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## **Abstract**

This Working Paper provides an in-depth analysis of public-private collaboration (PPC) in Chilean productive development policies (PDPs) through five case studies under two specific policies: the Technology Consortia Program and the National Cluster Policy. The analysis is based on a set of more than 30 semi-structured, in-depth interviews, and is complemented by official written information on the workings of each of the instruments and particular cases. The most significant conclusion that emerges is the importance of having institutions that allow the government to learn from the implementation of new policies in order to improve them over time.

**JEL Codes:** O43, D71, D78, L52

**Keywords:** Public-private collaboration, Productive development, Chile

## **1. Introduction**

This document provides an in-depth analysis of public-private collaboration (PPC) in Chilean productive development policies (PDPs) through five case studies under two specific policies: the Technology Consortia Program and the National Cluster Policy. The analysis is based on a set of more than 30 semi-structured, in-depth interviews (with more than 50 hours of recorded conversations), and complemented by official written information on the workings of each of the instruments and particular cases.

In the introduction, the current mapping of PPC in the Chilean PDP web is analyzed through a historical narrative that shows how PPCs co-evolved with innovative institutions, policies, and instruments. Section 2 looks at the Cluster policy and provides an in-depth analysis of the Special Interest Tourism Cluster, the Global Services Cluster, and the Aquaculture Cluster. Section 3 presents an analysis of the Technology Consortia Program and describes the cases of the CTI-Salud consortium and the fruit consortia. Given the significant differences in the nature of the PPC in each policy, we provide lessons at the end of each section. Section 4 concludes and sets forth a number of lessons that emerge from the case analysis.

### ***1.1 Overview of the Policies and Institutions for PDP and the Evolution of PPC***

Currently, the degree of public-private collaboration in productive development policies in Chile is quite low. The reason for this is that the government plays only a subsidiary, arms-length role in most such policies. It is important to highlight this characteristic in order to understand the PDPs analyzed later in this study. This prevailing logic is the outcome of a policy pendulum that has swung from a heavily interventionist state in the period 1940–1973, to an extremely orthodox paradigm that prevailed in 1973–1990,<sup>1</sup> which was inherited and only mildly modified by democratic governments since then. The period 1990–2010 saw a gradual shift toward more intense PDPs, which has been curtailed since a new right-wing government took office.

The current institutions and instruments of PDPs are thus a product of the work of democratic governments, which in 1990 inherited some underfunded and severely weakened

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<sup>1</sup> During the Pinochet government, most PDPs became horizontal. There were, however, important exceptions, such as the creation of Fundación Chile in 1976, which played a key role as a technological antenna and transfer institution. There were also some vertical policies during this period, such as the explicit support to the wood and pulp industry.

institutions for PDPs. Moreover, their connection to the private sector was minimal, given the relatively widespread fear of a return to an interventionist state model. This is a reflection of the private sector's distrust of the public sector and the arms-length role played by the government. It also stems from a view that the private sector's main goal is to obtain or expand rents. This mutual distrust has led to the lack of a culture of PPC in the country. This way of thinking about policymaking was slow to change, partly due to the fear of the effects of direct intervention and vertical policies from a substantial segment of the new governing coalition. At the end of the 2000s, still an important part of the center-left government—not to mention the right-wing opposition and most of the private sector—remained skeptical of the idea of vertical policies (Alvarez interview).

Given the above-described political constraints and views, democratic governments designed PDPs initially as horizontal instruments to foster productive technological innovation. FONTEC (Fondo Nacional de Desarrollo Tecnológico y Productivo) and FONDEF (Fondo de Fomento al Desarrollo Científico y Tecnológico) created co-financing instruments at the beginning of the 1990s, with the support of the IDB.<sup>2</sup> The relationship with the private sector under these instruments was almost exclusively organized around calls for proposals, evaluation, and allocation of subsidies to co-finance projects. Initially, the government did not even seek projects, implementing instead a fully demand-driven subsidy scheme, where demand had to emerge spontaneously (Alvarez interview). In order to align incentives with the private sector, these subsidy instruments were designed as matching grants, where firms had to contribute their own resources to the projects for which they were receiving funding from the government.

Other PPCs include the committees and councils of Chile's Corporación de Fomento de la Producción (CORFO). CORFO has created councils for each of the instruments it launches, and one for the overall institution. The councils are in charge of approving or rejecting instruments, approving or rejecting policy changes, and the overall strategic goals of CORFO. The private sector is always represented in these councils, which lend validity to what CORFO

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<sup>2</sup> FONTEC and FONDEF were created in 1991. The goal of FONTEC (ran by CORFO) was to promote and co-finance the execution of technology innovation projects, associative technology transfers, carried out by goods that produce goods and services. FONDEF (run by CONICYT) was aimed at universities and research institutes as beneficiaries that co-invest with the private sector in projects that have high socioeconomic impact and have the purpose of creating technology firms (Benavente, Crespi, and Mafioli, 2007; Bravo, 2012; and CONICYT webpage).

does and assures CORFO that it is not diverging from the needs of the private sector. It has been also important to build some mutual trust between the public and private sectors. The fact that the composition has been diverse and dominated by public sector representatives has made it difficult for the councils to be captured by the private sector.<sup>3</sup>

Another noteworthy PPC in Chile is CORFO's Investment Attraction policy. This policy is important because it was the first time that a vertical PDP was implemented after 1990. CORFO was allowed to shift its policy action from supporting existing firms to seeking and attracting investment from new firms not present in the country. Using this new policy tool, CORFO launched the High-Tech Investment Attraction Program in the first half of the 2000s, aimed at the offshoring and IT services sector.<sup>4</sup> The program and the public-private relationship consisted mainly of CORFO contacting foreign firms, inviting them to invest in Chile, and offering incentives to do so, including solving some coordination issues with related industries.

Public-private collaboration was again expanded when CORFO began promoting productive clusters at a regional level: the Integrated Territorial Programs (Programas Territoriales Integrados, or PTI). The program organized several mini-clusters through multi-annual support programs to enhance productivity and competitiveness.<sup>5</sup> A council was formed to manage the cluster and the requirements, which had significant private participation.

