielded the success of the wheat and rice missions, the author of the paper is skeptical whether political leaders will be able to respond properly (or be able to respond at all) if there occurs another food crisis. Paper hence is advocating for small government perhaps and removing regulations for NGOs and private business which contradicts Mazzucato.
18	26	Top-down approach was also successfully implemented, in collaboration between Asian and U.S. government, Ford and Rockefeller Foundations.	Success		
19	27	For wicked problems to be effectively addressed, public agencies must invest new structures and change their practices and culture, as the S3 practice promotes.	Success	Continual monitoring of the footwear industry mission can be considered	Additional studies focusing on MOIP from the perspective of, or including, S3s
20	28	Workstreams and other programs to track progress or action of each agent/stakeholder may be useful as was used in this project with different national stakeholders.	Ongoing	This research has been at the European level, paper suggests that future research to focus across the world.	Paper identifies Denmark and Sweden as potentially instructive cases for in-depth future studies related to MOIPs.
21	29	Case of biogas in Kalmar transitioned from being seen as a solution for waste management and fossil fuel substitution to being framed as a part of sustainable animal agriculture.	Ongoing	Future studies that pay more attention to domestic factors, make better use of the cross-temporal variation in the data, and employ more advanced methods. Future research can also focus on exploring details of those countries which obtained puzzling findings.	Future studies may adopt comparative case study approaches to missions with different problems and solutions in national contexts with different governance structures, to provide further insights into the local enactment of mission-oriented policies.

A. Paper	B. Mission case	C. Mission description	D. Setting (Country)	E. Time period	F. Research question(s)	G. Grand challenge
21	30	Biogas; Sustainability	Sweden	2009-2021	How are mission-oriented policies enacted in local practice?	Become a net exporter of renewable energy by 2050.
21	31	Biogas; Sustainability	Sweden	2009-2021	How are mission-oriented policies enacted in local practice?	Reach net zero emissions by 2050

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22	32	High-speed passenger rails, the Metroliner	U.S.	1949-1969	Why did this mission regarding high-speed passenger rails that seemingly drew parallels to the Apollo mission fail while the Apollo mission succeed?	Improve ground transport; Compete internationally by building electric trains that travel at speeds of 200 to 240 kph by 1968.
23	33	Grand Solutions (GS) program	Denmark	2014-2019	To what extent are the three layers of the new policy instruments for grand challenges nested according to the rationale of transformative R&I policy?	Develop new policy instruments for grand challenges (Governance preferences, Coordination, and Project Measures) in Denmark.

A. Paper	**B. Mission case**	**I. Type of study (case study, experimental, observational data, etc.)**	**J. Main finding**
21	30	Case study of the Jönköping region biogas. Data consists of document analysis of data from 2006-2020, followed by observation of long networking events. Finally, semi-structured online interviews with those who had participated in the biogas system were conducted.	The Jönköping region faced challenges implementing biogas for waste management due to controversies and lack of infrastructure. A biogas agreement improved the situation, leading to more fuel stations and increased biogas usage in public transport. However, the region's focus on emissions and limited ambition hindered biogas investments, and strategies fell short of production targets. Subsequent development of a biogas agreement with other regions helped address coordination.
21	31	Case study of the Gotland region biogas. Data consists of document analysis of data from 2006-2020, followed by observation of long networking events. Semi-structured interviews with those who had participated in the system.	This project faced challenges due to evolving problem definitions and shifting focuses which made it more complex and uncertain. Clear problem definition is crucial for MOIP success.
22	32	This paper covers a historical observational study on the "failed" government-led innovation on high-speed passenger rails in the U.S. Data consists of archival data from the government and news articles and other publications concerning the case.	Tight financial budget, poor stakeholder coordination, rush to meet early deadline (upcoming elections), political considerations dominating the project management, poor existing infrastructure, etc. led to the failure of the mission. Moreover, during the process, the private company bearing the responsibility of execution experienced near bankruptcy before merging with another private company.
23	33	Case study on the mission related to mitigating climate change as pursued by Danish government, by transforming production and consumption systems. Data consists of interviews, written documents, and observations. Interviews with program manager (of the corresponding program), project leader (research leaders of funded projects under the corresponding program), civil servants, and external experts were conducted.	Paper encompasses different problems and solutions in national contexts with different governance structures. In this study, Sweden was characterized by governance structure that provides local levels with rather strong agency. Insights from the comparison include the observation that older missions (from Sweden and Norway) were more well nested, suggesting time playing a factor in policy rationale and nesting. The findings also support the presumption that countries with track record of technological, industrial, or societal missions as well as countries. The paper also recognizes the costs and logistical issues that are required to be solved in order for cross-agency collaboration to be maintained. It might be more feasible, however, for small and unitary countries like the Nordics.

