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Policy coordination challenges in governments' innovation policy—The case of Ontario, Canada

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Abstract

Policy coordination to support coherent approaches in innovation policy has become a major governance puzzle for most countries. Recognizing the diversity of stakeholders involved in the innovation system, it is the synchronized actions of government policy makers that determine the coherence and support for a country's innovation agenda. By interviewing 30 experts from the federal and provincial governments, industry, and higher education sectors in Ontario, this study examines the relationship between the provincial and federal government in facilitating Canada's innovation agenda. The Canadian case reveals the factors that shape policy coordination and provides insights on mechanisms that could enhance collaboration in a decentralized innovation systems such as in Canada.

Key words: policy coordination; innovation policy; federal system; Canada.

1. Introduction

Over the past few decades, research productivity and innovation capacity have become a major defining criterion for national innovation systems (Dill and Van Vught 2010; Smits et al. 2010). Scholars have documented the significant growth in goals, policy initiatives, and governance approaches involving innovation (Borrás 2008; Vītola 2014). The policy sector is increasingly characterized by the diversity of stakeholders, territorial decentralization (regionalization, cluster initiatives, and cross-border science networks), and a variety of funding sources leading to differentiation in organizational competencies and responsibilities (Edler and Kuhlmann 2008; Borrás and Edquist 2014; Nilsson and Moodysson 2015). Nevertheless, there is recognition that innovation can be best supported through systemic approaches with coordinated activities between stakeholders (Lundvall 2009; Kuhlmann et al. 2010). Governments are expected to formally oversee the processes of defining and implementing a country's innovation agenda (Braun 2008).

Coordinated innovation policy has become a major public policy challenge for most governments (Kuhlmann et al. 2010). The puzzle with the systemic coordination of innovation policy lays in the complexity and heterogeneity of the system. Federalism presents additional hurdles for political actors to develop coordination capacities. The existence of a minimum of three vertical governance levels—cabinet, ministries, and agencies—and at least two (and often more) horizontal levels between policy fields create institutional complexity that is challenging to manage. A lack of congruency between the federal and regional governance systems leads to situations where the information flow is fragmented or absent,

program goals are conflicting, thus resulting in dying out of potentially promising project ideas (Kerber and Eckardt 2007).

A clear example of fragmented coordination issues can be found in Canadian innovation policy. Despite significant monetary allocations (Fallis 2013; Doern et al. 2016), recent policy reports have referred to a continuous innovation under-performance in Canada, linking it to a lack of policy coordination between the federal and provincial governments (Government of Canada 2011; Conference Board of Canada 2013). Universities and the private sector need to navigate this disintegrated governmental policy and program landscape, aligning their research agendas accordingly. Diffused policy development over several Ministerial departments and programs in the federal–provincial governments has resulted in mixed signals to knowledge producers, affecting overall knowledge mobilization in Canada. These issues demonstrate that policy coordination cannot be the outcome of an evolutionary process but must be strategically designed and promoted (Braun 2008).

The overall purpose of this article is to identify approaches to governmental policy coordination through an empirical study that could inform initiatives in Canadian innovation policy. The focus of this project is on the province of Ontario, as Ontario has a direct provincial mandate for innovation policy (Ministry of Research and Innovation, MRI), has the largest number of provincial innovation projects (e.g. Ontario Network of Excellence, the Colleges Ontario Network for Industry Innovation, and MaRS Innovation center), and has a clear provincial objective to improve partnerships with the federal government in innovation (Ontario's Innovation Agenda). This study draws on the concepts from public policy and political

science using a qualitative case study methodology to examine policy coordination. The following research questions guide the study: *What are the main factors shaping policy coordination between the federal and provincial government in Ontario? How can these factors inform coherent and systemic policy approaches in Canada's innovation system?*

2. Conceptual framework

Based on the policy coordination literature in public policy and political science, three main concepts frame the theoretical approach of the study—coordination models, policy networks, and policy learning. These concepts take into account both the external factors and internal dynamics in the study of policy making. Boston (1992) defines policy coordination as a process that facilitates a comprehensive, 'whole government' perspective instead of narrow sectorial views, avoids overlap and inconsistencies in policy directions, and secures a coherent order of priorities to minimize stakeholder conflict. Lundvall (2009) advocates for a systems approach to innovation and research that is based on learning. He notes that a system of innovation is a social arrangement constituted by elements and relationships, which interact in the production and diffusion of new economically useful knowledge. Those interactions are related to learning processes by which one updates knowledge on the practices that work (Lundvall 2009).

Discussion about policy coordination in governments has tended to focus on the two main models for effective coordination: the 'super-ministry' approach and the 'detached ministry' approach. The first approach, practiced in Denmark and Switzerland (Koch 2008; Griessen and Braun 2008), suggests incorporating all relevant sectorial fields under a single organizational setting. The critics point to the fact that policy coordination cannot be an end objective in one ministry and too much coordination might kill the independent development of each sectorial area (Braun 2008). Another stream of literature emphasizes the importance of flexible forms of coordinated action (Ansell and Gash 2008; Borrás and Radaelli 2010), where government coordinates from the distance, serving primarily as the facilitator of the process. This approach is applied in Germany and Finland (Orlowski 2008; Pelkonen et al. 2008), but the agreement on one central vision is strictly required. These two approaches are helpful in considering possibilities for Canada, acknowledging those context-specific factors that ultimately determine the best solution.