Moving to a macro setting, between 2003 and 2006, innovation as a policy topic, and innovation strategy in particular, was recognized and fostered. A royalty law in the mining sector was passed, where all of the receipts were to be used in innovation programs under an Innovation for Competitiveness Fund (Fondo de Innovación para la Competitividad, or FIC). Approval of the FIC was concurrent with the launching of a National Council for Innovation and Competitiveness (Consejo Nacional de Innovación para la Competitividad, or CNIC). CNIC was the most important institutional innovation in 30 years. It is an independent advisory body to the president. Its goal was to develop a long-term innovation strategy for Chile, propose how to

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<sup>3</sup> The selection of private sector members is done by CORFO and is generally not political. Also, the large amount of work these councils require (they meet every two weeks) is another test for these people beyond rent-seeking interest.

<sup>4</sup> The policy goal was to take advantage of the expansion of new information and communication technologies where the country had some location, infrastructure, and human capital advantages within the region, and develop a fast-growth new exporting sector. See Castillo (2008) for details.

<sup>5</sup> CORFO sought productive opportunities in different regions of the country (the selection of sectors included analysis by independent international consultants). Usually, these sectors were concentrated in certain geographic areas.

spend the funds coming from the mining royalty, and issue guidelines on how to spend all the public money devoted to science and technology, consistent with the strategy. With less power than initially proposed, it transformed innovation policy during the second half of the 2000s. It has given an order and macro guidelines to the different agencies, becoming the source of new ideas for policies, and being the place where agencies and ideas interact from a strategic perspective.

Since its inception, CNIC has had private sector representatives from the Confederation of Production and Commerce (Confederación para la Producción y el Comercio, or CPC), Chile's most powerful business association. Later, individual innovators and entrepreneurs joined CNIC. They have played an active role in approving policies rather than in actually designing them, something the authorities have been careful to separate from private influence, even though they could have participated in the design process as members of CNIC.<sup>6</sup>

CNIC officially emphasized the importance of selectivity and launched the National Cluster Policy. It also participated actively in the regional cluster program. Together with CNIC, an Inter-ministerial Committee on Innovation was created, which was supposed to have a decision making role in innovation policy and coordinating agencies. A map of the Chilean National Innovation System (NIS) can be seen in Figure 1.

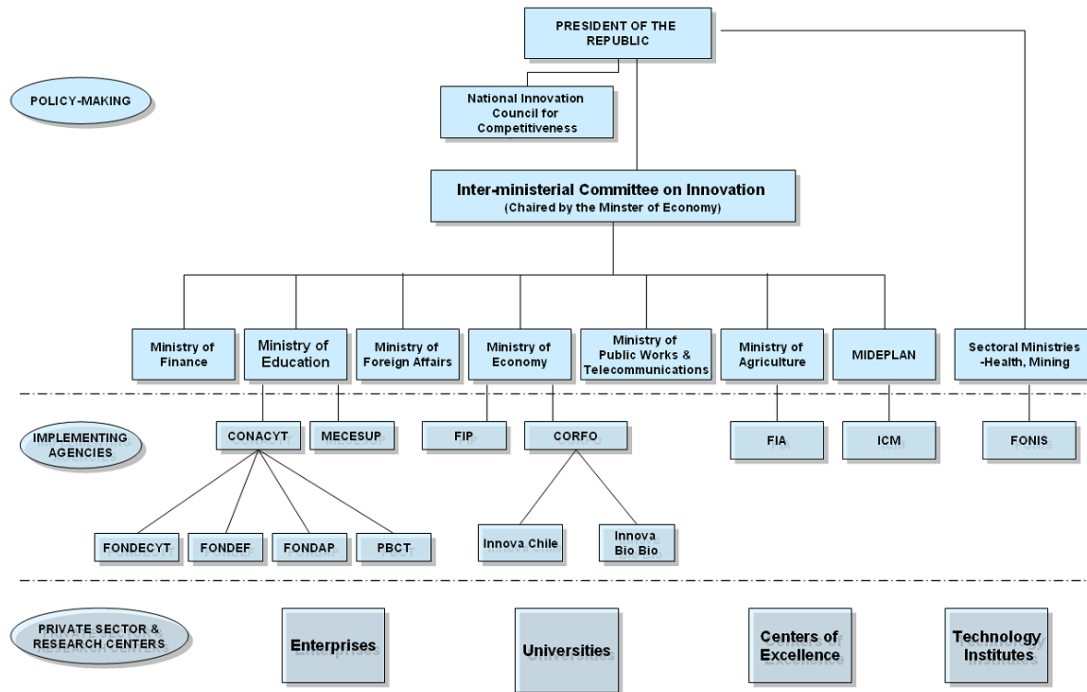
In addition, during the Bachelet administration (2006-2010), regional public-private collaboration roundtables were created to enhance sectoral competitiveness, channeling part of the resources collected from the royalty. These were the Regional Productive Development Agencies (Agencias Regionales de Desarrollo Productivo, or ARDP), organized by CORFO. They are important for this analysis because there was intense PPC and because these clusters, their institutional workings, and the workings of its PPCs shed light on what happened later in the National Clusters. It also shows that there were several coinciding (as well as conflicting) policies that had similar goals in a very short period of time.

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<sup>6</sup>An exception to this passive role was the president of the CPC, who actively participated in the design of policies to enhance human capital, particularly technical education (Benavente interview).



**Figure 1: A Map of the Chilean NIS**



Source: Bravo (forthcoming).

Additionally, during this active period, international institutions granted three loans to enhance firm innovation and its connection to science and basic research and to enhance the quality of applied university research. The World Bank granted a loan to the Milenio Scientific Initiative (located within MIDEPLAN<sup>7</sup>); the IDB granted a loan to CORFO for the Chileinnova Program; and the World Bank granted a loan to CONICYT for the Bicentennial Science and Technology Program (Programa Bicentenario de Ciencia y Tecnología, or PBCT). This latter program created the Consortia Program, analyzed in detail below, in which PPC will be examined in two specific cases: CTI-Salud and the Fruit Consortia.

<sup>7</sup> MIDEPLAN is the acronym for the Ministry for National Planning, in charge of part of social policy and social evaluation of projects within the public sector.