A. Paper	**B. Mission case**	**K. Policy recommendations**	**L. Degree of mission success**	**M. Future research suggestions for the case**	**N. Future research suggestions for mission policy/research**
21	30	Further market expansion of the output of the mission case was restricted by lack of infrastructure in the regions rural areas. Raises the argument for MOIPs to be all-encompassing.	Ongoing	Future studies that pay more attention to domestic factors, make better use of the cross-temporal variation in the data, and employ more advanced methods. Future	Future studies may adopt comparative case study approaches to zoom in on missions with different problems and solutions in national contexts with

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				research can also focus on exploring details of those countries which obtained puzzling findings (exerting more or less leadership than anticipated).	different governance structures. Such comparisons could provide further insights into the local enactment of mission-oriented policies.
21	31	This region launched other sustainable pilot projects in parallel to biogas. This added to the synergy of the problem framing and kept problem-solution space broadly defined, allowing for multiple end goals. For the larger mission of circularity of resources on the island, this positioned bigas as a convergent solution with low contestation.	Ongoing		
22	32	Even for missions at a regional level, "the synergies created by multiple projects at multiple locations, and in some cases, in multiple states," needed for success in government-led innovation.	Failure	For those who wish to continue the work on the regional rail system addressed in the paper, the author highly discourages MOIP model. Hence, research on other forms of policy models or different approaches to MOIPs can be focused upon.	Paper addresses the potential of success in technological MOIPs over education, energy, healthcare, transportation, in which grand demonstration projects are planned, but less successfully implemented. Hence, research on the latter fields over technological ones would be of aid.
23	33	The paper highlights the lack of integration in the Danish eco-system in the form of regulations or tax incentives. Moreover, for attempts at sustaining collaboration, there exist challenges. As one interviewee states, “Our point of contact at IFD has changed three times, which is a pity.” For cross-sectoral missions, then, retention of certain individuals with high tacit information and knowledge should be another concern that shouldn’t be overlooked.	Ongoing	Future research could undertake studies paying particular attention to the different trade-offs, the different organizational contexts identified, and the possible reasons behind weak nesting in the cross-country comparative cases brought forward in this paper.	Paper calls for large-n studies to be conducted in order to bring forth quantitively hypotheses as opposed to the use of single case studies in this paper

A. Paper	**B. Mission case**	**C. Mission description**	**D. Setting (Country)**	**E. Time period**	**F. Research question(s)**	**G. Grand challenge**
23	34	Flagship Program (FP)	Finland	2018-2022	To what extent are the three layers of the new policy instruments for grand challenges nested according to the rationale of transformative R&I policy?	Bring transformative effects from science and research in Finland.
23	35	Pilot- E program	Norway	2016-2019	To what extent are the three layers of the new policy instruments for grand challenges nested according to the rationale of transformative R&I policy?	Contribute to transformative change in Norway.
23	36	CDI’ (Challenge-Driven Innovation) program	Sweden	2011-2022	To what extent are the three layers of the new policy instruments for grand challenges nested according to the rationale of transformative R&I policy?	Provide solutions to societal challenges and thus contribute to the SDGs in UN Agenda 2030 in Sweden.

