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RESEARCH ARTICLE

Lost in translation: Challenges in creating new transformative innovation policy practices

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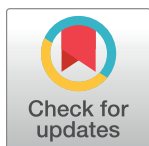
Abstract

The purpose of this paper is to identify key challenges that national policymakers face in trying to translate transformative innovation policy (TIP) theory into policy practice. We focus on the case of the Swedish innovation agency Vinnova's attempt to translate its TIP-related innovation perspective into the policy practice of the Swedish Innovation Partnership Programme (IPP). By means of a discourse perspective, we identify two key discourses and one institution influencing Vinnova's translation process. In addition, we describe four key challenges that Vinnova faces in this translation process relating to (i) the involvement of relevant stakeholders, (ii) overcoming a dominant discourse, (iii) time constraints of an institutionalized parliamentary system, and (iv) realizing policy coordination ambitions. This study adds to previous literature in identifying dominant discourses or institutional structures as a key barrier for change. Its contribution is to show how transformative translation challenges are played out in a national-level context.

Author summary

The purpose of this paper is to identify key challenges that national policymakers face when translating a set of new ideas on policy for sustainability transitions, called transformative innovation policy (TIP), into policy practice. Considering the urgency of sustainability transitions and that these new ideas have hardly been tested in practice, it is of general interest to understand what such challenges can be. In this paper we focus on the case of the Swedish innovation agency Vinnova and their attempt to translate some of the new core ideas into policy practice. In the paper we identified how different ideas from the Swedish Social Democratic Party, together with linear and technocratic ideas on innovation influenced Vinnovas translation process. In addition, we identify four key challenges faced by Vinnova, which other policy practitioners will also most likely encounter if they adopt similar ideas: (i) the involvement of relevant actor groups, (ii) overcoming existing and dominating ideas on how policy should be formulated, (iii) time constraints of an institutionalized parliamentary system, and (iv) delivering on policy coordination. The main contribution of this study is to show how transformative translation challenges are played out in a national-level context.

1. Introduction

In recent years, the development of "systemic", "transformative", and "missions-oriented" innovation policy perspectives–jointly referred to as "transformative innovation policy" (TIP) perspectives in this paper–has gained significant traction within the innovation policy literature [see 1 for a review]. These perspectives are often presented as a third-generation innovation policy apt for meeting (grand) societal challenges–challenges that past innovation policies with a focus on either economic growth or narrowly defined missions have been unable to solve [2–4].

While the TIP literature includes perspectives with different views, most notably one related to sustainability transitions and one related to missions [1], shared and, especially relevant TIP insights for this paper are that a more active government role is advocated, including (1) clear directionality [3–7], (2) broader stakeholder involvement throughout the policy process [4,6–10], (3) increased attention to processes of creative destruction and destabilization of current sociotechnical regimes [5–7,11–13], and (4) coordination and alignment at multiple policy levels [4,6–8,10].

While policymakers at national and transnational levels have shown great interest in the overarching ideas and promises of the TIP perspectives [2,5,14], tentative assessments of transformative policy programs and initiatives in Sweden, Norway, the UK and the OECD [15–17] show a discrepancy between the theoretical ambitions and how these programs are put into practice. One possible explanation for the apparent difficulties involved in implementing theories on TIP is a lack of practical policy guidelines. Recent years have seen growing critique towards innovation policy scholars for not tackling the challenge of translating policy recommendations into policy practice [1,18–21].

Policy design scholars emphasize the general challenges associated with the introduction of new policies, such as highly institutionalized norms and practices at the policy level, cognitive frames held by policymakers or other key stakeholders, and institutionalized policy mixes [16,22–24]. However, sustainability transition scholars have only recently shown interest in the translation of complex policy advise into policy practice. For example, Diercks [16] is one of few scholars to explore the challenges of translating system innovation theory with transformative ambitions into policy practice. His work focuses on the uptake of system innovation thinking in the organizational practices of the OECD. Although highly relevant, we still do not know how translation challenges are played out in policy practice at the level of a nation state. To increase the practical relevance of current TIP research, the purpose of this paper is to identify key challenges that national policymakers face in trying to translate transformative innovation policy literature into policy practice.

The paper is based on an in-depth case study of the Swedish innovation agency Vinnova's attempt to translate a theoretically informed TIP-related innovation perspective into policy practice in the Swedish Innovation Partnership Programme (IPP) (2016–2018). Sweden can be considered a "critical" case in that it has unique prerequisites for realizing transformative innovation policy: OECD [25] sees Sweden as a leader in sustainable technology innovation and a pioneer in several environmentally related policy instruments and Diercks [16,p.11] argues that Sweden has a particularly "sympathetic venue for decision making" for successful TIP institutionalization. Given the favourable conditions, it can be argued that if the translation of TIP perspectives does not work in Sweden it will also encounter significant challenges elsewhere [cf. 26,p.230]. The focus on Vinnova is justified by its central role in the creation of Swedish innovation policy and its TIP-related innovation policy perspective [27,28]. Although there are other public bodies that provide input to innovation policy, such as the Swedish Agency for Growth Policy Analysis and the Swedish Energy Agency, these do not have the

same status as a "translator" of scientific knowledge for strategic innovation policy as Vinnova [see 28,29]. The focus on the IPP follows naturally from its transformative ambition [30]. While the study covers challenges in Vinnova's translation of its TIP-related innovation perspective into the design and implementation of the entire IPP, the analysis of the implementation phase was delimited to the bioeconomy part of the Biobased and Circular Economy (CBE) programme. The focus on bioeconomy was selected based on the relative wealth of knowledge for policymakers to build on considering the many innovation and transition-related analyses on Swedish bioeconomy development [see e.g., 31].

Similar to previous scholars who have explored the way in which novel innovation theoretical perspectives have (or have not) been adopted in policy [e.g. 16,29,32], we use a discourse perspective to trace Vinnova's translation process and identify challenges connected to prevailing discourses and institutions. This leads us to define the following research questions:

a. *What key discourses and institutions influenced the translation of Vinnova's innovation perspective in the design and implementation of the IPP*?

b. *What key challenges did Vinnova face in this translation process*?

The paper is outlined as follows: The next section presents the research design, including the discourse analytical perspective and data collection. In Section 3, we set the stage for the analysis by introducing the IPP case, Vinnova's innovation perspective and the influencing discourses and institutions. In section 4, we present the analysis identifying the translation challenges and reflect on our findings. Section 5 concludes the paper.

2. Research design

2.1 A discourse perspective to study translation

Similar to many studies of attempts to translate [16], or implement [29,32], novel innovation political theory into policy practice, this paper leans on a discourse perspective of the policy process. We hence view an innovation political theory that is being translated, or implemented, as a discourse. This view fits Hajer's [33,p.44] definition of a discourse as "a specific ensemble of ideas, concepts and categories that are produced and reproduced through an identifiable set of practices and through which meaning is given to social and physical realities". By "practices" Hajer [33,34] refers to institutions, i.e. rules and routines, that enable and constrain social action. The close relation between discourses and practices is particularly useful when studying the translation of an innovation policy theory and its related discourse to policy practice.