## 2. National Cluster Policy<sup>8</sup>

### 2.1 Description of the Policy

The National Cluster Policy is a vertical policy whose goal was to promote the growth and competitiveness of high-potential sectors by solving coordination bottlenecks and specific market failures. This was to be done through the coordinated action of the public sector—using their full PDP portfolio—with the private sector. The actions of the public sector could include new policies and instruments. Removing bottlenecks would unleash increases in efficiency, productivity, and competitiveness. The policy would be implemented through an agenda emanating from public-private collaboration roundtables, which were the essential policy-making mechanism. At these roundtables, intense and productive PPC was supposed to occur.

Despite the name of the policy, its goal was not necessarily to work with, enhance, or create clusters *a la* Porter. Actually most of the clusters identified did not meet Porter's definition. A “cluster” was simply an economic sector defined more or less arbitrarily.

Sectors were selected based on the recommendations of an independent expert: The Boston Consulting Group (BCG). Commissioned by the CNIC, BCG analyzed eight sectors, identifying gaps and unmet needs in order to develop their potential. The studies were then presented and discussed by the CNIC, and five clusters were selected for funding and support. Two of them were in new or emerging sectors: global services and special interest tourism. Three were in industries with comparative advantages: mining, agriculture/food industry and aquaculture.

The policy emerged from the CNIC, which approved directives based on the idea and the importance of selectivity within an innovation strategy.<sup>9</sup> CNIC did not participate in the actual execution of the policy, however. It was delivered to the government for implementation without a single guideline. The CNIC thus had indirect responsibility for the outcome of the policy due to lack of leadership, involvement, follow-up, and evaluation.

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<sup>8</sup> Based on interviews of José Miguel Benavente, Carlos Alvarez, Hugo Lavados, Alejandro Ferreiro, Claudia Marró, Conrad Von Igel, and Cristobal Undurraga, plus several documents, mostly from CNIC.

<sup>9</sup> The cluster policy was officially incorporated into the Innovation Strategy in the second volume of the White Book of Innovation (CNIC, 2008). However, the idea of selectivity and vertical policies was initially resisted given the fear that they could likely be captured by the sectors that stood to benefit.

Moreover, the period when this policy was enacted was one of active policy design and where significant funding was provided for innovation, thanks primarily to the FIC. However, the FIC generated the need to spend additional resources which, in hindsight, was not done in the most efficient way, since there was also considerable overlap in the new policies being enacted. In particular, national and regional clusters were created in a very short period of time and with a sense of urgency, with little planning, methodology, oversight, or evaluation. The CNIC and the Inter-ministerial Committee did not fulfill their policy oversight role.

Politically, the Ministry of Trade and Industry became responsible for implementing the cluster policy as head of the Inter-ministerial Committee for Innovation (Figure 1). However, after a short period of time and due to a mix of political realism and lobbying, leadership of each cluster was assigned to a different ministry. CORFO took over Global Services. The Ministry of Agriculture took charge of the food cluster. Aquaculture and Special Interest Tourism remained under the Ministry of Industry and Trade, and Mining went to the Ministry of Mining. The corresponding minister (or the head of CORFO) became the head of each individual cluster. The head then appointed a (remunerated) executive secretary, which organized the roundtables and led the whole process. CORFO coordinated the policy and allocated the resources. It also created a specific department to provide methodological, financial, and operational support to each Cluster roundtable. CORFO was the only government agency that had the institutional flexibility to organize public autonomous roundtables with budget and executive capacity in short periods of time.

The policy was inaugurated at the end of 2007. The initial work involved the selection of roundtable members, the selection of an executive secretary, and the elaboration of initial preliminary agendas. After this was done, each cluster was officially launched. The launch dates ranged from November 2007 (Global Services) to November 2008 (Aquaculture). The original plan for the first stage was that during the first quarter of 2008, the roundtables would validate the agendas. During 2008 and 2009 the executive secretaries would implement the strategic agendas, developing short-, medium-, and long-term goals, creating a portfolio of projects, and leveraging political and financial resources from public sector agencies and the private sector.

Initially, very little money was allocated to clusters. The resources devoted to them depended on their demands and necessities. The resources initially provided were for management and for “club goods”: studies, seminars, (as they were for regional clusters).

Nevertheless, the public sector in some cases ended up allocating significant sums of money through instruments.

The policy did not have much time to produce results. The governing coalition lost the December 2009 elections, and the new right-wing coalition discontinued the policy in the sense that large-scale public-private roundtables ceased to meet.<sup>10</sup> Thus, most of the policy outcomes that usually take significantly more than one or two years to materialize, particularly in areas related to innovation and coordination, will not be realized or measured.

## ***2.2 Special Interest Tourism Cluster<sup>11</sup>***

The tourism case can be considered a quasi-at-large PDP, since its level of development and competitiveness is low, but the sector exists. This sector would not be considered a cluster according to Porter's definition. There are, however, some linkages, albeit weak ones, among the different industries, such as lodging, restaurants, transportation, and national and international travel agencies. It does have some geographic proximity but it is undeveloped, and one does not observe the agglomeration economies, coordination loops, and positive externalities present in the more developed clusters. Moreover, each geographic area has a different type of tourism. Each region has its own characteristics, level of development, and needs.

Notwithstanding, BCG positioned the special interest tourism sector as one with high potential and with an important role for public-private coordination as a way to solve some of the problems of the sector. Indeed, most of the actions proposed required public-private coordination: promotion, local capabilities and human capital, territorial and institutional organization, and increasing sector associativity (Boston Consulting Group, 2007a).

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<sup>10</sup> Interviews with current CORFO high-level managers indicated that very recently some public-private roundtables have been reenacted (mostly demand driven) in what are called "Programas de Innovación" However, these roundtables appear to be very small and have a much narrower focus and potential impact, since none of the industry key representatives and businesspeople we interviewed mentioned them as relevant or as a continuation of what was done in the Cluster Policy.

<sup>11</sup> Based on interviews of Hugo Lavados, Alejandro Ferreiro, Pablo Retamal, Claudia Marró, Isabel Zúñiga, Javiera Morales, Pablo Szmulewicz, and Lorena Arriagada.