A separate stream of literature—the policy network approach—focuses on the influence and the relationships between actors involved in a policy area (e.g. innovation). Policy networks are formed by the actors who have an interest in the policy area, share a common policy focus, and can shape policy outcomes (Heclo 1978). Padure and Jones (2009) state that policy networks provide a useful mechanism for assessing conflicts and the various interests of policy actors involved in a policy field. Arnold and Boekholt (2003) describe three broad categories of actors that form the policy network: *the government and the cabinet*, for example, high politics, the *sectorial* level of ministries responsible for day-to-day decisions about policy implementation, and the *agency* level, which executes implementation tasks and often has a certain degree of freedom to decide on how to implement policies. Network-oriented approaches that include voluntary and inclusive approaches to policy coordination have become increasingly documented approach in the governance literature (Hillman et al. 2011).

Policy coordination is connected to policy learning, the reflective process whereby policy actors accumulate expertise and shape policy beliefs (Sabatier 1986; Sharaput 2012). This accumulation of expertise enhances the tendency to shape policy beliefs, creates new ideas, and takes ownership of the policy decisions (Sabatier 1988). Several authors have emphasized the importance of learning capacity, linking it to one potential mechanism for gradual policy change in innovation policy (Lundvall et al. 2002; Zito and Schout 2011; Radaelli 2009). As innovation often emerges in non-linear ways, 'learning-through-interacting' becomes crucial. Nilsson et al. (2008) state that everyday policy making is part of a long-term process of learning and strategizing, in which common views and political coalitions are constantly formed. Lundvall et al. (2002) argue that interactive policy learning can lead to innovation and increased economic performance. Overall, policy learning creates awareness and builds capacity on the ways policy coordination can be achieved. This concept allows focusing on expert knowledge and institutional memory needed for achieving cohesive policy approaches in innovation.

3. Contextual Background of Canadian Coordination Challenge

As innovation systems are context specific, embedded within a particular national setting, shaped over the years by certain regional needs and political demands (Nilsson and Moodysson 2015), it is important to understand how the system has evolved. A varied literature has emerged examining historical developments of Canadian innovation and science policy (see Doern et al. 2016; Doern and Stoney 2009; Atkinson-Grosjean 2006; Gault 2003). This literature highlights the changing policy focus and associated financial commitment in relation to innovation policy. Coordination mechanisms have been briefly discussed, analyzing mainly the work of number of government agencies and external advisory bodies (e.g. Science Council of Canada, Science Technology and Innovation Council, and Tri-Council Agencies), concluding that coordination challenges within the decentralized system remain a pressing issue for Canada.

There is the agreement that the federal–provincial divide of inter-jurisdictional responsibilities is one key obstacle to coordination (Niosi 2000; Salazar and Holbrook 2007). While the federal government has an overall responsibility for Canada's economic competitiveness and social well-being, the higher education sector, including research universities, is regulated and governed by the provincial governments. Research by Mitchell and Ledwell (2011), Creutzberg (2011) and Sharaput (2012) among others emphasizes the need for a clearer division of policy roles among the federal and provincial governments in Canada to support innovation. There are growing concerns around provincial foci regarding innovation, as most efforts are embedded in provincial departments and regional or sectorial strategies with little legislative power or engagement (Doern et al. 2016; Fallis 2013).

Scholars have documented limited visibility, power, and lack of organizational sustainability for the science ministry within the federal government (Dufour 2014). Canada has a Minister of Science but this role is only one voice in a Cabinet of thirty-five to forty ministers and the Minister is a single member in a 338-member House of Commons (Doern et al. 2016). The departmental structure for science and technology has kept changing over decades and the lack of continuity has impacted institutional memory. Several other ministers continue to hold more power as their departmental and agency

structure and mandates are significantly science based (e.g. fisheries, agriculture, and natural resources) (Doern et al. 2016).

Regarding coordination practices, Canada has experimented with more centralized steering between the 1960s and 1980s and more decentralized, network-based forms of coordination from the 1990s onwards (Clowater 2012; Atkinson-Grosjean 2002). The formation of the Science Council of Canada in 1966 was an important step toward increased state steering of science policy, having a goal to develop a coherent national strategy for science (Clowater 2012). The reports of the Science Council of Canada (1967–1992) repeatedly discuss the coordination barriers between research sectors, advisory bodies, and government jurisdictions. The recommendations support a 'comitology' approach where inter-jurisdictional coordinating bodies are seen as a solution to improved policy coordination. In 1971, a 'super-ministry' approach was adopted through establishing the Ministry of State for Science and Technology. Although the idea of 'state ministry' was seen as a potentially workable concept in Canada, the increased bureaucracy and political issues served as major roadblocks between the superministry and the acceptance of horizontally conceived policies (Aucoin and French 1974).

In the 1980s, Canada took a turn toward decentralization, focusing on aggressive entrepreneurship, market competition, and discontinuous innovation (Atkinson-Grosjean 2002; Clowater 2012). At the policy front, Canada's first National Science and Technology Policy was introduced in 1987, emphasizing competitiveness and tighter collaboration with industry. New funding programs (e.g. Canada Foundation for Innovation (1997), Genome Canada, Networks of Centers of Excellence Program (1988)) were introduced that focused on interdisciplinarity and market-oriented research (Fisher et al. 2001; Fisher and Rubenson 2010). Another 'super-ministry' was formed to coordinate science policy—Industry, Science and Technology Canada (ISTC)—with a focus to strengthen stakeholder ties with industry.