Many discourse scholars see policy processes, e.g. on how to design innovation policy to target societal challenges, as discussions and debates where different discourses compete in trying to gain support for their definition of reality [e.g. 34–36]. Such debates are often dominated by prevailing policy discourses that enjoy greater *discourse structuration*, i.e., are considered more coherent and credible by relevant actors, and are increasingly *institutionalized* in various policy and governance norms, values and practices, which makes it particularly hard for novel and radically different policy ideas and discourses to gain recognition [33,34]. The possibility of a novel discourse to enter and influence a policy debate and process is not only dependent on the power of other discourses that are part of that debate but also by a wider institutional context [33,36–38], which according to Hajer [33], embody the discursive development of the past. The challenges that prevailing discourses and institutions constitute for novel discourses to influence the policy process is visible in some of the abovementioned studies [16,32] as well as in the reasoning of TIP scholars who define TIP as an emerging discourse [16] or similar cognitive structure [4,5,17,39].

Despite constraining institutions maintained by dominant discourses, Hajer [33] and Schmidt [38] stress actors' ability to change institutions. According to work by Schmidt [38,40], change is dependent on actors' sense making capacity. Actor's sense making capacity is largely steered by their institutional context of rules and routines, which implies that actors mainly act according to, and thereby maintain, their institutional context. However, through participation in discussions and debates outside the institutional context, actors may be convinced by new ideas and discourses that influence their sense making capacity and inspire them to act against rules and routines and thereby contribute to institutional change.

To develop a discourse powerful enough to influence a policy debate, or maintain the power of an incumbent discourse in that debate, actors use various strategies [33–35,40]. A key strategy used is the articulation of storylines. A storyline is a simple representation of a complex discourse with the purpose of increasing its legitimacy and support, so called discourse structuration. The simple messages in storylines allow for interpretative flexibility, which enables the mobilization of a broad range of actors. To attract supporters, storylines can be linked with, for example, strong scientific evidence, influential actors, or positive demonstrations. For full discourse structuration to come about, several storylines need to become coupled so that their message becomes increasingly coherent and credible, with reduced interpretative flexibility and eventual institutionalization as a result [33].

Similar to Diercks [16], this paper defines "translation" as equal to the process of discourse structuration, i.e. a process by which a novel discourse gains recognition and becomes increasingly coherent and credible according to relevant actors. However, in contrast to Diercks [16], this paper does not go into the details of the strategic work of translation or the resulting level of discourse structuration and institutionalization. Instead, a pragmatic discourse perspective is applied to describe and position Vinnova's TIP-related innovation perspective and storyline in relation to the prevailing discourses.

In this study, the translation of Vinnova's theoretically informed innovation perspective into IPP policy practice is viewed as including several stylized translation steps in which key actors with potentially different discourse perspectives are successively engaged (see arrows in Fig 1). The first step is the translation of academic knowledge on innovation policy to policymakers, in this case Vinnova. The second step describes Vinnova's assignment from the Swedish government to monitor and analyse new scientific knowledge in order to give strategic advice on the national innovation policy [28], where we assume that the theories and related
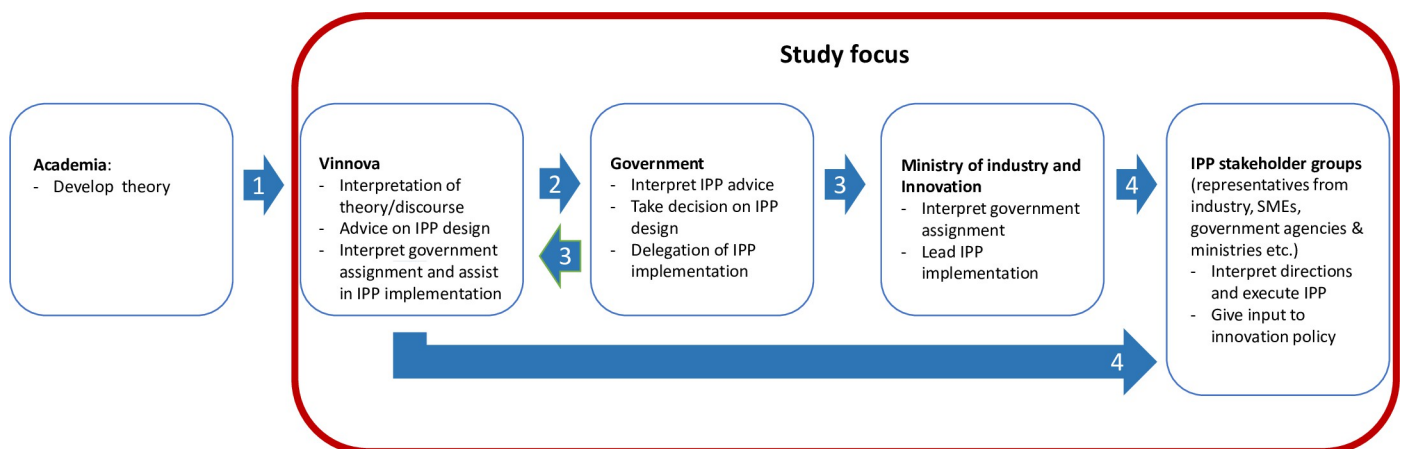

Fig 1. The study covers four translation steps (see arrows), in which three are in focus, involving different actors that potentially promote and/or reproduce different discourses.

discourses that Vinnova included in its innovation policy perspective shaped its advice on the design and implementation of the IPP. We view Vinnova's IPP advice as equal to a strategic storyline by which Vinnova tries to influence the debate and policy practice. In the third step, the Swedish government, in discussion with Vinnova, the parliament and eventual other influential actors, decided to what extent Vinnova's suggested IPP design was to be followed. By these means, the government translated the Vinnova IPP storyline, or what was left of it, to government agencies which were to implement the IPP. In this case, the government assigned the Ministry of Industry and Innovation to implement the IPP with assistance from Vinnova. The fourth and final step covers the way in which the Ministry of Industry and Innovation interpreted the government assignment of implementing the IPP, translated it into IPP policy practice, and involved Vinnova in this work.

As indicated by the red line surrounding the arrows two to four in Fig 1, the focus of the study is the translation of Vinnova's perspective to the IPP. Hence, the first step in Fig 1 is only included as a backdrop to this study, by which the theoretical and discursive belonging of Vinnova's innovation perspective is identified.

2.2 Data collection and application

The analysis is based on qualitative data, gathered through a literature review and interviews during 2019. To get a first impression of the policy process of the IPP and Vinnova's innovation perspective and role in this process, a literature review was conducted covering mainly policy documents, reports, and academic papers. For more insight into the discursive and institutional influences and challenges Vinnova faced in translating their innovation perspective to the IPP and the CBE sub-programme, we conducted 17 semi-structured interviews of 1 to 2 hours each (see Table 1 for details). Interviewees were identified through policy documents and snowballing. The interviewees were actors who shaped or were affected by the evolution of the IPP and/or the CBE sub-programme.

In the identification of relevant discourses and institutions influencing the translation process, we first explored the theories and discourses influencing Vinnova's innovation

Table 1. List of interviewees.