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24	37	Scottish National Investment Bank (SNIB)	Scotland	2019-2020	Are mission-oriented innovation policies sufficiently nuanced to assist policy makers in the operational and strategic deployment of new policy instruments such as the SNIB?	Develop the SNIB which will focus on capital development and finance for new ventures by providing 'innovative, high growth Scottish firms' with long-term 'patient finance'.

A. Paper	**B. Mission case**	**I. Type of study (case study, experimental, observational data, etc.)**	**J. Main finding**
23	34	Case of Finnish research to target sustainable solutions to solve societal challenges. Data consists of interviews with program manager (of the corresponding program), project leader (research leaders of funded projects), civil servants, and external experts were conducted, written documents, and observations.	How can Academy of Finland has limited people of backgrounds other than science and research. They operate with an implicit assumption that scientific breakthroughs from the projects alone will bring transformative effects and therefore has limited range in their stakeholder involvement. No strict sense of directionality; Cross-sectoral or public-private collaboration is minimal. Projects from the mission receive long-term funding. Stakeholder involvement low. Paper identifies the mission also having weak nesting.
23	35	Case study of the Norwegian Pilot E program and overall Norwegian innovation policy structures. Data consists of interviews, written documents, and observations. Interviews with program manager (of the corresponding program), project leader (research leaders of funded projects under the corresponding program), civil servants, and external experts were conducted.	Despite low funding, the mission is ran by three different governmental agencies, illustrating high need for coordination. By creating spaces for experimenting with new solutions, with a focus on technological solutions, the mission has a rather risk-taking perspective. Paper identifies Mission to have medium nesting with the weakness in the mission being limited stakeholder engagement.
23	36	Case study of the Swedish CDI program and overall Swedish innovation policy structures. Data consists of interviews with program manager, research leaders of funded projects under the corresponding program, civil servants, and external experts, written documents, and observations.	The mission from Sweden targets collaborative projects seeking to provide solutions to societal challenges and thus contribute to the UNSDGs. Strict bottom-up directionality; Opportunities for collaboration exist but overall cross-sectoral and cross-agency collaboration is low. Significant way of funding via a stage gate perspective. Paper identifies the mission as medium degree of nesting.
24	37	Observational study on the case of Scottish National Investment Bank that draws on a range of empirical data sources such as the bank's academic blueprint, Scottish governmental documentation, secondary innovation and productivity data, and interviews with senior policy makers charged with implementing the bank. Paper suggests for a diffusion-orientation for the new bank, for the policy to be context-led rather than mission-led.	SNIB proponents underscored the complexity of the mission (for the bank to address three different societal challenges from UNSDGs). The MOIP reinforced rather than reversed policy path dependencies, bringing to light the existing poor functionality of innovation systems. The mission chosen despite lack of evidence for perceived effectiveness of other state-owned investment banks. Therefore, even if the mission objective of operating the bank was fulfilled in theory, the desired benefits of promoting innovation in Scotland would not be achieved. When choosing mission objectives, perhaps the translation must be made clear between the objective of missions and intended key results.