Since the 1990s, the federal government has intentionally reduced its political control by increased funding through research councils and limited federal influence on regional cluster development (Doern 2007). Driven by the idea that innovation often emerges unexpectedly through non-linear networked ways, the government withdrew from a range of regulatory activities, supporting innovation primarily via funding. In 2007 and in 2014 the federal government introduced updated strategies for Canada's Science, Technology and Innovation, but it did not make this centralized vision into more coordinated action. Policy reports continued to underline that there is a need to 'establish a clear federal voice for innovation, and engage in a dialogue with provinces to improve innovation coordination and impact' (Government of Canada 2011, p. E-13). Yet, limited actions have followed to improve the situation.

Ontario is the largest province with the most industrial and university-based research activity in Canada. Since 1980, the Ontario government has struggled to respond to the transition from a traditional industrial base to a more knowledge-intensive economy (Wolfe and Gertler 2001). It was not until 1997 that the issue of innovation policy emerged on the agenda of the Ontario government. In 2005, the government first began to frame a coherent strategy around innovation (Sharaput 2012). The establishment of the Ontario MRI in 2005 signaled a clear provincial commitment to innovation as a key component of Ontario's economic policy. In an attempt to prepare a strategic plan for Ontario, the Ontario Innovation Agenda was introduced in 2008. It was heavily focused on the development of highly qualified personnel with the explicit aim of strengthening Ontario as a leading, innovation-based economy (Ministry of Research and Innovation 2008). The Council of Canadian Academies (2013) report indicates that Ontario has provided strong public and financial support for higher education research but has been weak in enhancing private investment and commercialization. Another problem is structural. The innovation agenda has been the responsibility of several ministry's (MRI, then became part of Ministry of Economic Development and Innovation) with little connection or coordination between research and innovation policy and higher education policy with the Ministry of Training, Colleges and Universities (Fallis 2013). As a result, Canada has still to solve the 'coordination problem' that creates inconsistencies and obstacles across governments, units, and policy sectors affecting productivity and innovation capacity.

4. Methodology

An exploratory case study strategy was adopted to address the research objectives. The case selection involves the provincial government of Ontario and the federal government of Canada. Interviewees from the industry sector and representatives from Ontario universities and colleges were also included to provide insights on the governments' policy coordination capacity.

Two main methods and data sources were employed. The first step was a background analysis. It involved conducting content analysis of the government policy documents related to Canada's innovation policy. The documents analyzed included the 'Innovation Canada: A Call for Action' (2011), 'Moving Forward in Science, Technology and Innovation 2014' (Canada's Science and Technology Strategy), Ontario's Innovation Agenda (Government of Canada, 2013), and 'Canada – Ontario Labour Market Development Agreement' (Government of Canada 2005). A content analysis (Weber 1996) was carried out, identifying themes relevant to the topic, for example, how policy coordination is understood, strategic initiatives taken, and mechanisms applied for supporting innovation.

The second step involved 30 semi-structured interviews with provincial and federal policy makers, university senior administrators and innovation experts from non-governmental organizations. Interviewees were selected based on their association with key stakeholder institutions. Snowball sampling was used to identify additional interviewees, where existing study subjects refer future subjects with relevant expertise (Goodman 1961). The sampling frame involved the following broad stakeholder groups: five federal level policy makers (Industry Canada (4), Federal Economic Development Agency for Southern Ontario (1)); 10 provincial level policy makers (Ministry of Economic Development, Employment and Infrastructure/MRI (6); Ministry of Training, Colleges and Universities (3); and Cabinet Office/Intergovernmental Affairs (1)); 5 industry stakeholders (IBM (3), Parteq Innovations (1), and Cisco Systems Canada (1)); and 9 Vice-Presidents Research and 1 senior administrator from the universities/college sector in Ontario (Carleton University, University of Guelph, McMaster University, Ryerson University, Seneca College, University of Ontario Institute of Technology, University of Waterloo, Western University, University of Ottawa, and York University). The interviews were recorded and transcribed. Data were coded using NVivo software. The analysis involved determining categorical themes (open coding), establishing patterns (axial coding and selective coding), and developing generalizations from the information provided through the interviews (Creswell 1998).

5. Findings

The findings confirm that inter-governmental policy coordination in Canada is currently an *ad hoc* activity without a clear organizational structure or mechanism to support it. The factors that shape the nature of policy coordination fall into the three broad categories: factors related to the federal system, factors related to the administration of policy coordination, and factors related to the stakeholders. Each of those categories will be examined below.

5.1. Factors related to the federal system

The Canadian federal governance system plays a major role in limiting policy coordination capacity. The divided power between the responsibilities of the federal and provincial government has led to competing priorities in policies. The provincial government is interested in enhancing and funding Ontario's competitive advantage especially in the areas where there already is a strong culture of innovation such as in life sciences, manufacturing, information technology and communication, and social entrepreneurship (Premier's Mandate Letter 2014). The federal government is supporting broader national areas such as natural resources and energy, the environment, agriculture, health, and life sciences (Government of Canada 2014). Such divided focus has a larger impact and implications on big-science research projects that aim to cross provincial boundaries to contribute to the whole-country innovation vision. Several university representatives describe issues with larger cross-provincial research projects:

> When it comes to things like big science, we also have a challenge because the federal government looks to the benefits of Canada and [. . .] Ontario will only look at supporting the Ontario's component of those things. [. . .]There's an opportunity to build cyber infrastructure in the north. [. . .]We want to implement a program that is, you know, Yukon, Nunavut, Northern Ontario, Northern Labrador, Quebec. It might be a provincial priority in Ontario and therefore Quebec doesn't want to support it. So what do you do, skip over that province because it's not a provincial priority there? So that's a challenge for us in terms of the provincial priority settings if we want to work on a national agenda.