### 2.2.1 Context: Industry, Public Sector and General Economic Issues

In order to understand the outcomes produced by the tourism cluster roundtable, it is necessary to look at the context of previous public-private relationships in this sector. Relevant public-private collaboration in this sector dates back to 2000, when a newly appointed head of Chile's National Tourism Service (Servicio Nacional de Turismo, or SERNATUR) (the public tourism agency that administratively falls under the Ministry of Trade and Industry) held meetings with a large number of private sector representatives, out of which came a document containing a list of critical initiatives. Business associations had an important role in this interaction, and they reported that Chile "had a national tourism policy" at that time. It is in this apparently positive context that the cluster policy was launched. Thus, this new roundtable had the challenge of generating additionality. It would seem logical to take this joint work as a starting point and expand it in the roundtable.

A second contextual issue was a series of other initiatives under way or being launched that decreased the relevance, importance, and novelty of the roundtable, both from a public sector and a private sector perspective. Three deserve particular mention. First, at the time the roundtable began working, the Ministry of Trade and Industry sent a tourism bill to Congress. This draft law was designed to reform the public agencies responsible for tourism and to raise the profile of tourism within the Ministry of Trade and Industry by creating an Undersecretary of Tourism, which meant that the sector would have resources allocated to it. Second, before the agenda was launched, the *regional* cluster policies (ARDPs) were already underway. There were three sectors per region to be prioritized in each of the 15 regions of the country, and in each region tourism was one of them. Thus, the challenge was how to integrate regional interests into a national vision. Third, since 2005, the Inter-American Development Bank (IDB) was supporting SERNATUR in the design of a new policy agenda, which would culminate in 2009 with a loan that was supposed to finance this agenda.<sup>12</sup> According to a SERNATUR interviewee, even though some of the policies were actually incorporated in the cluster agenda, they were in competition with one another and with the cluster agenda itself.

A third important issue is the fact that Hugo Lavados replaced Alejandro Ferreiro (the acting Minister) in January 2008. Ferreiro was regarded by most of the interviewees as a

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<sup>12</sup> According to a public sector interviewee from SERNATUR, a central part of that agenda was developing a "nueva oferta turística." A relevant aspect of it was actually defining an agenda for special interest tourism!

technically savvy minister, who took great interest in the sector and in the cluster policy. Lavados, on the contrary, was a much more politically oriented minister, focusing his time and effort on the Ministry's congressional initiatives.<sup>13</sup> Considering he was the president of the cluster roundtable, this had an important impact. Finally, the subprime crisis hit the country during the second half of 2008, redirecting energies and resources away from these PDPs.

### *2.2.2 Setup, Launch and Composition*

The public-private cluster roundtable was set-up within in the Ministry of Trade and Industry (MINECON) and was presided over by the Minister, who chose the participants. The private sector had no role in choosing the members of the roundtable. The public-sector participants were chosen based on their connections with the tourism sector.<sup>14</sup> The cluster coordinating unit at CORFO also participated in the meetings as an observer. The private sector participant was chosen from among business association leaders and important representative entrepreneurs. An academic was also chosen to participate.

The presence of individual entrepreneurs was not understood and was criticized by business associations, who felt that they should have represented the private sector in such a body.<sup>15</sup> Adding to the criticism from associations, public sector interviewees indicated that some of those chosen to represent the private sector were not the best choices, mostly due to their lack of knowledge about how to work in public-private forums.

The cluster was to hire an executive secretary, and for that a professional manager was hired using headhunters and recommendations from the private sector. On paper, this was the most professional appointment process for choosing a director among all the clusters analyzed, since it was the only one that chosen by an outside party based on technical and sectoral expertise and without political influence.

Before the cluster began operating, there were meetings between public sector actors to prepare an initial agenda for the cluster. However, it is not clear how effective these public-

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<sup>13</sup> Besides the Tourism bill there were also bills on Aquaculture regulation, a reform of the institutions in charge of competition and anti-trust, and an SME statute that was being discussed (Lavados interview).

<sup>14</sup> The entities included were the Ministry of Trade and Industry (minister and vice minister), CORFO (director of the CORFO program for special interest tourism, CONAMA (national environmental agency), Public Works, Agriculture (but never participated), Ministry of Fiscal Assets, CONAF (agency in charge of managing public national parks), and ProChile (the export promotion agency).

<sup>15</sup> Only some of the tourism-related business associations were on the table.

public coordination efforts were, as most interviewees spoke about conflicting agendas within the public sector as one of the main explanations of this cluster's failure. The cluster was constituted in June 2008, but was not officially launched until July 2008, the month when the executive secretary was hired and began formally working in the cluster. Thus, he did not participate in setting the initial agenda. The final more or less agreed upon agenda that was developed with the private sector was aimed at identifying gaps in a number of areas relevant to the sector. Gaps were identified in human capital (insufficient knowledge and use of English), connectivity, sustainable management, international promotion, domestic development, and quality standards for services, and projects were set up in these areas. Working groups were to be set up in these areas to perform more in-depth work, with both public and private sector participation (Cluster de Turismo de Intereses Especiales, 2009a and 2009b).

### *2.2.3 Operation of the Roundtable and Public-Private Collaboration*

Three issues marked the fate of this agenda: power struggles over the agenda between the various public institutions at the table, agency problems for the executive secretary, and lack of leadership on the part of the heads of the roundtables. These issues were government-driven; consequently, private participation and interest dwindled quickly. Thus, there is not much of a story to tell about public-private collaboration. Nevertheless, relevant lessons can be learned about the necessary conditions for roundtables to function and for fruitful PPC to happen.

According to most of the public sector representatives interviewed, there were disagreements within the public sector with respect to what topics to advance with the private sector. They point to unproductive discussions being mostly held between public sector agents who were pushing particular agendas. In particular, CORFO and SERNATUR clashed over the agenda. Even within the ministry there were conflicting sectoral agendas, between the minister and the undersecretary, both of whom both participated in the roundtable. A comparison with the Aquaculture and Global Services cluster shows a clear contrast. In both of those clusters, a tentative agenda was proposed and agreed to by the public sector from the outset, and most of the private-public work was to give specific content to it. Unlike tourism, no time was wasted on defining the original criteria under which the roundtable was supposed to work.

The executive secretary was very competent in terms of analytical capacity, but not in terms of leadership, political ties, or conflict resolution. He tried to obtain support from some of the participants and to validate himself and his role, but he was not able to resolve conflicts,

forge a common public sector viewpoint, or establish productive conversations with the private sector in order to push a common powerful competitiveness agenda. According to all those interviewed, he did not do a good job as executive secretary.<sup>16</sup> In contrast, the executive secretaries of the other clusters analyzed were previously well known and validated by both the industry and the government participants.