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A. Paper	B. Mission case	K. Policy recommendations	L. Degree of mission success	M. Future research suggestions for the case	N. Future research suggestions for mission policy/research
23	34	Finnish program could include more directionality for the societal challenges to be addressed, more experimentation and risk-taking, expanding the epistemic boundaries and widening the stakeholder engagement as well as increasing cross-agency collaboration and mix in policy perspective.	Ongoing	Future research could undertake studies paying particular attention to the different trade-offs, the different organizational contexts identified, and the possible reasons behind weak nesting in the cross-country comparative cases brought forward in this paper.	Paper calls for large-n studies to be conducted in order to bring forth quantitively hypotheses as opposed to the use of single case studies in this paper.
23	35	Paper suggests the Norwegian program to expand the epistemic boundaries and stakeholder involvement.	Ongoing	Future research could undertake studies paying particular attention to the different trade-offs, the different organizational contexts identified, and the possible reasons behind weak nesting in the cross-country comparative cases brought forward.	Paper calls for large-n studies to be conducted in order to bring forth quantitively hypotheses as opposed to the use of single case studies in this paper
23	36	Paper suggests the Swedish program to increase cross-sectoral coordination and collaboration to fully reap the benefits of the policy mix that is already considerably explicit. While the Danish mission was denounced for its top-down approach with lack of flexibility, this Swedish mission is also emphasized for its too broad focus and need for more targeted areas.	Ongoing		
24	37	If nation or region does not have strong innovation systems in place, should begin with smaller-scale projects before implementing one such as this, even with international consulting because they are almost guaranteed to fail. Innovation policy should be driven by the unique demand conditions and innovation requirements of local actors, rather than being led by vague opaque missions.	Failure	Paper suggests the bank to potentially attach 'competitiveness clauses' (similar to traditional bank covenants) to future loan funding tranches which are conditional on productivity improvements within funded businesses.	In alignment with other scholars, the paper also calls for newer approaches to innovation policy analysis which aspire to greater context-sensitivity, experimentation and examination of 'the role of agency in making and breaking policy path dependencies'

A. Paper	B. Mission case	C. Mission description	D. Setting (Country)	E. Time period	F. Research question(s)	G. Grand challenge	
25	38	Cancer treatment in Cascadia	U.S., Canada	2016-2021	What unique challenges arise for cross-border missions of regional development?	Research on cancer treatment; Cooperate among research infrastructures for enable data; Brand cross-border region as a global tech hub	
25	39	Health, Food Production, Creative growth, Sustainable development	Sweden, Denmark	2015-2021	What unique challenges arise for cross-border missions of regional development?	Brand cross-border region as a LifeSci hub with global resonance; Cross-border education & training; cross-border R&D infrastructure.	
25	40	Tourism; Health Services; Public Transportation	Italy, Slovenia	2016-2021	What unique challenges arise for cross-border missions of regional development?	Develop local economy; Develop transportation infrastructure; Provide accessibility to health services in the cross-border region	

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26	41	Active and Assisted Living Programmed (AAL)	14 EU partner states	2008-2020	What main features of current R&I and broader policy context and what policy outcomes have been generated so far?; To what extent do the two examples of current R&I and related policies show features of a mission-oriented approach, and reflect accelerator and/or transformer missions?; How scalable is the mission-oriented approach?	Improve quality of life of older people via ICT-based solutions to active and healthy ageing and strengthen Europe's digital sector.	

A. Paper	**B. Mission case**	**I. Type of study (case study, experimental, observational data, etc.)**	**J. Main finding**
25	38	Case study of the Pacific Northwest region across the US and Canada. The data were collected through desk research analysis, including formal cooperation agreements, academic papers, newspaper articles and official documents on cross-border cooperation in the selected regions.	The mission case studied in the paper implies that this strong involvement of multi-national companies (e.g. Microsoft and Amazon) drives the mission agents to pursue a highly *perceived* societal value; The mission description includes a quote from the former Governor of public collaborator, Washington state, praising the work of the mission in finding *cure* for cancer (instead of treatment or prevention). Hence, from both the public and private sides, this mission may be subject to commercialization for political wins that would unquestionably alter the development of the mission, whether better or for worse.
25	39	Case study of the Danish-Swedish region's medicine and life sciences sectors. Data: secondary data and interviews related to the cases studied in the region.	The governance of the region is rather extensive: nine local municipalities and three regional bodies forming the Oresund Committee. Moreover, the MediCon Valley Alliance is recognized for its successful policy intervention exemplary stimulating cross-border and cross-cluster collaboration. Despite border controls (installed in 2015), the Oresund Bridge overpowered for its top-down hierarchical logic.
25	40	Case study of the regional development of region across Italy and Slovenia. Data were collected through desk research analysis, and interview-based case studies. Municipalities in the region facilitated by an EU agency (EGTC) comprised of elected officials from regions, to coordinate. The health project pursues the goal of heightening accessibility of health services (autism, mental health, etc.).	Unlike the US and Canada cross-border mission, this mission is governed by a single entity, the EGTC agency. This allows for smoother collaboration. Despite this, there still exists regulatory barriers that hinder innovation potential, but perhaps less than if they were governed differently and more traditionally.
26	41	Case study on the Active and Assistant Living program (AAL), in close conjunction with the EIP on Active and Healthy Ageing (AHA) and the JPI More Years Better Lives (MYBL). Data consists of opinions and data from stakeholders through interviews, survey, and a workshop. Data sources also consisted of information publicly available e.g. government/funding agency/initiative's webpage, existing academic and other types of policy studies, and other material describing and analyzing the policies (e.g. news, magazine articles.)	Policy mix is comprehensive, including financial support, non-financial support to commercialization, efforts for promoting standards and interoperability of developed solutions and components and a "Smart Ageing Prize". Program considered 'somewhat effective' but lacks deadline or clear milestones.