Interviewees	Key organizational affiliation 2015–2018
A	Research institute
B	Consultant
C	Innovation cluster
D	Ministry of Industry and Innovation
E	Ministry of Industry and Innovation
F	Vinnova
G	Private company
H	Vinnova
I	Vinnova
J	Vinnova
K	Swedish Energy Agency
L	Swedish Energy Agency
M	Ministry of Industry and Innovation
N	University
O	Vinnova
P	Vinnova
Q	Vinnova

perspective and IPP storyline (which are described further in Section 3.2). The influential discourses and institutions were identified through policy documents, internal documents at Vinnova and interviews. Interviewees were asked questions about the ideas (innovation-related and other) or factors (e.g. institutions) that influenced the development of the IPP initiative and its design and implementation. When coding the data, some of these ideas and factors were more visible than others in creating opportunities or challenges for the translation of Vinnova's innovation perspective into the IPP and were identified as key influencing discourses and institutions. These discourses and institutions are outlined in Section 3.3.

3. The Swedish Innovation Partnership Programme (IPP)

3.1 A historical perspective

The idea of the IPP was announced by the Social Democrats in 2012 as part of a larger systemic innovation policy package that also involved the formation of a National Innovation Council (NIC) [41]. The Social Democrats' systemic perspective was not new, it resembled a systemic innovation policy ambition pursued by various innovation scholars inspired by Schumpeter's work from the 1930s and the Swedish policy scholar Dahmén in the 1940s and 1950s [42]. With the development of more elaborate innovation systems perspectives, such as the National Innovation Systems (NIS), the Triple Helix concept, and the technological systems perspective in the 1990s, these scholarly ideas gained increased recognition and institutionalization within the OECD as well in Sweden [16,42–44]. In line with this, the Social Democrats stressed the need to leave the current focus on the linear model in the national research policy and instead promoted "strategic collaboration" for innovation by means of the NIC and the IPP [41].

The idea of an innovation council for realizing a more systemic and effective innovation policy for economic growth and tackling societal challenges has long been part of the Swedish political agenda. Following two earlier attempts to establish such a council in 2004 [45,46] and in 2008 [47], the NIC was finally set up in February 2015 by a government lead by the Social Democrats. The NIC aimed to coordinate key issues for the strategic development of research and innovation policy between government ministers, strengthen collaboration between different actors in Sweden, and concentrate efforts in developing the innovative and competitive force of Sweden [41]. It consisted of the Prime Minister (leading the council), five government ministers, four representatives from academia, and six business and labour market representatives. To strengthen Sweden's innovative and competitive capacity, the council members applied a "holistic" innovation perspective on emerging innovation policy issues [30,48]. The holistic perspective was introduced by innovation scholar and council member Charles Edquist and was inspired by the NIS framework [48].

The establishment of the IPP followed in June 2016. The aim of the IPP–which in direct translation means the "national collaboration programme"–was to stimulate collaboration between the government, the private sector, academia and the labour unions, increase common prioritizations of resources for research and education, as well as activities for stimulating export [41]. It was suggested that societal challenges should be taken as a starting point for the IPP. This built on the idea that future societal opportunities and challenges, properly handled, could imply great opportunities in strengthening Sweden's competitive advantage and employment rates. The NIC influenced the general direction of the work within the IPP by providing input regarding the selection of three key societal challenges and five IPPs corresponding to strategic innovation areas where Sweden had a competitive advantage and a potential to meet the identified societal challenges (see Table 2) (interviewees G, H, I, N). The selection of the bioeconomy as a strategic area as a means to meet the societal challenge of environmental and climate technology is not surprising seen to the vast Swedish biomass

Table 2. The three guiding societal challenges and the five IPPs.

Key societal challenges	IPPs for collaboration
• Digitalization	• Next generation trips and transports
• Life science	• Smart cities
• Environment and climate technology	• Circular and biobased economy
	• Life science
	• Connected industry and new materials

resources and economic and climate related interest connected to exploiting these resources to renew and transform old industries such as paper and pulp, petrochemicals and materials. This is not the least mirrored in Swedish climate policy and high government investments in the development of advanced biorefinery solutions over time and Sweden being a frontrunner in this field internationally [49]. However, the NICs input to the selection of challenges and IPPs was very limited since its selection was based on a set of programs suggested by Vinnova in previous government assigned work (interviewees G, H).

While the NIC played a minor role in shaping the IPP, it created legitimacy for developing new transformative innovation policy activities (interviewees H, I, O, P). The Social Democratic lead government created additional legitimacy for transformative innovation by being the first government to install a Ministry of Industry and Innovation, as previously there had only been a Ministry of Industry [48].

3.2 Vinnova's innovation perspective

When designing and implementing the IPP, Vinnova's point of departure was a pragmatic challenge-led perspective inspired by the socio-technical transitions theory on system innovation. This perspective had been developed over time based on practical policy experience, resulting from interactions with industry and policy actors, but also through interaction with various types of innovation scholars in academia. Indeed, following the tradition of preceding national government agencies responsible for technology, industry and innovation policy, i.e. the Swedish National Board for Technical Development (STU) and the Swedish National Board for Industrial and Technical Development (NUTEK), Vinnova's adoption of selected academic concepts can be traced to close interaction with academia [50,51]. In Vinnova's case, this interaction was partly realized through certain employees who had close relations with researchers, but also through the funding of interdisciplinary scientific research projects and centres of excellence with the ambition to inform innovation policy [29,43].

The innovation system discourse was dominant at Vinnova in its early days, which was mirrored in its original name "Swedish Governmental Agency for Innovation Systems" [42,43]. However, Vinnova did not apply the NIS approach, focusing on one national level innovation system, which was promoted more generally by innovation scholars and the OECD at the time. Instead, it used a sector-focused innovation systems approach called "Technological Systems (TS)", the development of which had been aided by a government-funded research project and had occurred in parallel with, and as an alternative to, the NIS approach [43,50,51]. According to the TS approach, a key means to achieve technology development was the stimulation of industry (or sector) specific network formation [29,43].

Vinnova was also influenced by other system perspectives such as the Triple Helix approach [52], emphasizing the need to involve actors from science, business and the public sector for a more successful innovation process, as well as Porter's [53] writings on cluster development, which stated that geographic concentration of interconnected companies and associated

institutions collaborating and competing in a particular field creates positive advantages in terms of competition and business development [29,46].

Driven by the ambition to tackle societal challenges Vinnova launched a new research and innovation programme, "Challenge Driven Innovation" (CDI) in 2010. The program marked a shift in Vinnova's innovation perspective–from a TS-dominated approach embedded in the innovations systems discourse to an approach focused more on systems innovation and socio-technical transitions [20,27]. Some scholars [see e.g. 20,27] equate this shift with Vinnova's application of a TIP-related perspective and thus Vinnova's promotion of an emergent TIP discourse. However, interviewees (O, P) at Vinnova argue that they did not have a clear idea about what TIP theories entailed or what role these could play for policy at this point, or even five years later when they were asked to give input for the IPP design. This was not surprising considering the limited literature in this field at that time and the, consequently, very emergent state of the TIP discourse and, as argued in the introduction, limited attention for translating this literature into practical policy guidelines.