> There's a federal funding program called Canadian Foundation for Innovation, CFI. It funds major infrastructure projects. I mean big money, millions of dollars. But they'll only fund 40 percent of the cost of the project. They expect the other 60 percent to be matched by other sources./. . ./ The federal government approves its 40 percent. That's no guarantee that the provincial government will say yes, we'll kick in the other 40 percent. They usually do, but there have been instances where the provincial government said no, we're not going to fund that with our 40 percent. The reason being it doesn't satisfy Ontario's priorities.

Such conflicting priorities in provincial governments in Canada serve as a significant obstacle for big science research projects that could enhance national knowledge production and innovation capacity. When each province is looking to gain its own distinct goals, the capacity to achieve broader benefits is lost.

The federal system by default complicates communication and policy coordination as the federal government does not have a legal right to influence provincial policies, yet it has the power to determine a vision for the whole country. As a result, there is an active collaboration between the respective cabinet, the Ministries, and relevant agencies, yet communication between the provincial government and the federal government is limited. For example, the federal government administrators noted holding routine conference calls and face-to-face meetings between their internal units to maintain information flow and keep staff members informed about new policy developments. High-level officers (e.g. assistant deputy ministers responsible for science) would meet with department representatives every 2 weeks to discuss current issues and give updates on policy developments. Similarly, the provincial government officers commented on high-level interactions taking place between different ministries. Here is an example:

> I think at the provincial level, everything we have done, has always taken that coordinated approach. Any time we are coming forward with a cabinet document or a strategic policy or a strategic approach to support innovation, it is done in collaboration with our key Ministries. So, it means that information is shared, there are opportunities for other Ministries to way in and flag areas of concern.

According to most of the interviewees, the key challenge in policy coordination is a lack of vertical communication—collaboration between provincial and federal governments. The federal system creates top–down power hierarchies that do not contribute to inclusion. A representative from the provincial government comments: '[There are] different levels of politics. There is always that relationship where they [the federal government] are the big brother and you [provincial government] are the little brother'.

Provincial policy officers emphasize that stronger coordination with the federal government is needed in terms of data sharing, making decisions on larger capital investments, and collaborating on decisions over broader national priorities. One interviewee notes that currently there is fragmentation and a reactive approach between the provincial and federal government as opposed to proactive input to the overall strategic direction in research policy: '[in S&T policy] we don't have a very strong tradition of federal-provincial collaboration in a direct and concerted manner. We do it indirectly'. Six government policy experts from both the federal and provincial governments commented on noticing an increased centralization from the federal government but not a shift toward greater collaboration over the past 10 years.

Decentralized federal systems such as in Canada demand extra efforts from the federal policy makers to reach out and create productive working relationships across provincial organizational units. Creating awareness of the potential consequences that working in silos might cause in terms of larger research projects is essential in order to make extra efforts for establishing coherency in policy support.

5.2. Factors related to the administration of policy coordination process

Political systems play a key role in policy coordination, yet the day-to-day administrative practices define how the process unfolds. As policy problems are getting increasingly complex, transcending the borders of the policy sectors and involving a growing number of stakeholders, it requires administrative practices that are responsive to the changing nature of the policy issues. According to the interviewees, the coordination process is seen as 'messy', 'taking a lot of effort', 'complex', 'complicated', difficult', 'indirect', and 'not easy'. There is not a clear formal structure in place for managing stakeholder relationships. People lack the knowledge on how to navigate this extremely wide network of stakeholders with different levels of authority and power.

Most interviewees recognize that increased attention to policy coordination is needed indicating that there is more to be done

('there are a lot of inconsistencies that we have not fixed yet' and 'we've got gaps to fix'). Interviewees reflected on the increasing need for adaptation: 'I think a lot of the [policy] issues are becoming more horizontal than they were before, which requires a lot of us to be more out there and consulting more with others'. Four provincial government officers as well as two industry representatives commented that it was essential to take an organized approach to policy development, so that all departments within a ministry as well as in other ministries are involved in the process in a systematic way.

The analysis of the policy documents revealed that there is clearly awareness among the federal and provincial governments about the lack of policy coordination. For example, the federal policy document from 2011 'Innovation Canada: A Call for Action' states the need for increased collaboration with the provinces: 'We heard that whole-of-government coordination must be improved and that there should be greater cooperation with provincial programs, which often share similar objectives and users' (p. E-2). Similarly, Ontario's innovation strategy (2013) emphasizes the need to work together with the federal government. The document states that 'Ontario welcomes opportunities to partner with the federal government and other provinces on projects that reflect and build on Ontario's research strengths and investment priorities' (p. 25). Borrás (2008) states that administrative coordination of innovation policy assumes that there are (1) the existence of explicit and co-operative mechanisms established for vertical and horizontal coordination and (2) evidence of clear patterns of actor interactions to reduce redundancies and create synergies between government actions. Although there is increased awareness of the need for enhanced collaboration, there are no clear mechanisms or indicators in place to secure the effectiveness of policy coordination in the Canadian innovation system.

Human capacity, time, and resources available for policy coordination activities set limits to the process. As government experts are usually very busy, they have to juggle various priorities with conflicting timelines. The efficiency of operations was a crucial factor to the administrators working in the federal government. Coordination activities are used when the process is expected to bring tangible outcomes and often involve input from a minimum amount of stakeholders. There is always competition between the efficiency and ability to be open and inclusive. The following quote by the federal expert is illustrative: 'Coordination is not an end in itself. We're doing it when it makes sense to do it,[...]and we're picking the partners we do it with'.