The cluster met only three times during his term as executive secretary, between January and May 2009.<sup>17</sup> From interviews and an analysis of the minutes, a picture emerged about the problems of the work in these meetings. First, the public sector agents proposed most of the discussions. The agenda seemed to be imposed by CORFO, despite the work that had been going on previously between SERNATUR and part of the private sector. This discouraged private sector participants, such as the Chilean Association of Tour Operators (Asociación Chilena de Empresas de Turismo, or ACHET), which had previously coordinated with SERNATUR. However, the agenda discussed did involve the private sector participants.<sup>18</sup> Second, according to most interviewees, the private sector's participation was not very decisive, since there was no continuity in the attendance nor in the participants. Some of those interviewed from the public sector side claim that private actors did not have much to propose and lacked (with the exception of ACHET) a national and public policy perspective.

In view of these problems, many private sector interviewees felt that the cluster was “just another roundtable,” despite having a much broader and longer-term perspective than any of the other roundtables. The generality of the issues discussed, together with weak work on specific sub-committees, and the evident clashes and lack of common objectives within the public sector, made the roundtable seem like a waste of time for private actors. Not surprisingly, the tourism cluster roundtable was considered a failure by most of those interviewed and most of the

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<sup>16</sup> Only one interviewee did not offer a negative opinion. In his view, the executive secretary did not have enough time to show what he was trying to do.

<sup>17</sup> The executive secretary was fired by the Minister in mid-2009 and was replaced by his new chief of staff (who kept his job as chief of staff). According to most interviewees, the Minister basically killed an agonizing table by naming unilaterally a politically close ally, who had experience in the sector, but for whom the cluster was low on his list of priorities.

<sup>18</sup> The particular areas of interest of the private sector were quality standards, promotion (both domestic and international), and the strengthening of SERNATUR. The private sector proposals were in the areas of infrastructure, the professional fields to be implemented in universities, and standardization of quality given the heterogeneity in the sector.



documents analyzed. There were almost no results<sup>19</sup> from the roundtable, and meetings stopped a year after it was officially launched.

## ***2.3 Global Services Cluster<sup>20</sup>***

### *2.3.1 History and Background*

The Global Services cluster is possibly the most successful case among the sectors chosen by the CNIC. Interestingly it is the most “at the large” of all clusters, since it was promoting a sector that was in its infancy. “Global services” refers to the production and export of tradable, knowledge-intensive sectors, such as call centers, business process outsourcing (BPO), knowledge process outsourcing (KPO), business processing and analysis, engineering services, and others. India, with its call centers and software programmers, is the paramount example of what is this sector is. Offshoring is not only a new sector in Chile, but in the world, and was born relatively recently due to the confluence of a series of factors, including the possibility of outsourcing knowledge processes, the pressure on firms to reduce costs after the dot-com crisis, and the trend toward trade liberalization.

In Chile, public-private collaboration in this sector did not begin with this policy. It can be traced to public and private efforts to boost the competitiveness of these types of services, starting at the beginning of the 2000s. From the public sector side, the global services cluster can be seen as an expansion of the High-technology Investment Attraction Program (Programa de Atracción de Inversiones de Alta Tecnología, or PAI). An important part of this plan involved the inclusion of the private Chilean firms. Although the sector was underdeveloped and internationally not competitive, it had some important firms, particularly in the ITC sector.

### *2.3.2 Initial Setup and Public Sector Coordination*

When deciding where to locate the cluster within the government, it was clear that it had to be hosted within CORFO, since it represented an expansion of their investment attraction program. The Ministry of Trade and Industry accepted this proposal, and thus the CORFO’s vice Carlos

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<sup>19</sup> According to most of the interviewees, the only area with a positive outcome was the creation of a program of English training for tourism. Some interviewees even point that this program was not a product of the table but a CORFO program already underway which was adapted and used for tourism.

<sup>20</sup> Based on interviews to Carlos Alvarez, Mario Castillo, Claudia Marró, Raul Rivera, Raul Ciudad, and Mohit Srivastava.

Alvarez, presided over the cluster and Mario Castillo, director of the PAI at the time, became its leader. Castillo had been working on the program for seven years and had forged the links with the private sector that were later exploited in the Cluster.

The global services cluster had the particularity of being directed from inside CORFO, which provided it with a source of funds and policy maneuver over and above that of the other clusters. For example, the executive secretary, being a CORFO manager, spoke regularly with all the other managers, and in this way could actually influence CORFO's instruments and obtain the necessary flexibility and support for the cluster's initiatives. This was a privileged position compared to that of other managers. Finally, the fact that both the president and the executive secretary were part of the same institution had also advantages in terms of coordination.

The actual configuration of the roundtable was defined by the public sector, without formally consulting the private sector. Both CORFO and the Ministry of Economy designated the members. They sought out the representatives that had participated with CORFO in the formulation of the PAI policy. Moreover, according to one of those interviewed, members were chosen with the additional requirement of being allies of CORFO, meaning that they had benefited from CORFO's previous programs (such as PAI), or that they would have something to gain by being on the roundtable. According to a private sector representative, the private sector members did not have a problem with this, as the composition of the roundtable matched their preferences and they had complete faith in the head of the cluster. This was apparently the only cluster that had this level of continuity of public and private sector work and a relationship between them.

This cluster was the first to be launched, in November 2007. CNIC included representatives from international companies, such as Oracle and Evalueserve; business associations, such as Foro Innovación, the Chilean Information Technology Association (Asociación Chilena de Empresas Tecnológicas de Información, or ACTI), and the Chilean-American Chamber of Commerce; an engineering association; academia, including the dean of a prestigious engineering faculty and director of a technical institute; and the public sector, including representatives from CORFO, the Ministry of Education, and ProChile.<sup>21</sup>

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<sup>21</sup> Other related sectors joined the roundtable later, including the film and architecture industries.

### *2.3.3 Public-private Interaction*

Based on a prior BCG assessment and previous work with the private sector, the president and CEO identified a group of key areas to work on, which were proposed to the roundtable as a whole. Once approved, working groups were created to address and generate specific proposals on each issue.<sup>22</sup> The cluster met monthly and the subcommittees met bi-weekly, depending on the committee. The agenda of each subcommittee was presented for approval to the general council and, if approved, the public sector representatives would make sure that instruments were created or funds allocated to address the problem.