Despite the lack of knowledge about TIP theory, some TIP elements can be observed in Vinnova's design of the CDI program and the Strategic Innovation Programme (SIP) starting in 2012 [20,27]. These elements touch upon the four transformational failures identified by Weber and Rohracher [39]: directionality, demand articulation, reflexivity, and policy coordination. Considering directionality, the challenging process of creating the right pathway to tackle societal challenges, both the CDI and SIP involved stakeholders to a greater extent than before. The CDI was designed around four societal challenges that Vinnova identified together with a set of key stakeholders, and further prioritization of innovation areas to meet these challenges was done by means of even broader stakeholder involvement. In the SIP, actors from industry, civil society, and the public sector were encouraged to define "innovation agendas" in line with societal challenges. The trust in stakeholders' ability to self-organize was exceptional in the SIP, considering that Vinnova delegated much of its management authority to programme coordinators. Considering demand articulation, this was particularly evident in the CDI, with its focus on involvement of problem owners and users. The TIP element of reflexive learning was more visible in the SIP, where recurrent evaluation and monitoring was built into the process and results fed into the decisions about direction and progress of the programmes [20,27]. Both programmes proved to be less successful in policy coordination, for realizing regulatory and legal change. Such issues were considered to lie outside the political mandate of Vinnova [20].

Hence, at the time of the IPP design, Vinnova was not fully aware of the TIP theory, but the way Vinnova applied its systems innovation and socio-technical transitions perspective was seen as part of the emergent TIP discourse (see arrow 1 in Fig 2). The view of Vinnova as having a TIP perspective may have been influenced by its early engagement with key TIP scholars and promotors of the TIP discourse, an engagement which continued throughout the implementation of the IPP. One example of this early engagement is Vinnova's contribution to the development of a transformation-oriented policy at the OECD from 2013 and onwards [16,54]. Inspired by the systems innovation perspective, Vinnova joined the Transformative Innovation Policy Consortium (TIPC) led by SPRU at the University of Sussex in 2016. One of Vinnova's lessons from the TIPC activities contributed to Vinnova's idea of so called "policy labs", exploring the adjustment of rules and regulations in Sweden (policy coordination). Vinnova also had a particularly early encounter with Mariana Mazzucato, who was invited to present her work to Vinnova already in 2014 [55]. What followed was a close collaboration between Vinnova and Mazzucato and the hiring of expertise at Vinnova to aid the development of a novel "mission-oriented approach" (interviewees I, P, Q).

In 2018, Vinnova's policy perspective was summarised as follows [56,p.4 our translation]:
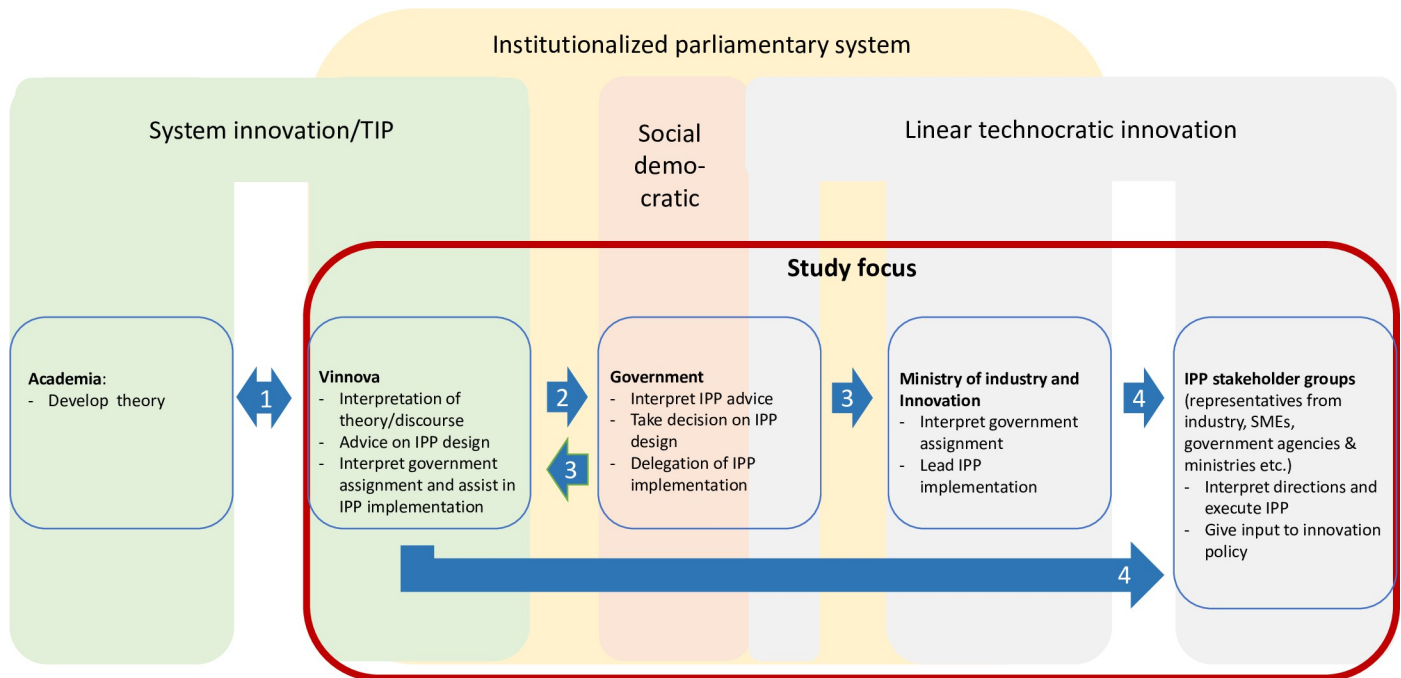
Fig 2. Actors promoting and/or reproducing discourses and an institution influencing the translation steps in the design and implementation of the IPP.

◇ *Depart from societal challenges and visions instead of established sectors or academic disciplines.*

◇ *Stimulate the formation of new actor constellations able to see beyond incremental solutions and develop novel business and organizational models.*

◇ *Introduce a wider view on which policy areas are necessary and should be included to realize system change. In other words, include all policy and political areas relevant to innovation and system change.*

◇ *Work with issues related to policy and regulations as natural parts of innovation processes.*

Seen from a theoretical and discursive perspective, the quote shows clear overlaps with TIP recommendations on directionality, broad stakeholder involvement and especially increased policy coordination mentioned in the introduction. The quote and the early interaction with TIP scholars indicate that Vinnova's system innovation perspective was informed by TIP theory throughout the implementation of the IPP. Shortly after the IPP, Vinnova started to promote "mission processes" [57]. However, Vinnova is still very much working on defining its "mission-oriented" system innovation perspective and ways in which this could be applied successfully in a policy context (interviewees J, P, Q).

3.3 Key influencing discourses and institutions

Following the discourse methodology described in Section 2.2, two discourses and one institution with significant influence on the translation process have been identified, including the actors that promoted and/or reproduced them in the studied translation steps (see Fig 2).