There were examples where the college sector involved primarily in applied research projects was excluded from the governmental policy conversations. A Vice-President of an Ontario college noted the following: 'They [the federal government] don't really treat us as a first-class citizen in the research and innovation sector, and I accept that'. Such selectivity might often lead to situations where knowledge producers are forced to shape their activities according to policies as supposed to being able to shape the policies according to the needs of their activities.

Physical proximity was mentioned as a factor that enhances chances for policy coordination. A provincial government representative comments: 'I've noticed that it's much more difficult to coordinate oftentimes with our provincial colleagues in other provinces than it is to coordinate, you know, with other ministries here'. In addition, administrative capacity within governments is highly dependent on the bureaucracy of the organization. An officer from the federal government reflects 'The bureaucratic process can slow things down. You have to figure it out, who's doing what and

sharing our functions, responsibilities and then work would be sometimes challenging'. The willingness to gain attention and to seek everyone's cooperation is very time intensive. It is highly dependent on the specific priorities and particular mandates of the ministries across the government, so that they are willing to dedicate time to the particular issue.

There seems to be a need and openness to engage in coordination activities, yet there is a lack of knowledge on how to coordinate the system effectively. As policy coordination is largely a social process focusing on stakeholder relationships, it does not always bring immediate benefits. Therefore, it is hard for government officials to justify the time, effort, and resources spent on coordination activities. As a result, activities emerge when there is a pressing need and often result in processes that exclude many relevant stakeholders.

5.3. Factors related to stakeholder groups

Different stakeholder expectations for policy coordination was a theme that characterizes how interviewees understand the process. Outcomes and the purpose of the process were viewed differently depending upon the stakeholder group. Most interviewees from the provincial government define policy coordination as a system level process, where the objective is to achieve agreement and coherence across policies. That means getting different stakeholders to agree on a common agenda, so that reconciliation is achieved. This process-based approach emphasizes the power of negotiation as government administrators are working to moving the process forward to formulate a commonly acceptable policy position.

The government interviewees also expressed the need to reach an alignment within a political mandate, agreeing on a vision and making sure that there are common interests among all parties involved. The following example illustrates the point:

> So more policy coordination would, in my view, help people better understand other's perspectives but also allow for a way to better accommodate those differences rather than trying to work around them. (provincial government officer)

Three interviewees from both the federal and provincial levels of government described the process of policy coordination from an outcome perspective. They felt that policy coordination should lead to efficient outcomes in program delivery. One interviewee specifically described the importance of communicating the timing of various government programs, so that the program implementers will not miss out on all of the opportunities offered to them by the government.

Yet some stakeholders from industry, the provincial government as well as the university sector associate policy coordination with discussing finances. University representatives see policy coordination as a process of negotiating financial resources for their institutions. As the provincial government is sometimes required to provide matching funding to large innovation grants, it is crucial to them to review specific conditions of the funding decisions with the federal government. For them policy coordination means reaching an acceptable agreement regarding the program budgets. Industry representatives noted that having tangible benefits for all stakeholder groups is a key to policy coordination. An initiative has been established from the industry sector for increased stakeholder collaboration. An interviewee described a large-scale consortium that they were able to establish involving governments, academia, and industry: 'We are trying to benefit all members of the consortium; we are trying to benefit the country through the government funding.

And so I think that's the real key, I know that governments are starting to look for that'.

Only one interviewee from the provincial government described policy coordination as a horizontal systematic collaboration between partners with different levels of authority and power:

> To me it's about working horizontally and collaborating for a better outcome./.../ It means working with others. So we work with other provinces on policies to support the premiers when they meet, for example, annually. And we work very closely with other ministries. It's all about working horizontally. It sort of smoothens the path for the policy to kind of make its way through the government.

It seems that the processes of coordination are associated primarily with a specific task that must be resolved. It is less likely to be understood as a systematic and ongoing process among diverse partners to establish stronger working relationships that might benefit in developing a broader system-level perspective to innovation and research.

Political ideologies served as a key obstacle for creating working relationships based on mutual trust. During the time of the interviews, the province of Ontario had a Liberal government, while the Canadian federal government was conservative. An interviewee points to the conflicting worldviews becoming a challenge in policy coordination: 'I think the number one thing that hinders [policy coordination], it is ideologies, just because you're liberal or conservative or whatever'.

An interviewee working on inter-governmental relations at the provincial government described a situation where there was a clear refusal to communicate from the part of the federal government:

> We're actually in the midst of sort of what we're calling a federal engagement campaign. So the fact is that the Premier wrote to the Prime Minister and she didn't get a response back for like eight or nine weeks. That prompted a number of reactions from our Premier's office where they said, you know, this is unacceptable. The response that we got from the Prime Minister didn't agree to a meeting.

An industry representative confirmed the point about policy coordination being primarily hindered by individual political gain. Large-scale collaboration efforts across different levels of government leave little opportunity for claiming recognition for individual contributions. So, the politicians prefer opportunities where they can individually be recognized for distributing small amounts of funds locally as opposed to supporting larger research efforts across provinces. He notes: 'The cynic in me would say they [politicians] do it that way because they can get more photo ops locally. They can make more impact, get more votes locally. They need to be more strategic, more surgical'.

A provincial government representative was concerned about the fact that policy decisions are made at the highest level and the provincial government is left to quickly react to those decisions, which leads to fragmentation of policy approaches. He comments: 'Sharing of information is not done in a proactive way. It's reactive. Like we would hear the announcement coming from a federal government about what it wants to do'. After the federal elections of 2016, the political situation has changed with Canada having now a Liberal government both at the federal and in Ontario. That seems to point toward more engaged relationships in the future.