The private sector played an active role in all of these discussions and deliberations. They also proposed previously unaddressed issues that were then frequently incorporated into the agendas. For example, ACTI proposed that the internationalization of Chilean firms in new markets was a way to expand production and create new demand for Chilean services and foreign investment in Chile. This proposal was incorporated into the cluster's agenda, and CORFO launched an instrument to promote it. ACTI also pushed to raise the profile of the Chilean brand as a relevant issue for the industry. Another issue identified through PPC was that data security was an important constraint preventing the attraction of new investment to the sector, since there was no regulatory legislation. This enabled the cluster to push for the enactment of a bill to address that problem. That draft law is currently being discussed in Congress.

An interesting example of actual interaction was the work done in the Human Capital subcommittee, presided over by the dean of the School of Engineering of the Universidad Católica, with the participation of representatives from business associations, domestic and international firms, and CORFO. The group came up with three outcomes: expansion of English language training programs and scholarships, a study of job profiles in the industry, and a proposal for a reduction in the length of the engineering program in university curricula. These outcomes emerged after a contentious discussion. According to interviewees who participated in the group discussions, any member could contribute to the discussion, but the government usually had the last word and made the final decisions, which were binding. Sometimes this was

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<sup>22</sup> The workgroups that were formed were: regulatory framework, human capital, promotion, and domestic industry development, each headed by a different institution (government, university, Foro Innovación and ACTI, respectively).

positive, according to one private sector member interviewed, such as in the case of the mechanisms underlying the expansion of English training for the industry. But in others, it was badly evaluated, as in the case of the job profiles, where the private-sector members of the subcommittee heavily criticized Fundación Chile, the institution that was chosen to do the study, the methodology, and the outcome, since agreements and diverging viewpoints were ignored by the government.

#### *2.3.4 Analysis and Impact for the Private Sector*

Another area where there was no agreement was on the potential for capture. The public sector stressed that the sector was almost nonexistent, with domestic firms being relatively underdeveloped. The private sector, however, maintained that there were capture attempts, which became evident during the work of the Domestic Sector Development subcommittee. There are two important issues related to this. First, against the capture argument, the ACTI-domestic sector- representative had a broad, long-term, public-sector vision and seemed to be much more oriented toward long-term development and public objectives rather than representing the sector's attempts to obtain public funding.<sup>23</sup> Another important factor was that most of the other firms represented at the roundtable were either potential beneficiaries of some of the instruments, or had already benefited from subsidies granted as part of the investment attraction program.<sup>24</sup> This made them immediate allies of the government. The question is whether or not this can be considered capture.

Substantial resources were invested in the instruments and programs that came out of the cluster. According to *Cluster de Servicios Globales* (2010), US\$14.2 million were spent on studies and new instruments by each subcommittee. However, according to most interviewees, this effort was timid.

The private sector representatives also complained that not enough was being done in some areas and that in others the government took actions without much consultation that then

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<sup>23</sup> For example, even when one goal pursued by the table was to bring foreign competition into the country, ACTI and the domestic sector representatives supported this proposal even though it could hurt the industry in the short run.

<sup>24</sup> For example, the domestic IT sector received benefits to obtain subsidies (under the guise of supporting economically backward regions in order to be in compliance with WTO rules) since some of them were given to foreign companies to establish themselves in Chile. Moreover, ACTI had a seat at one of CORFO's Innova Councils that assigned "normal" horizontal subsidies, so they had other ways of obtaining subsidies (whether seeking rents or not).

resulted in failure (e.g., the job profiles). There were also complaints about the methodology, which many considered cumbersome. At the same time, there was recognition that the private sector was wrong on some issues, and that in general the public sector's actions were positive, not driven by capture, but rather oriented toward social objectives and executed appropriately.

Some groups were more successful than others, but former public and private sector participants characterized the outcome of the process as clearly positive. Without exception, participants believe that the cluster generated significant additionality to what was being done before its creation and what could have occurred in the same period if it had not existed. Firms were attracted, and there were demonstration effects and global positioning of the country in the sector. Policy instruments to solve bottlenecks and promote the sector were created (e.g., English language scholarships and tax benefits), and bureaucratic constraints were lifted (e.g., fast-track visas for Indian executives). The main objective of the cluster—to increase exports from US\$200 million in 2006 to US\$1 billion in 2010—was measured and achieved.<sup>25</sup>

When asked about the practical benefits that accrued to them and to the industry as a whole, private sector representatives highlight the fact that positioning the country abroad in the sector brought demand and foreign direct investment (FDI) to the country that would not have come otherwise. This raised GDP and generated spillovers in terms of human capital and capabilities that had not been sufficiently present in the country. The cluster was a great substitute for a powerful and public-good-oriented business association for global services in Chile, which did not exist. The cluster allowed the industry to coordinate and establish a productive dialogue and an understanding with the government and academia in order to enhance competitiveness and develop human capital in the medium term.

### *2.3.5 Political Cycle and the Policy under the Current Government*

The new government ended the public-private roundtables that were the heart of the entire cluster program. This occurred despite attempts from private sector members, such as ACTI, to continue them, and initial nominal support of the sector by the new CORFO administration. Meetings were nevertheless stopped. The result was that public-private collaboration

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<sup>25</sup> An independent consulting firm was hired to perform the measurement yearly, and the goal was surpassed. This, however, does not prove causality of the intervention.

disappeared.<sup>26</sup> Most private sector representatives point out that the cluster needed more time to implement many of the measures agreed upon in the agenda and for the impacts to mature.

## ***2.4 Aquaculture Cluster***<sup>27</sup>

### *2.4.1 History and Background: the ISA Crisis and the Salmon Roundtable*

To analyze the development of the Aquaculture cluster, it is necessary first to understand the history and importance of the Chilean salmon farming industry, which is the main player within the sector, and the severe sanitary crisis it was facing when the cluster policy was enacted.

The aquaculture sector, and the salmon industry in particular, is, together with mining, the only real cluster *a la* Porter in Chile. The industry has strong linkages with the animal feed industry, medical labs (for vaccination), services (for logistics and quality control), and the machinery and metal-mechanic industry, among others, and it was expanding to test new species.