The first discourse was a *social democratic discourse of collaboration* promoted by members of the Social Democratic party. The Swedish social democratic culture has traditionally seen

economic development as a responsibility shared between the public and private sectors [29]. This culture has its roots in the Swedish welfare model and the collaboration primarily between the governing Social Democratic party and industry (via labour unions), but also involving academia and entrepreneurs, as means to develop industrial growth [58]. This focus on collaboration has been argued to have a particularly good fit with innovation system theories and the related discourse, arguing for public-private Triple Helix collaboration [29]. Nevertheless, there was no clear link between this discourse and any specific innovation policy discourse; while the social democratic Prime Minister and the Minister of Industry and Innovation had developed an advanced challenge led innovation perspective, many public officials at the government level still had a linear innovation perspective (interviewee M, I).

The second discourse was a dominant *linear and technocratic discourse on innovation* found among public officers, mainly apolitical civil servants from the Ministry of Industry and Innovation coordinating the CBE programme, and stakeholders involved in the CBE programme (interviewee Q, I). This discourse was related to the linear model of innovation, which sees R&D funds as sufficient for the development of an innovation and its related market [see 4]. The technocratic element of this discourse was reflected in the focus of technical problems and solutions when discussing innovations, while more systemic issues connected to norms and regulations, as well as market creation, were ignored. According to Edquist [48] and several interviewees (interviewees I, O, P, Q), the Ministry of Industry and Innovation is known to have limited knowledge of the systemic aspects of innovation.

Finally, Sweden has a heavily *institutionalized Swedish parliamentary system*. Different from hierarchal parliamentary systems, where ministers steer government agencies, the Swedish system builds on a dualistic system where government ministries and the agencies are separate entities. Swedish ministers act together with the government in the decision-making process in the parliament. Once a decision is made the government orders government agencies to execute it and ministers have no further say in this. While agencies will still have to report to their respective ministries, only legal authorities can correct their behaviour by calling on the government to initiate a new decision-making process to change practices. This means that government agencies can carry out their regulative and monitoring tasks without political influence, which makes their practice increasingly fair and legally secure. However, it also creates a silo-structure for political decision-making, which sets limitations for how fast policies and regulations can be adjusted [59].

4. Challenges in Vinnova's translation of its innovation perspective to the IPP

This section presents the analysis of the challenges related to the translation of Vinnova's innovation perspective to the IPP in a context of the key discourses and institutions defined in Section 3.3. The analysis is presented in chronological order, starting with the IPP design, followed by the IPP implementation, where four translation challenges and their effects become visible. The section concludes with a reflection on the translation challenges.

4.1 Designing the IPP

As explained in Section 3.1, the Social Democratic government proposed the idea of the IPP as a collaboration programme, guided by societal challenges, in which future priorities for research and innovation were to be set out. The government had received input from the NIC and Vinnova regarding the guiding challenges and program areas but had no real idea about how to further operationalize its ambitions. Hence, the government consulted Vinnova to propose a design (interviewee I).

Due to time constraints, Vinnova's preparation of the IPP design proposal, and thus the strategic storyline it entailed, became somewhat ad-hoc (interviewee P). Hence, Vinnova's IPP advice was prepared based on two existing knowledge bases: the experiences gained from the CDI and SIP, based on Vinnova's novel challenge-led system innovation perspective, and two recent reports Vinnova had worked with. Considering the first knowledge base, Vinnova had recently started the CDI and SIP initiatives under the previous conservative government and intended to continue these initiatives under the new Social Democratic government (interviewee H). The first years of running the SIP had shown that inflexible regulations were a key barrier for transformative innovation [interviewee H; see also 17,60]. Hence, as indicated in the following quote, Vinnova saw an opportunity to use the IPP to push continued financing of the SIP and to solve transformative innovation barriers of inflexible regulations in the SIP by arguing for increased collaboration between SIP innovation actors and government ministers and their related agencies managing these regulations (interviewees H, P):

When we heard about the IPP, we [. . .] rather saw an opportunity to concentrate efforts and to use the whole political piano, the whole orchestra, from financing of research to research and development to smart regulation. If you cannot get the regulations to stimulate rather than prevent the type of system change that will be needed, then you need to have all regulating and monitoring authorities inside the tent, not outside. (Interviewee P, our translation)

These two interests were visible in the storyline Vinnova presented in its advice to the government's research and innovation policy bill in 2016 and in its proposed design for the IPP. As input to the research and innovation bill, Vinnova [60] argued for continued support to work with system innovation connected to societal challenges in the CDI and SIP and that the public sector should be engaged to the same extent as other actors, such as academia and the private sector. In a similar vein and indicated in the quote below, Vinnova's [61] proposed design for the IPP stressed that the IPP would strengthen "existing programmes" (i.e. the CDI and SIP) by better collaboration and identification of bottlenecks. In addition, Vinnova argued for the need for the IPPs to secure high level collaboration with, and legitimacy from, policy and public sectors next to business and academia, realized through the selection of particular IPP stakeholders. In the proposal, Vinnova defined these stakeholders as representatives of the government, directors-general of government agencies, CEOs of large companies and SMEs, star scientists with "policy ability" in relevant fields, and selected regional representatives [61].

The ambition of the government to gather the initiatives aimed at strengthening Swedish competition in the long term through research and innovation in five IPPs, is an important measure to secure better collaboration between the existing programmes and to identify bottlenecks that hamper the realization of their full potential. An important part of implementing the IPPs is the shaping of its governance. It should be shaped to achieve collaboration and anchoring on the highest level within politics, business, academia and the public sector. [61,p.1, our translation]

The second knowledge base were two reports that Vinnova referred to in the IPP proposal. The first report reviewed national innovation councils [see 62]. The second report reviewed the work of the European Innovation Partnerships, which was a governance tool aimed at creating future growth and social welfare at the same time as addressing critical societal challenges [see 63]. Considering that these reports dealt with high-level stakeholder platforms, it is likely that they also inspired and legitimized Vinnova's promotion of high-level stakeholders in the IPP. Based on these reports, Vinnova also proposed alternative designs for the IPP [61].

According to interviewee O, Vinnova considered advocating a "systems changer" design with transformative ambitions but doubts about the acceptance of such a radical design by the Ministry of Industry and Innovation led to the advocacy of the less ambitious "vision group for investments in research and innovation" [see 61,p.3, our translation]. This could be seen as a strategic move in the IPP storyline by which Vinnova tried to increase the chance that its proposed design became accepted. The resulting design of the IPP proposed by Vinnova [61] is summarized in Table 3. The table describes the suggested objective of the IPP and how it can be organized in stakeholder platforms in the five sub-programmes.

Seen from a theoretical perspective, interviewees at Vinnova (I, O, P), argue that the key theoretical message that Vinnova managed to translate in its design proposal and in discussions at government offices was the system innovation perspective on socio-technical transitions. The quote below indicates that Vinnova primarily promoted system innovation elements, such as the participation of a broad range of actors in the stakeholder platforms, as well as inclusion of regulative issues, referring to regime barriers, in the discussions on the IPP.