As noted by Lundvall (2009), policy coordination is a social process and largely about relationship building. This point was confirmed by the interviewees as well. A federal government representative asserted that 'It is all about personalities and people. Everyone at every level of the organization has the capacity to bestow or withhold their complete cooperation'. Another interviewee from the federal government characterized the process as follows: 'political stars have to align' in order to get everyone working with the same interests and energy levels.

As coordination involves people and their individual personalities, their motivation and willingness to cooperate determines the result. The position of the policy experts designates the relevance and priority given to the process. The operational processes are greatly enhanced by having high power individuals involved. This serves as a signal to others that the issues are important and need immediate attention despite the busy schedules of the administrators. A federal level officer noted that 'If you get a minister involved, you usually don't have a lot of problem getting people's cooperation'. A few individuals from the university and government sector noted the importance of being able to set political ideologies aside for the common goal. This finding overlaps with Weingarten's (2013) argument that policies are based on evidence as much as they are based on ideologies, stereotypes, and institutions. Developing relationships takes time in order to build trust between the partners. Building trust and having open communication was frequently mentioned by all stakeholders as a key factor that shapes policy coordination. A university Vice-President notes:

> A lot of them are long-standing relationships, in terms of research, that have started out small and are built through time as the parties have come to trust each other. Communication tends to be the biggest issue.

A broader issue in policy coordination, raised by an interviewee with over 20 years of administrative experience from a research-funding agency, has to do with the overall profile of research policy nationally. While the government officials are increasingly articulating the importance of building knowledge economies, the actual political visibility of research policy is absent. This is not an area that is used in political campaigns to attract voter attention. There is very little talk about the importance of research and knowledge mobilization in political debates. The interviewee notes:

> The first gap to me is that there's very little visibility for science policy, of a research policy among elected officials in legislatures across the country, whether it's provincially or federally. There's very little talk about science, and there's very little capacity within parliaments or legislatures to understand science.

The findings demonstrate that there are several operational factors that influence the capacity for policy coordination. The lack of knowledge on how to handle the increasingly complex stakeholder pool refers to the need for clarifying coordination procedures at the federal level. Without a clear mechanism, other factors such as political authority, organizational culture, issues of trust, and a lack of broader political visibility of research policy tend to shape the outcomes of the process.

5.4. To centralize or not to centralize?

According to the conceptual insights, the two distinct models of policy coordination are the 'Super-Ministry' and the 'Detached-Ministry' approach. In the case of the 'Super-Ministry' model there

is a strong central vision with key organizational units gathered under one large Ministry. An example of this approach would be Denmark's Ministry of Science, Innovation and Higher Education (Koch 2008). In the 'Detached-Ministry' model, practiced in federal countries such as Germany, each government unit operates on its own taking into consideration the local contexts. The decentralized model practiced in Canada has received considerable criticism regarding limited collaboration and fragmentation of visions (Mitchell and Ledwell 2011; Creutzberg 2011; Sharaput 2012). Doern and Stoney (2009) observe that in the last 20 years, Canadian federal S&T policy has undergone a period of designed neglect. Informed by the idea that innovation occurs in multi-directional and interactive networked ways, the federal government has intentionally reduced its political control by increased funding through research councils and limited federal influence on regional cluster development (Doern and Kinder 2007; Doern 2007). As a result, many interviewees expressed the need for a stronger national level vision.

According to the findings, only six interviewees across the groups were firm believers in the benefits of the decentralized approach. One federal government representative views decentralization as a useful tool that allows incorporating diverse views into policy making:

> I tend to favour decentralized approaches. I find that decentralized processes allow enough bottom-up sort of thinking. I think it tends to have more buy-in, broadly speaking, than anything else.

This view aligns with the argument that a strong centralized political influence might decrease autonomy of stakeholders and lead to loss of competence and potential for *ad hoc* innovations (Edler and Kuhlmann 2008). Furthermore, concentration of governmental activities could exclude many actors and contexts that are important in the broader innovation policy domain (Koch 2008; Bauer, Lang and Schneider 2012). Several interviewees made the point about Canada being a very large country with diverse regional economies and a clear need for context-specific policies. It was feared that centralized policy approaches, that is policies designed, implemented, and monitored by the federal or national governments, might lead to a growing gap between economically powerful and weaker parts of the country (Kuhlmann 2001). One interviewee from the federal government noted that innovation requires freedom of creativity. According to him 'an overly centralized approach would stifle innovation'. Some took decentralization in Canada as a fact that cannot be changed or questioned. They referred to the Constitution Act as a firm foundation for decentralization where any other approach would be in conflict with the law.

In the literature, not only centralized but also coordinated innovation policy is seen to work toward a comprehensive national vision with specific goals and clear priorities (Edler and Kuhlmann 2008; Pelkonen et al 2008). Authors argue that a coordinated central vision supports coherence across policy sectors (Koch 2008; Weber and Rohracher 2012), secures significant investments toward nationally important priority areas (Doern and Stoney, 2009), and facilitates effectiveness by overcoming fragmentations across diverse programs pursuing similar objectives and targeting the same population (Chaminade and Padilla Perez, 2014). Nine interviewees across all sectors, except for the federal government, were hoping to see stronger central leadership regarding research and innovation policy. The interviewees were critical of the scattered and fragmented approaches at the national level where each province has its own research priorities. The clear need for a stronger vision for Canada as

a country was explicitly emphasized by six interviewees. Here is an example by the industry representative:

> I say yes [to centralized approach], I think there are some things that we absolutely have to have a national level focus on in order to be world-class./.../ I would say central focus, not necessarily concentrating it all in one spot, but some form of centralized policy. Centralized funding and saying that we are going to focus on that. And we're not.