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A. Paper	B. Mission case	K. Policy recommendations	L. Degree of mission success	M. Future research suggestions for the case	N. Future research suggestions for mission policy/research
25	38	The three cases each feature a distinct form of governance (regional development logic, research-extensive, and hybrid). All three cases highlight how regulatory guidelines and border regulations (would) harm MOA implementation. Contract law discrepancies, language and cultural differences (when it comes to social attitude towards mental health, for example) served as regulatory barriers. Based on this, the paper offers Policy recommendationss: select only one main challenge; design policy mix to be all-encompassing; fund research all while involving the private sector to allure more capital.	Ongoing	This case addresses physical proximity and geographical barriers in the form of international borders when it comes to innovation. While top agents were able to cooperate, local community agents are less so. This is detrimental to innovation potential. Hence, when addressing grand challenges, it raises questions on how the environment be created to ensure bottom level collaboration.	Possibilities in testing and researching an industrial policy concept in a regional context is available.
25	39		Ongoing	A physical bridge was built in 2000 to connect the two regions, aiding the cross-border collaboration. This raises questions such as for other missions concerning geographical or sectoral proximity challenges, should literal bridges be built?	
25	40		Ongoing	Evaluative power of the model imposed in the paper should be supported with more comparative studies when post-pandemic recovery strategies are implemented; Quantitative studies.	
26	41	Within scope of the broader transformer mission the AAL program needs to be structured with quantified objectives, milestones, a clear timeline and a roadmap. In view of supporting competence of the EU, a focus on a smaller but dedicated number of themes could help to define a clearer, more targeted and hence more effective AAL program. Further, concentration of means and attention on a limited number of themes on which progress can be made with sufficient potential for radical innovation could warrant the scalability of AAL solutions by their design.	Ongoing	Although the mission does not have a clear set deadline, the mission has already achieved parts of the desired outcome. Therefore, it can be used to argue whether Mazzucato's definition of MOIPs having a set deadline is necessary or not for achieving desired outcomes of a mission.	New approaches to impact assessment should be developed and tested, including new types of system modeling that allow capturing the complexity of impact pathways and scenarios in systems of innovation, production, and consumption. Paper also suggests a “PESCA” approach for new MOIPs.

A. Paper	B. Mission case	C. Mission description	D. Setting (Country)	E. Time period	F. Research question(s)	G. Grand challenge
27	42	Nutrient recycling (NR) policy	Finland	Feb 2010 - May 2019	What kinds of actions and hybrid constellations of actors have been initiated during the NR policy? How do the value-creation mechanisms of legitimizing, compromising, and mixing appear in different stages of the NR policy?	Promote the development and use of organic fertilizers to supersede chemical fertilizers on which crop farming currently largely relies on.
28	43	Swedish State Railway Company X2000	Sweden	1982-1990	How has PPI been used? What are the different characteristics of and different kinds of PPI? What is its relationship to other public innovation policy instruments?	Build faster and more reliable passenger transport on existing tracks
28	44	Swedish Telecom Administration Televerket; AXE Telephone switch	Sweden	1970-1990		Create a computerized switching telephone network for improvements in efficiency, capacity and maintenance costs