> *There are certain parts from the system innovation literature that I think we nevertheless managed to stick to, which defined the discussion quite a lot. This partly included the much broader actor constellations that were participating. It wasn't only industry and academia, there was also the inclusion of politics and the public sector in a wider sense in the group [...] Then also that we at least tried, and to a varying degree succeeded, in raising regulative issues.* (Interviewee I, our translation)

Vinnova's storyline on the proposed IPP design, mediated in written and oral form, resonated well with the social democratic discourse promoted by the Social Democratic government (interviewees H, O, P). Particularly the need for more collaboration between high-level actors, representing government ministries and regulative agencies and innovation actors, in strategic agenda setting platforms. By these means, the government hoped that the silo-based decision making could give way for a more agile and flexible decision-making process that could better support increased innovation, economic growth, and employment (interviewee

Table 3. Vinnova's proposed design for the IPP platforms.

Objective	Formulate overarching visions and objectives for research and innovation policy within respective areas Identify bottlenecks and call on measures
Setup	Meeting 1–2 times per year to review actions against set visions and objectives
Participants	Medium size group, 10–20 persons High level Selection based on organizational affiliation
Mandate/ resources	Comments on material regarding development in relevant programme portfolios Vinnova secretariat
Output	Recommendations regarding strategic routes
Degree of openness	Medium degree of openness Input from participating organizations
Risk	Reduced interest as a result of weak steering Unclear division of labour between programme council and boards in participating programmes
Examples from other countries	Strategic research Finland (?)

Source: Vinnova [61,p.3], *our translation*

M). As noted in the quote by a Vinnova employee below, Vinnova and the government had a shared vision in this respect.

I really think that there was a great consensus; I mean, the previous government with Dam-berg as Minister for Industry and the fact that Stefan Löfven was Prime Minister. One of the issues Löfven knows in depth from his time as President of the Swedish Trade Union Confed-eration LO is innovation. He understands, you know. Then in his new role as Prime Minister he also understood that the future is not only about collaboration between academia and industry, but also about integrating regulations. (Interviewee I, our translation)

The need for increased coordination between the different government ministries and pub-lic agencies and private innovation actors was an old idea that Vinnova and the government had discussed for many years. This idea was also a driving force behind the many attempts and final realization of an innovation council, which was expected to make innovation policy more efficient, as mentioned in Section 3.1 (interviewee P, see also H, M).

The successful link up of Vinnova's storyline on the IPP design with the social democratic political agenda and innovation discourse led to the acceptance of many, but not all, of Vinno-va's design suggestions for the IPP. A significant deviation from Vinnova's proposal was the government's decision that Vinnova was not to oversee the IPP, as suggested by Vinnova. Instead, the Ministry of Industry and Innovation was assigned the programme with Vinnova in a supportive role [64]. This was unorthodox considering that in Sweden, government deci-sions are usually implemented by government agencies and not by the ministries [65].

4.1.1 Challenge #1: Involving relevant stakeholders. The first translation challenge was related to the involvement of relevant stakeholders able to contribute to the formulation of strategic innovation agendas in the IPP. We see the origin of this challenge in the translation between academia and Vinnova (Step 1 in Fig 2) in that Vinnova's interpretation and further translation of how to apply the system innovation and socio-technical transition idea of broad stakeholder involvement failed in practice due to insufficient guidance from the TIP literature and related discourse (see also discussion in Section 4.2.5). It resulted in a lack of relevant knowledge among selected CBE platform members and also limited the flow of relevant knowledge into the platform.

Based on Vinnova's expectation that the IPP would be able to compensate for shortcomings in policy coordination and influence of reports on innovation councils and the European innovation partnerships, Vinnova promoted involvement of high-level stakeholders to repre-sent a broad range of actors in the IPP platforms. As a result, the CBE programme platform consisted mainly of high-level CEOs, directors from research institutes and research funding organizations, and rectors of universities. These people had executive power, which could be an asset once an innovation agenda was formulated (interviewees L, P, Q), but lacked the required knowledge to identify key challenges and solutions, including a strategic innovation agenda to further innovation. In selected sub-groups of the CBE programme, it became so dif-ficult to have discussions in this constellation that the Swedish Energy Agency was asked to provide background knowledge (interviewees K, L).

It also proved difficult to involve additional stakeholders that could provide relevant back-ground information to the stakeholder discussions. Vinnova's design proposal suggested that research funding organizations, such as Vinnova, the Swedish Research Council for Sustain-able Development (Formas) and the Swedish Energy Agency, were to collaborate closely in a dedicated working group and prepare relevant background information as input to the plat-form discussions [61]. In theory, this could potentially compensate for some of the knowledge deficit among selected stakeholders in the platforms. However, the government decided not to

engage other funding agencies in the IPP. It merely requested Vinnova to "provide an analysis that shows current and potential development needs" after joint consultation with other research funding organizations, without providing any extra funds to make this happen [66, p.2]. Hence, while the funding organizations (including Vinnova) may have had relevant knowledge that would have improved the knowledge input to the agenda setting process, their resulting input in the CBE programme was a rather shallow review of previously funded research programmes, excluding a gap analysis (interviewee Q).

4.1.2 Challenge #2: Getting past a dominant linear and technocratic discourse. As indicated by the quote below, another challenge was the dominance of a rather linear and technocratic view on innovation among the involved stakeholders and public officials at the Ministry of Industry and Innovation (interviewee Q). An interviewee (I) indicates that this discourse was dominant among public officials of the government offices as well, although to a lesser extent. Hence, we link this challenge to several translation steps, from Vinnova to the public officials at the government, further to the Ministry of Industry and Innovation, and finally to the IPP stakeholders (Steps 2, 3 and 4 in Fig 2).

> . . . *the competence was, I think, primarily technical; in other words, natural science-oriented. Hence, not innovation and what was needed for transition. . . how we should collaborate, what are important ingredients for this. The innovation policy competence was rather limited among the actors in the group and those involved at the government offices.* (Interviewee Q, our translation)

According to interviewees (I, Q), the dominance of the technocratic and linear discourse implied that problems and solutions defined by stakeholders in the CBE programme were largely defined as having a technical character that could be solved by means of more R&D funds, while more systemic issues of how to solve regulative barriers and create markets were given less attention [see also 67].

Moreover, it limited the ability of government officials to acknowledge and accept Vinnova's systems innovation and socio-technical transition-inspired policy advice and to give sufficient directions to the public officials from the Ministry of Industry and Innovation who were to implement and execute the IPP. According to Swedish National Audit Office [65] and interviewees (D, Q), the government officials gave no description or direction on how project leaders at the Ministry of Industry and Innovation should work with the IPP. The interviewees (D, Q, M) describe how the main instructions referred to an experimental approach with "handshakes" between industry and public parties for innovation to come about. Considering that the public officials at the Ministry of Industry and Innovation responsible for implementing the IPP had an even more linear and technocratic view on innovation than the government officers (interviewees H, O, Q), they could only be creative with their available knowledge. This implied that they adopted a different interpretation of the IPP purpose. Instead of seeing the IPP as an agenda-setting stakeholder platform, the public officials at the Ministry of Industry and Innovation gave weight to the word "programme" in the IPP and interpreted it as a conventional research and innovation programme with public funds to be divided in projects (interviewees D, H). Influenced by the Ministry of Industry and Innovation, the CBE programme stakeholders shared this interpretation.