One potential reason for the federal government to support decentralized policy approaches has to do with the highly promoted idea since 1980s that innovation emerges unexpectedly, in non-linear ways, driven by competitiveness and market rules with government steering from a distance (Doern 2007; Doern and Kinder 2007). Also, the establishment of various federal advisory and funding bodies has helped in maintaining stronger relationships with industry and university stakeholders as direct producers of knowledge, yet the need to address the federal–provincial divide has stayed in the background. Stakeholders question the leadership skills for the federal government to enhance collaboration:

> Now, this assumes that you've got good leadership in a centralized policy coordination and I wouldn't know if this federal government could do that. I would trust that the provincial government in Ontario a little bit more. I feel like they might be better at it, maybe just because of the scope and scale.

It was strongly emphasized that the federal government should be the one taking a clear leadership role in the process of policy coordination. As the federal government has a constitutional responsibility and accountability to facilitate Canada's economic and social well-being, the respondents felt that it was time for the federal government to show leadership in overcoming the provincial-federal divide. Close collaboration with the provinces was believed to be the key in succeeding in this process. A provincial government interviewee suggests:

> There needs to be a strong federal-provincial-territorial table, I mean as part of maybe the Council of Federation that works with the Federal Government. Innovation needs to be coordinated at that level.

Another interviewee reflected on her previous negative experience working on the issues related to security policy where the federal government took a strong leading role and pushed through a policy agenda without any conversation with the other stakeholders. As a result, the policy turned out to be a failure, also resulting in several lawsuits. She comments:

> I don't think that's the way to sort of put forward a national idea. You need to try and have a conversation. You need to sort of get buy in. You need to get ideas around what this thing should look like. You need people to understand what your objectives are.

The largest number of respondents, a total of twelve, were unsure about which model would benefit Canada best. Several respondents noted that the system that balances centralized and decentralized approaches would be ideal. A federal government officer states:

> It's a balance between those two. But a little bit of concerted effort on the funding and collaboration side is helpful, but I wouldn't do it at the expense of allowing for more organic innovative approaches that come forward.

Several administrators questioned the presented dichotomy of a centralized–decentralized coordination model. For example, three

university representatives mentioned the need to consider the desired outcomes first and then decide on the specific approaches. Depending on the benefits at the institutional, regional, national, or increasingly international level, one needs to balance between a more centralized and decentralized model. A provincial government administrator similarly noted that the coordination should take account of the specific needs as the problems and policy issues are very sector and issue specific. She noted that instead of looking at the continuum of two opposite models, it would be more accurate to set a list of basic principles that policy coordination needs to include:

> I think a couple of the things that I have noticed are patterns, regardless with whom you are working with, is that you need to be transparent, you need to be clear, you need to have an understanding of what your objectives are and I mean you can have a willingness to listen to what other people's objectives are.

With her many years of policy experience, those principles have helped her in order to move processes forward in a productive way. The fact that meaningful conversations with stakeholder groups have been conducted and implications of specific policy approaches to each group have been carefully considered can help to achieve a consensus at the broader level.

Centralization does not equal coordination. Overall, the findings demonstrate that most interviewees, twelve, advocated for a balance between the centralized and decentralized approaches emphasizing the need for building a government dialogue for policy coordination. Nine interviewees from the provincial government, academia, and industry sector advocated for a stronger centralized vision for policy coordination compared to six that favored the decentralized approach. Interviewees from the federal government refrained from articulating the need for a stronger national level approach, potentially for supporting the non-linear view of innovation. A few felt that balancing the two approaches would work well for Canada. Instead of choosing one over the other, it is rather about formulating the core principles that would help to secure the ownership of policy decisions.

6. Conclusions and Discussion

The study demonstrates that policy coordination in Canadian federal–provincial relations is an area that needs synchronized action and a strategic approach. Although coordination and communication within federal and provincial governments is functioning on a regular basis, coordination vertically between the federal and provincial governments is limited. The results contribute to the previous findings that point to the constitutional divide of powers between the two levels of government (Fisher and Rubenson 2010; Creutzberg 2011). The factors that contribute to limited policy coordination include the decentralized nature of the federal system, limited capacity, and knowledge to administer complex system of innovation policy and diversity in stakeholder expectations. Interviewees from different stakeholder groups understand the process of policy coordination differently. For example, provincial government representatives tend to view the process as negotiating interests to obtain coherence in policy approaches. Federal government representatives are looking to achieve effectiveness in policy outcomes. Some members from the provincial governments (but also from academia) understand the policy coordination not only as a means for negotiating financial resources but also as an opportunity to articulate concerns and being part of the decision-making process.

The case of Canada supports Lundvall's (2009) view of policy coordination whereby it is a social process of communication, learning, and networking. The two coordination models 'super-ministry' approach (Braun 2008) and 'de-centralized ministry' approach (Ansell and Gash 2008) provided a useful dichotomy to analyze data; however, the results indicate that instead of choosing one distinct model over the other, a learning-centered approach is necessary in the federal systems. Learning-centered approach does not require any major system level restructuring but allows for gradual change instead. The approach features inclusive policy making involving non-state actors, voluntary participation, and aims for consensus. As a result, a clear and continuous mechanism that is based on mutual learning practices is needed for Canada. Without a clear administrative mechanism, other factors such as individual interest or authority, organizational culture, or trust issues tend to dominate and contribute to fragmented and competing approaches to policy coordination. An explicit forum that brings together middle level policy makers across different policy sectors and government levels is needed for Canada. The goal of that forum is to provide a way for reducing programmatic redundancies and enhance complementarity across government initiatives.