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28	45	Light Corridor; Stimulate the market and improve the efficiency of lighting	Sweden	1988-1990s		Stimulate the development of energy-efficient products and make the results marketable.
28	46	Swedish refrigerator for energy efficiency	Sweden	1988-1991		Develop a refrigerator 40-50% more efficient than existing models.
28	47	NødNett Norge, Digital mobile radio system	Norway	1995-2004		Coordinate independent analogue mobile radio networks; Enable interdepartmental communication.
28	48	Automatic Dependent Surveillance-Broadcast Program	U.S.	2006-2013		All aircrafts to be equipped with ADS-B by 2020 (broadcast location, improve security, accuracy, and reliability of air traffic information).
29	49	Vision-Driven Health	Sweden	2019-2022	How can mission-driven environments (MDE) be evaluated, and does "Mission Work Processes" (WPs) assist in this process?	Structural change in the health system to bring about long-term systemic changes in ecosystems for health.

A. Paper	**B. Mission case**	**I. Type of study (case study, experimental, observational data, etc.)**	**J. Main finding**
27	42	The case study on Finnish organic fertilizers was studied through NR-related policy documents and interviews with project actors and other key actors including politicians, agents from the Finnish Innovation Fund, LUT University, Finnish NGOs, and more. Interviews were either via email or around 15-45 minutes over call. Since its inception in 2010, the mission changed form throughout with certain government administrations influence. Despite extension of the deadline to 2030, authors of the paper are skeptical of its attainability.	Hybridity is important to be added to MIP implementation and design. An important implication of this is that this perspective blurs the line for mission identification as success or failure. Policy mixes perhaps should contain restrictive measures although for high political missions such as this, it can be counteractive. Finnish NR policy represents a complicated interplay among value-creation logics over time. Reasons for failure and extension of deadline for this mission case is due to poor analysis of the starting points, wrong indicators used, and wrong use of indicators.
28	43	Case study on the procurement of the X2000 high-speed train in Sweden. Data consists of publicly available, relevant documents such as tender calls, scientific literature, policy documents and evaluations and other written materials and reports.	Procurement lasted several years, open to foreign firms. Swedish State Railway Company (SJ) sole user and represented the final demand for the trains. One challenge was defining realistic requirements, which took time to resolve. ASEA awarded the contract as a developer, allowing interactive learning and competence development. Yet, requirements of a locomotive-drawn train limited the train's competitiveness internationally. X2000 brought improvements to infrastructure, profitability, reduced infrastructure costs, lower energy consumption, shorter travel times, and less accidents / pollution. Did not result in radical technical change or widespread adoption, X2000 had limited success in terms of industrial policy.
28	44	Case study of the AXE telephone switch in Sweden. The objective was to create a computerized switching telephone network that met communication needs. Data consists of publicly available, relevant documents such as tender calls, scientific literature, policy documents and evaluations and other written materials and reports.	AXE developed by semi-public company Ellemtel, jointly owned by Swedish Telecommunications Administration (STA) and Ericsson, resulting in a cooperative procurement process. The initial stage focused on developing functional specifications, with Ellemtel assessing proposals from STA and Ericsson. With successful completion of the mission, Sweden became the first country in the world to offer national digital coverage. Involved private sector players profited greatly from this.

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28	45	Case study of the Swedish light corridor project which aimed to stimulate the development of energy-efficient products, systems, and processes in buildings. The methodological approach followed is exploratory. Data consists of publicly available, relevant documents such as tender calls, scientific literature, policy documents and evaluations and other written materials and reports.	Representatives from various sectors appointed to discuss strategies for efficient electricity use. Thirteen large real estate management firms and owners signed agreements, representing 30% of total floor space. Participants received investment bonuses for achieving energy savings. Procurement led to a significant increase in domestic sales of high frequency electronic ballasts, causing prices to drop. Helvar became a major player in the Swedish market and started exporting.