To challenge this linear view, Vinnova employees tried to educate the participants and steer the process towards a more systemic view on innovation. This solved some of the initial misunderstandings at the Ministry of Industry and Innovation regarding the purpose of the IPP (interviewees B, H, Q). However, towards the end of the CBE programme period, time pressure forced Vinnova employees to push their systems innovation and socio-technical

transitions ambitions aside to accomplish the assigned IPP mission in time (interviewee Q). The result was that the majority of the actions taken as a result of the CBE programme were oriented towards R&D projects rather than towards the intended strategic and systems innovation actions [67, Interviewee Q]. Seen in a discourse perspective, Vinnova did not have sufficient power or time to fully open up the cognitive capacities of the stakeholders to see the benefits of applying their systemic approach in the IPP.

4.1.3 Challenge #3: Time constraints caused by the institutionalized parliamentary system. Vinnova was also faced with a translation challenge connected to the highly institutionalized parliamentary system, which is not particularly open for modification by novel discourses (see section 4.1.5). The lengthy decision-making routines of this institutional system resulted in time constraints in realizing the transformative ambitions of the IPP. While this challenge probably originated when translating Vinnova's TIP-related perspective to the government (Step 2 in Fig 2), it had a negative effect on all the translation steps covering IPP implementation.

Because of the lengthy routine for mobilizing novel research and innovation funds part of the institutionalized parliamentary system, funding for activities identified in the IPP was not released until the final year of the programme. This created high pressure on the funding agencies to distribute the funds within the year [Interviewees J, Q, see also 65]. According to interviewees (interviewee J, Q), the SIP was the only available channel with a potential fit that could be mobilized on a short term. Thus, to meet the suggested measures defined by the stakeholder platforms in the IPP, government funds were directed to the SIP. While it was announced that other complementary actions were to be executed in addition to the SIP funding, these were not prioritised [64]. Consequently, the CBE programme resulted in funding activities that could be executed in the short term and not necessarily the most relevant activities to foster a circular and biobased economy that can meet the challenge of climate change mitigation.

4.1.4 Challenge #4: Realizing policy coordination. A fourth translation challenge in implementing the IPP was connected to the difficulty of realizing Vinnova's ambition of increased policy coordination to make sure relevant policy instruments, rules and regulations would facilitate rather than hinder transformative innovations. While the need for coordination was acknowledged, sufficient resources were not available (interviewees D, K). As argued by interviewees (I, P) and indicated in the quote below, this coordination challenge was related to the limited legitimacy for the IPP among public authorities outside the Ministry of Industry and Innovation and Vinnova.

More or less consciously, these public authorities prioritized their everyday routine of silo-based work part of the institutionalized parliamentary system, over the coordination activities in the IPP. We link this challenge primarily to institutional barriers and shortcomings in the translation from the government to implementing authorities considering the government can be seen as responsible for legitimacy building and funding (Step 3 in Fig 2).

> . . .It became too much of a Ministry of Industry and Innovation and Vinnova matter. The whole point was that many more needed to feel compelled if this type of coordination and these wide approaches were to succeed. [. . .] It did not become a concern for the whole government, and thus not all the relevant public authorities were involved. (Interviewee I, our translation)

As mentioned in Section 4.1, Vinnova and the government shared the ambition to tackle the innovation challenge of inflexible rules and regulations by means of increased collaboration between the government authorities and innovation actors in the IPP–an activity that had the ambition to open the silo structure part of the institutionalized parliamentary system

(interviewees H, M, P). To make this happen, the IPP needed to increase policy coordination between ministries and their respective agencies related to issues raised in the IPP. Hence, selected state secretaries of the government ministers were to chair each IPP. The chair of the CBE programme was the state secretary of the Minister of Rural Affairs (interviewees D, M). In addition, relevant state secretaries and ministers were to take part in meetings to enable "political crosstalk" and thus enable increased and faster impact of issues raised in the IPP on political decision making [65,p.47, interviewees B, D, Q].

Initially, the state secretaries participated actively in the programme meetings. However, towards the end of the programme participation had ceased and only the Ministry of Industry and Innovation was engaged. This implied that it was no longer possible to coordinate the work between the government Ministries and the underlying monitoring and regulative agencies (interviewee P). According to an interviewee (P), this coordination failure contributed to the narrow focus on R&D, since this was the domain of the Ministry of Industry and Innovation. Increased involvement of other ministries could have enabled a wider programme output, including initiatives to form new policy instruments and change existing regulations.

Next to coordination failures on a ministerial level, there were also coordination failures at the level of government agencies. Vinnova's design proposal included the promotion of coordination between funding agencies and their initiatives, to deliver relevant background information to platform discussion and, based on strategic IPP agendas, concentrate efforts in more efficient support for innovation [61,66]. However, as mentioned in Section 4.2.1 the participation and input from funding agencies was limited. According to Vinnova employees (interviewees I, P), the reason for this was the lack of legitimacy for the involvement of other ministers and their related agencies in the IPP. According to the Energy Agency, which had relevant knowledge for the CBE, the CBE activities were not prioritized due to lack of funds (interviewee K).

Policy coordination even seemed to be difficult between initiatives that were part of the same Ministry. One example was the Forest Programme, led by the Swedish Forest Agency, which answered to the Minister of Rural Affairs under the Ministry of Industry and Innovation (same as CBE). The key issue in the Forest Programme was how to balance the goals of biodiversity with increased forest output. This issue was of crucial concern for future Swedish bioeconomy development and for the CBE Programme [68]. Still, during the CBE program period there was hardly any interaction between these programs (interviewee D)–again due to a lack of resources for such coordination activities in terms of time and funding.

4.1.5 Reflections on the IPP translation challenges.   Regarding translation Challenge #1, relevant stakeholder involvement, Vinnova advised high-level stakeholders representing different types of public officials and innovation actors who turned out not to have the knowledge to carry out the tasks set out in the CBE platform. Considering that Vinnova was not familiar with the novel TIP literature when it prepared its IPP design proposal, one may argue that this literature may be able to inform Vinnova on how to involve stakeholders more successfully, considering that broad stakeholder involvement is a general TIP advice. However, as argued in the introduction, the possibility to learn from the TIP literature is still limited due to the lack of clear policy guidelines, especially concerning stakeholder management [1]. Moreover, when consulting key TIP references such as Mazzucato [69] missions-oriented approach and Schot and Steinmueller [4] transformative innovation policy approach, they differ on how to engage stakeholders and what qualities these stakeholders should have to facilitate transformation. This creates confusion regarding what approach to choose. Whereas Mazzucato [69] advocates a top-down approach, where governments pick "willing" stakeholders with relevant knowledge (e.g. scientific actors) to aid in setting direction for the transformative mission-oriented policies, Schot and Steinmueller [4] promote bottom-up, self-organized stakeholder involvement

and trust that a sufficiently heterogeneous stakeholder group will be able to learn and set directionality for the transformative work regardless of previous knowledge. In this regard, the IPP approach contained elements of both these perspectives in that it was more top-down than bottom-up but did not consider the knowledge of the selected stakeholders. Mazzucato also values stakeholders' ability to legitimize the mission-oriented work and to share risks and rewards with the government in this radical transformation, so that the government can take more of a private venture capitalist role [69]. This resonates with the high-level actors involved in the IPP, who had the mandate to radically change investments or organizational practices to foster and legitimize transformative mission-work. In the case of the IPP, however, the lack of appropriate knowledge among these high-level stakeholders flawed the strategic agenda-setting and policy advice, which made their executing and legitimizing power less of an asset. To sum up, Vinnova's advice on the IPP has more resemblance to Mazzucato's [69] work than that of Schot and Steinmueller [4]. While early interactions between Vinnova and Mazzucato may explain this (se Section 3.2), it is somewhat surprising considering that Vinnova's design of the IPP is argued to be largely inspired by a system-innovation perspective on socio-technical transitions.