As policy coordination is a process involving cognitive learning and adaptation of policy views, the literature has been scarce in suggesting indictors for measuring policy coordination. One way to measure coordination is through patterns of actor interactions, redundancies reduced, and reflective analysis conducted of the previous policies to enhance learning capacity (Borrás 2008). Yet more research is needed in order to create a comprehensive system of policy coordination that can be adopted by policy makers. One example of an initiative to bring together government representatives, academia, and industry leaders is provided through the Canadian Science Policy Conference—a forum dedicated to build the bridge between policy experts, academia, and industry representatives.

In the federal systems where altering constitutional interjurisdictional responsibilities is not realistic, the openness of interviewees toward learning-center perspectives to achieve policy coordination was apparent. That aligns with the policy literature whereby everyday policy making is a long-term process of learning and strategizing (Nilsson et al. 2008). Learning-centered approaches to policy making help to avoid power hierarchies, resistance to participate, and can lead to ownership of decisions (Sabatier 1986, Zito and Schout 2011, Sharaput 2012). An international example of mutual learning initiatives for policy coordination is the Open Method of Coordination facilitated by the European Commission. The initiative uses benchmarking, action plans, and exchange of best practices that has led to the identification of common challenges and useful policy approaches at the EU level (Van Vught 2010, Zeitlin 2010). That approach could provide a useful reference point for Canada.

Stronger central vision does not always mean better coordination. As suggested by Heclo (1978), it is increasingly the policy networks that drive actors in innovation systems to collaborate and shape policy outcomes. This study confirmed that policy network literature is useful in mapping out the links and examining relationships between the actors (Padure and Jones 2009). Yet this study showed that in an actual practice, it is increasingly the government that determines the members of such network. As demonstrates the Canadian case, stakeholder relationships in research policy are currently maintained in a need-based and top–down format, where the federal government makes decisions regarding who gets to be included in the national level discussions. Such selectivity in a decentralized governance system does not contribute to productive and

collaborative communication or trust and might exclude some groups (e.g. college or industry sector) enhancing the lobbying power of area-specific organizations. As Canada stands out with a low share of total R&D done by the business sector (only 52% compared with OECD average of 68%) (Fallis 2013), it is imperative that the college sector with its direct partnerships with industry is included in the broader national innovation discussions. Increased awareness of policy coordination issues among government administrators could be achieved by creating focused inter-jurisdictional roundtables on sharing knowledge and debating current issues. Inclusive participation could be achieved by creating incentives of interests—opportunities to learn from best (or failed) practices, develop one's professional network, and become visible actor with opportunity to impact national innovation vision.

Overall, there is agreement about the need to introduce more collaborative policy coordination mechanisms with a stronger leadership capacity by the federal government. Horizontal innovation policies mean that policy initiatives and instruments deriving from various domains (in practice from ministries) are coherent, strengthen each other, and address wider societal issues (den Hertog and de Groot 2005). While the interest is present, the approach itself is currently not practiced in Canadian innovation policy. Metcalfe (1996) differentiates between two levels of policy coordination. The first level is visible when organizations recognize other organizations involved. This stage is clearly achieved in Canadian innovation policy. Actors have been mapped out; there is an awareness of the increased need for coordination. The second stage where organizations exchange information with other stakeholders is currently not visible in federal–provincial relations. The results demonstrate that while a clearer national level vision is expected, there are doubts about the federal government having the capacity or knowledge to drive this process forward. Hopefully, the situation is changing as the new Liberal government was elected to power in 2016. There are already visible signs of improvement occurring, as the new federal government has formed an Advisory Panel for fundamental science review and formation of an innovation action plan with interactive website and roundtable discussions collecting stakeholder contributions. Future research on Canadian policy coordination could focus specifically on examining the second stage of policy coordination, thus gathering insights on the horizontal coordination and progress made in establishing a mechanism for engaging diverse actors in innovation-related policy discussions.

This study revealed several factors that might help to foster the process. Political commitment for the process has to be secured. With two Ministers currently in place with mandate on innovation (Minister of Science and Minister of Innovation, Science and Economic Development), they have the potential to increase the visibility and voice for Canada to become 'a global center for innovation' (Government of Canada 2016). Higher-level visibility at the federal government (e.g. senior level cabinet minister) might help to draw increased political attention to the issues of collaboration to support partnerships in research and innovation across provinces and territories. Considering ways to secure participation activity is also important. This could be done by mutually agreeing on relevant topics, clearly stating the benefits of the process and making arrangements to reduce the regular work responsibilities of the participants, thus making time for policy coordination. There is also a need for increased involvement and a voice from the industry sector. Industry is often left with an observer position in the science policy realm. As their interest is in quick commercialization of knowledge, they tend to stay away from the national policy conversation unless the topic directly influences their business. The initiative needs to come from a federal government to set up a Coordinating Committee for Research and Innovation. The mandate of the proposed committee is to secure a firm, integrative, and bottom-up learning environment, so that the diverse stakeholders have the opportunity to articulate their interests leading to a mutual ownership and buy-in for the policy decisions regarding research and innovation. With the recent political change in the federal government, the time for paying increased attention to the state of intergovernmental policy coordination is ripe.

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