The salmon industry is a young industry that began in the late 1970s. In a few decades, production rose from negligible levels to more than US\$2 billion by 2008, placing Chile in competition with Norway as the world's largest salmon exporter (DIRECON, 2009; La Tercera, 2012). The government played a key role in the birth of the industry, mainly through Fundación Chile, which, together with foreign academics and the Japanese International Cooperation Agency, acquired the necessary technologies and shaped the organization of production.

While Chile rivaled Norway in volume of production, there were important differences between the two production systems.<sup>28</sup> Regulation was very weak—Chilean businessmen praised the idea of self-regulation and pushed for it—and there was little collective action. Both of these factors were fundamental in ensuring biosecurity and sustainability in a sector that depends on a common resource. These issues contributed to a dramatic sanitary crisis in 2007–09 due to the outbreak and expansion of the ISA virus. The consequence was a reduction in the production of Atlantic salmon, the most heavily produced variety, from close to 400,000 tons to 100,000 tons (Garate, 2011) in just a few years. The impact was felt in the 2009 and 2010 production volumes.

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<sup>26</sup> Current government documents indicate that this public-private council is still operating, but the facts and interviews do not seem to bear this out. A private sector representative noted that the President had promised to re-establish an opportunity for public-private dialogue but this has yet to occur.

<sup>27</sup> Based on interviews of Hugo Lavados, Alejandro Ferreiro, Carlos Alvarez, Claudia Marró, Felipe Sandoval, Bernabé Santelices, Juan José Soto, Monica Ríos, Luis Pichott, Jorge Katz, Carlos Vial, and Domingo Jimenez.

<sup>28</sup> For example, Chilean growing centers are very close to each other and there were significantly higher levels of fish overcrowding and antibiotic use, as well as a lower use of proper vaccinations.

The social impact on the producing regions, the economy of which revolved around this sector, was enormous. An estimated 25,000 jobs were lost, which were around half the direct and indirect jobs associated with the sector (Alvial et al., 2012).

When the magnitude of the crisis made the problem unmanageable, the private sector went to the government to ask for regulation and help. To deal with this situation, the Minister of Trade and Industry postponed the creation of the cluster and centered all of its efforts on confronting the salmon crisis. Thus, in April 2008, the Ministry of Trade and Industry formed what they called the “Salmon Roundtable.”

#### **Box 1: The Salmon Roundtable**

The Salmon Roundtable was a public sector deliberative body directed by Minister Hugo Lavados. The Executive Secretary, Felipe Sandoval, was a former Undersecretary of Fishing and a savvy negotiator.<sup>29</sup> The goal of the roundtable was to analyze the situation in the industry and present proposals for restructuring the sector, solve its short-term crisis, and contribute to its long-term sustainability. The private sector was not formally in the roundtable, but it was present in two ways: first, there were experts sitting at the table that had previous experience in the private sector. Second, the roundtable asked the private sector for information and negotiated proposals with them under the table to ensure that they would be acceptable to the sector and thus would have a greater chance of being approved by Congress. The roundtable’s proposals included important regulatory changes, commission of a study to define parameters and indicators to determine carrying capacity, and strengthening of monitoring institutions (Katz, Iizuka, and Munoz, 2011). The main outcome of the roundtable was a bill sent to Congress in 2008, which was approved in March 2010, days before the newly elected right wing government took office.

While these events were occurring, aquaculture was selected by CNIC as one of the sectors to be prioritized under the new innovation policy. The Aquaculture cluster roundtable was established in September 2008, right after the salmon roundtable had sent a bill to Congress. Given the preponderance of salmon in aquaculture, and the serious crisis situation, the “salmon problem” had a central role in this cluster. In fact, the cluster was the forum where some of the discussions of the salmon roundtable continued. But the cluster was a fundamentally different initiative in two respects: it focused on long-term problems of the sector, and it was not restricted

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<sup>29</sup> Other members of the group included Juan José Soto (advisor to the Minister), Luis Pichott (Fundación Chile expert), Bernabé Santelices (academic), Edith Saa, and Jessica Fuentes (From SERNAPESCA). Many of them later participated in the aquaculture cluster roundtable.

to salmon. Felipe Sandoval was also appointed Executive Secretary of the cluster, taking advantage of his expertise and the knowledge and outcomes built during the work of the Salmon Roundtable.

#### *2.4.2 Organization and Description of the Cluster*

As with other cluster roundtables, the decision of the members was made without consulting the private sector. According to public sector representatives interviewed, the members of the cluster were proposed by Sandoval and Juan José Soto, as advisor to the minister, and approved by the minister. Members from the public sector included most of the members of the salmon roundtable. However the cluster roundtable was significantly larger, with representatives nominated from other public services (CORFO, CONICYT, CONAMA, and regional governments), academia (from different regions of the country), and the private sector, some of whom were counterparts of the salmon roundtable and some were well known as industry leaders or firm owners with a broad view of the sector problems. Since the roundtable's mandate transcended salmon, representatives of emerging aquaculture industries (e.g., salmon upstream industries and producers of mussels, oysters, algae, and scallops) as well as from environmental organizations, such as the World Wildlife Federation (WWF), were also included.

The initial idea of the cluster was to strengthen linkages and develop private research and development capacity in aquaculture in order to advance in terms of complexity and diversity of production. A key issue analyzed was the development of harvestable species of fish, mollusks, and other seafood in order to use the know-how and logistics already developed for salmon. The salmon crisis also pushed the roundtable to think about longer-term institutional reform and regulation (mostly for salmon), in addition to what was being discussed in Congress. The ISA crisis weakened the dedication of the cluster, as it siphoned financial and particularly political resources away from it. On the positive side, the formation of the salmon roundtable created consensus and trust among public officials and some technical experts at the center of the cluster.

Given the large size of the cluster roundtable, work was divided into five areas. Subcommittees made up of cluster members (and in some cases people outside the cluster) were formed to analyze bottlenecks in the sector in specific areas and to come up with solutions. The five areas were human capital, research and development, infrastructure, institutions and the regulatory framework, and supply chain.