A. Paper	**B. Mission case**	**K. Policy recommendations**	**L. Degree of mission success**	**M. Future research suggestions for the case**	**N. Future research suggestions for mission policy/research**
27	46	In the mission process, one of the funded projects was used to showcase the fact that there can exist a profitable NR business. This garnered positive public attention. For missions with stage-gate form of funding, doing a similar act of illustrating success at the intermediate levels can be useful. Paper suggests an explicit adoption of the hybridity perspective in policy evaluation practices. Key success factor for MOIPs is for involved actors to learn and develop.	Ongoing	This paper analyzes the mission of Finnish NR policy history from initial development to postponement of deadline to 2030. Hence, further analysis can be conducted on this additional time granted to the mission.	More refined analyses of MOIPs focusing on a refined and actionable understanding of how, when, and under which circumstances missions may actually help address societal challenges can be of aid.
28	47	To promote interactive learning in Public Procurement of Innovation (PPI), establishing focus groups or task forces early in the process involving various stakeholders such as users, policymakers, researchers, and firms. This cooperative approach encourages interaction and mutual learning, leading to effective PPI outcomes. However, the existing EU regulations on public procurement have posed challenges for the implementation of PPI initiatives.	Success	Paper calls for efforts to be made to further develop experiences and procedures for using catalytic PPI extensively as a policy instrument in the context of grand challenges, in particular for public agencies such as the European Commission. However, excessively detailed specifications by the procuring agency should not occur as it limits ability and creativity of potential suppliers to provide innovative solutions to the challenge. The procuring agency should however "translate" the wicked problem into functional requirements that constitutes solutions to the challenges in a feasible manner.	Paper recommends further research on identifying what should be the most appropriate rules to enhance innovation by means of procurement; This analysis should be based upon innovation theory than on competition theory, the reason being that cooperation is an important ingredient of PPI processes and in innovation process in general.
28	48	Can be used to argue how both public and private sectors can receive large benefits from the collaboration. Sweden became a leading country in telecommunications and the private companies were able to gain shares in other companies.	Success		
28	49	Lighting program involved setting new standards and fostering development of new products, combining procurement with support activities. Financial incentives drove the mission to success, in developmental stages as well as in getting people to use it.	Success		

A. Paper	**B. Mission case**	**I. Type of study (case study, experimental, observational data, etc.)**	**J. Main finding**

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28	42	Case study of the Swedish energy-efficient refrigerators program. Mission objective was to reduce national electricity demand and promote energy efficiency. Data consists of publicly available, relevant documents such as tender calls, scientific literature, policy documents and evaluations and other written materials and reports.	Purchaser group set goals, Electrolux AB emerged as winning manufacturer, offering prototype 33% more efficient than the most models available. Introduction of this energy-efficient refrigerator had immediate impact on the domestic market with a notable increase in the market share for efficient white wears. Cumulative energy savings from the Electrolux model alone exceeded 1 GWh by 1994.
28	43	Case study of shared digital mobile radio system for emergency and alert situations. Mission to address communication needs of public safety agencies by coordinating independent analog mobile radio networks. Data consists of publicly available, relevant documents such as tender calls, scientific literature, policy documents and evaluations and other written materials and reports.	During the pre-procurement phase, feasibility and pilot studies conducted to assess communication needs of different agencies and the possibility of shared radio system. This collaboration allowed agencies such as fire departments, police forces, and health services to interact and learn from each other, leading to a coordinated solution.
28	44	Case study of the development of the Automatic Dependent Surveillance-Broadcast (ADS-B) system in the U.S. Mission objective was to enhance air traffic control and public safety by allowing aircraft to broadcast their positions. Data consists of publicly available, relevant documents such as tender calls, scientific literature, policy documents and evaluations and other written materials and reports.	Through a multi-stage contracting process and engagement with industry stakeholders, Federal Aviation Administration selected a supplier and implemented ADS-B. The procurement focused on performance specifications to encourage innovation and competition. Contract awarded to International Telephone and Telegraph Corporation to oversee establishment of infrastructure and equipment. ADS-B proved to be a transformative technology, improving coverage, efficiency, and capacity in air traffic control.
29	45	Case study of the mission of "Vision-Driven Health" concerning a common vision and a long-term systemic transformation within the Swedish health care and life sciences sector. Data consists of selective reviews of relevant literature concerning best practices for setting up and governing MDE-like initiatives; interviews with 7 coordinators, web-based survey of 40 respondents, and consultation with 5 external experts.	Vinnova-recommended WPs partly align with practices recommended in the literature, yet, WPs formulated abstractly and implemented heterogeneously by the MDEs. This heterogeneous implementation seems necessary for the MDEs to progress towards their visions but complicates a uniform set of evaluation principles. The MDEs also prioritize the WPs differently. Problem targeted by the concern the health care sector such as unidirectional distrust among healthcare professionals, and delays between research and operational/clinical development of health care innovation, institutional restrictions, etc.