Translation Challenge #2, getting past the dominant discourse, is a known challenge in related literature. Literature on translating innovation perspectives with transformative ambitions to policy has observed how various strategies contributed to momentum of the transformative discourse at the OECD at the same time as persistent institutions prevented its institutionalization [16]. In the IPP case, the translation process was interrupted much earlier, as the dominant linear and technocratic discourse limited the capacity of public officials and other stakeholders to absorb and adjust to Vinnova's innovation perspective. In the sustainability transition literature, the resistance to change posed by a dominant discourse is often manifested in institutions and described in terms of socio-technical regimes [39,70]. As mentioned in the introduction, a key advice from the TIP literature on how to tackle challenges of institutional resistance is by stimulating "creative destruction" and destabilization of dominant regimes in combination with fostering new ground-breaking innovation. In the case of dominant discourses setting barriers for the implementation of the IPP, education and involvement of a wider range of stakeholders to increase coherence and credibility to Vinnova's IPP storyline may be a way forward.

Translation Challenge #3, time constraints for realizing the IPP, resulted from the institutionalized parliamentary system and contributed to the formulation of less relevant policy actions. The parliamentary system is–and should be–a very stable institution. It is deeply embedded in the Swedish society and is not likely to change very much in a foreseeable future. Here we, therefore, need to consider whether the IPP could have been designed differently. One approach would be to assign the responsibility for the IPP to government agencies, which are apolitical and already have assignments that stretch over the government term of office. This resonates with Vinnova's original design proposal for the IPP, which suggested that Vinnova would coordinate the programme, as well as with Vinnova's more recent suggestion to set up a permanent "policy lab" function to increase policy coordination [see 56].

Translation Challenge #4, failing to realize policy coordination, is a fundamental challenge considering it was a key function that Vinnova wanted the IPP to fulfil in order to better support the transformational innovation initiatives of the CDI and SIP. The policy coordination challenge in the IPP relate to what Weber and Rohracher [39] refer to as vertical and horizontal policy coordination failures. For example, there was limited horizontal policy coordination between participating ministers towards the end of the program period and limited vertical policy coordination between the Ministry of Industry and Innovation coordinating the CBE Programme and its subordinate government agency, the Swedish Forest Agency, leading the

Forest Programme. To solve the policy coordination failure, Weber and Rohracher [39] argue for increased administrative capacity as a key means. To realize this, both legitimacy building to engage more actors from the public offices in the program and the mobilization of sufficient resources to support their activities would have been required.

To sum up, this paper illustrates the complex process of translating theory into policy practice where policymakers should account for the interactions between new and existing policy and their potential effect on the policy outcome. The need to account for existing policy is by no means a new observation [e.g. 21,22,71]. However, here we contribute with insights on how this process can play out in a national level policy context. As indicated in Section 3.2, the CDI and SIP were part of Vinnova's new challenge-led innovation policy, which was based in a systems innovation and socio-technical transitions approach. A particular policy ambition of the SIP was to increase coordination between public offices and innovation actors to overcome regulative and other barriers for transformative innovation, but this failed due to rigid silo structures [Interviewee H, see also 17]. In Kern and Howlett's [71] terminology this could be seen as a policy route of "drift", where a new innovation policy goal of policy coordination for transformation to meet societal challenges was adopted, but the silo structures that were part of the old policy regime hampered the realization of this goal. Once the IPP appeared, it was seen as an opportunity for Vinnova to solve this policy coordination failure. However, because of the lack of knowledge to identify relevant challenges and measures for transformative innovation (translation Challenge #1), a dominant technocratic discourse preventing the stakeholder uptake and understanding of the IPP aim and method mediated by Vinnova (Challenge #2), and weak policy coordination and learning between government ministers and agencies (Challenge #4), the means to reach the goal of policy coordination to meet societal challenges were flawed and counterproductive. In other words, due to the failure of the IPP to reach the goal, the transformative policy perspective pushed by Vinnova remained in a drift route. However, some progress has been made. As a result of the experimentation and government assignment to investigate the "policy-lab" concept further (see Section 3.2), an activity that Vinnova sees as closely related to the IPP [56], the general legitimacy for policy coordination has increased.

5. Conclusions

The purpose of this paper was to identify key challenges that national policymakers face in trying to translate transformative innovation theory into policy practice. A discourse framework was used to analyse how Vinnova translated its TIP-related innovation perspective into the design and implementation of the Swedish Innovation Partnership Programme (IPP).

The first research question concerned the key discourses and institutions that influenced the translation process. Two discourses and one institution were identified. The first discourse was a social democratic discourse, which promoted state and industry collaboration. It was reproduced by the government and enabled the translation of certain elements in Vinnova's innovation perspective. The second discourse was a dominant linear and technocratic innovation discourse viewing R&D funds as sufficient for realizing innovation, which prevented the translation of Vinnova's transformative perspective. The institution identified was the Swedish parliamentary system that contributed to additional translation challenges due to its rigid decision-making structure.

The second research question concerned the key challenges that influenced Vinnova's translation process. Four challenges were identified. Challenge #1 was the involvement of relevant stakeholders, which became problematic since the selected stakeholders did not have relevant knowledge to carry out the task of the CBE and provide relevant policy advice. Challenge

#2 was to overcome the dominant linear and technocratic discourse, which made it difficult for public officials and stakeholders to acknowledge and accept Vinnova's systems innovation perspective and resulted in a focus on technology-oriented R&D measures instead of the intended strategic and systemic innovation actions. Challenge #3 concerned the time constraints of an institutionalized parliamentary system. The lengthy routines of the parliamentary system created time constraints that contributed to the selection of relatively easily achieved programme activities, i.e. R&D, regardless of whether they were relevant or not. Challenge #4 was realizing policy coordination. The policy coordination ambitions of the IPP failed due to limited creation of legitimacy for the IPP at government ministries and agencies embedded in silo-based work routines. Moreover, even when policy coordination was recognised, the resources were too limited. This also contributed to a policy dominated by R&D since only the Ministry of Industry and Innovation was engaged in the end.

To sum up, this study adds to previous literature by identifying dominant discourses or institutional structures as a key barrier for change and showing how translation challenges play out in a national context. The study shows that even a front runner such as Vinnova can experience considerable difficulties when trying to translate TIP theories into policy practice. We would, therefore, argue that future TIP research should engage more in research that can provide better policy guidelines on how to design and implement policies to realize transformative change. The challenges identified in this paper can serve as input to future work on such policy guidelines.

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