A. Paper	**B. Mission case**	**K. Policy recommendations**	**L. Degree of mission success**	**M. Future research suggestions for the case**	**N. Future research suggestions for mission policy/research**
28	46	Success of this procurement initiative demonstrate potential for market transformation and energy savings through targeted technology procurement programs.	Success	Paper calls for efforts to be made to further develop experiences and procedures for using catalytic PPI extensively as a policy instrument in the context of grand challenges, for public agencies such as the European Commission.	Paper recommends further research on identifying what should be the most appropriate rules to enhance innovation by means of procurement.

Appendix I

28	47	Norwegian Ministry of Justice and the Police led procurement process, Siemens Networks Norway AS chosen as supplier. The implementation of the system occurred in two stages, with the eastern part of Norway being integrated first. The project also aimed to sell the concept to other European countries. The case judged to have a positive impact on employment, efficiency, and public safety in Norway and therefore deemed a success.	Success	Paper calls for efforts to be made to further develop experiences and procedures for using PPI as a policy instrument in grand challenges. Yet, excessively detailed specifications by procuring agencies may limits ability and creativity of potential suppliers to provide innovative solutions. Procuring agencies should seek to "translate" wicked problems into functional requirements that constitutes solutions to the challenges.	Further research on identifying rules to enhance innovation by means of procurement. Revisions considered on public bodies' (e.g. the EU) rules about PPI, for example by creating separate regulations for regular procurement and for PPI.
28	48	FAA issued the ADS-B mandate, requiring aircraft to be equipped with ADS-B by 2020. A big achievement in adoption of the project mission. Supports arguments for regulations to complement missions to ensure adoption. Further, "industry days" were organized, showing how consultation and dialogue between buyers and suppliers can influence the requirement setting stages.	Success		
29	49	Missions (MDEs) should be evaluated on an ongoing basis (since bottlenecks change over time). Evaluations should be conducted by measuring both progress through an 'attribution approach', meaning to focus on outcomes, and the degree to which an intervention reached its end goals. Evaluations can be conducted by the policy actor, external authorities, or other external evaluators.	Ongoing	Assessment of long-term societal impact should be designed carefully and interpreted with caution. Attributing societal impacts to transformations in system focus (potentially triggered by an MDE initiative) is fraught with challenges. Future suggestion for the MDEs is for participants to agree on clearer and more specific guiding visions and focus on making small number of big changes, rather than trying to support interests from several stakeholders and formulating a R&I agenda in an inclusive way that aims to be inclusive.	Empirical studies and evaluations of MOI remain scarce. Research needed on whether organizations subjected to interventions are causally performing better, what structural changes are spurred by missions; if recently formed partnerships structurally differ from those formed at the beginning in terms of e.g. collaborations across sectors.