As with the tourism cluster, the roundtable was presided over by the minister of Trade and Industry. However, unlike tourism, the minister was present and fully engaged. Additionally, the executive secretary was well known in the industry and had excellent relations within the public sector. Several of those interviewed described him as a master of conflict resolution. This situation provided a different context for work of the cluster when compared to Tourism. The selection of public sector participants was in many cases instrumental to Sandoval's goals and way of working, since he influenced the nominations. Not surprisingly, the remaining public institutions participating in the cluster worked with the proposed agenda from the beginning. A consulting firm was hired to manage the cluster, guide the discussions, and register agreements.<sup>30</sup>

#### *2.4.3 Public-Private Collaboration within the Cluster*

Most of those interviewed concurred that the private sector representatives actively participated in all meetings and was interested in putting forth proposals (although some public sector representatives interviewed criticized the interests of the apparently less prepared smaller sector representatives). In general, their participation and work were regarded as public-spirited and not guided by special interests. Still, the size of the roundtable and the variety of participants rendered its capture by special interests unlikely. One public sector representative interviewed even noted that private sector representatives not only spent a significant amount of time in the numerous meetings, but even purchased their own plane tickets to attend the meetings, since there were no funds for transportation. They rarely missed a meeting. Box 2 below details the workings of one of the subcommittees.

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<sup>30</sup> There are mixed opinions on the (large) amount of money spent on this consultancy firm, which included family members and friends of the Executive Secretary. Some interviewees considered its work a waste of money, while others valued it as important.

### **Box 2: Institutions and Regulation Subcommittee**

The work done by the subcommittee in charge of regulation and institutions was exemplary. Its goal was to propose institutional reforms to expand research and development in aquaculture. The group was aware that the cluster and its proposals were sensitive to the political cycle and thus might not survive a change in government due to the lack of an appropriate institutional framework. For this reason they invited a right-wing economist and right-wing think tank member to be part of the group. In this way, the commonly agreed outcome would be in theory accepted and incorporated into the policies of the new government, no matter which coalition won. They hired an executive secretary to guide the discussions and organize the results. Consequently, the group had a goal of arriving at clear outcomes before March 2010, because after that “anything could happen.”

As with other subcommittees in the aquaculture cluster, their work methodology was based on workshops. Once the key set of topics was agreed, they organized seminars with experts from different fields to develop proposals to improve existing institutions. From the information presented, they debated and decided on the best policy path to propose, given the current context. According to those interviewed who participated in the group, the subcommittee worked efficiently with a firm focus on generating realistic proposals that would bring about real changes.

As in other cases, the decisions were reached by consensus rather than voting. There were some issues that generated heated debates. One area of strong disagreement was the goal and financing scheme of the Fisheries Promotion Institute (Instituto de Fomento Pesquero, or IFOP), a public research institute which had little influence but which was supposed to have a larger role in research in the future. After the discussion, the points of agreement were written up and sent to the general cluster for approval. Unlike some areas of the Global Services cluster, decisions in the subcommittees were not influenced by previous public sector decisions. This made the work more open and fluid between all participants.

The final document generated by the group was presented and approved by the general Aquaculture cluster, to be put into effect through specific actions. This particular group also shared its policy proposals with the incumbent candidate and the opposition candidate’s campaign expert groups in the hope that they would be incorporated regardless of who won the election.

#### *2.4.4. Cluster Outcomes and Analysis*

When asked about the achievement and outcomes of the cluster, most of those interviewed mention the outcomes of the Salmon Roundtable, indicating that what came out of the cluster was not very significant. The private sector representatives have a similar opinion, despite not being formally a part of the salmon roundtable (but clearly having participated in more informal discussions and the work done in Congress). Some of those interviewed affirmed that the discussions were tedious and unproductive, centering on long-term issues when there were huge

short-run issues needing immediate action (most of them outside the scope of the cluster) that were much more pressing. Others, however, insisted that the roundtable produced interesting results, although few were implemented.

Some of those interviewed were critical of the failure to establish a methodology for the cluster's deliberations. From the selection of participants, to the way that work and meetings were conducted, to the way that the money was spent—mostly on studies, some of which were questionable because of their redundancy, and on a consulting firm that not everybody considered to be good. No better alternatives were proposed, but the fact that there was no thought of doing so was a concern.

#### *2.4.5 Political Cycle*

As with the other clusters, with the change in government this cluster stopped working as a public-private roundtable. Moreover, it seems that the efforts to make the results of the cluster endure would not have significantly worked if one of the cluster participants, Monica Ríos, had not kept working in the ministry of Trade and Industry after the change in government. Some of the issues, particularly from the subcommittee described above, were recently incorporated in new policies. However, there are no mechanisms in place to ensure the evolution and sustainability of policies previously put in place.

#### *2.4.6 Lessons of PPC from the Cluster Policy*

The cluster policy had unfortunately too little time to show any of the results it might have obtained, since it existed for only two years. After the change of government, the public-private roundtables were dismantled or simply discontinued. Unlike the Consortia policy, there is no indication that these PPC forums will be reinstated in the near future.

The success of a cluster can be measured by the amount of joint work done in terms of fruitful strategic dialogue and agenda setting, how effectively a common agenda was set, and how well that agenda was implemented. From a public sector perspective, a virtuous agenda setting process was important because it revealed where the constraints were for specific sectors and where instruments and policies (or simply of public or private coordination) to solve those bottlenecks were lacking. In general, regardless of the existence or lack of measurable outcomes, one clear positive result of the work of clusters is a byproduct of private-public interaction: a

better understanding of the thought processes, interests, and constraints of the other sector, and the building of trust in order to improve the workings of the sector.

Despite the short time that they had to develop policy outcomes, the three clusters analyzed left some useful lessons for the future organization of public-private initiatives for competitiveness, particularly because they had different outcomes with some common, unvarying features. These lessons are presented as a group of “dos” and “don’ts” that can be extracted from the three cases.

### ***Do***

- **Choose empowered and motivating leadership** to mobilize the rest of the public sector (public-public coordination) and to motivate private sector participation and work. The person chosen to lead a PPC effort must have the respect and validation of both sides of the roundtable. Inclusive leadership, technical capacity, and particularly validation from the public and private sector based on previous relationships are necessary conditions. The person must have the political and technical capacity to mediate among multiple public agencies and coordinate with the private sector. Tourism showed a contrast relative to Global Services and Aquaculture, since the executive secretary was hired based on objective technical skills and knowledge of the sector, although he lacked knowledge and trust from the public sector and private sector stakeholders at the roundtable and had to invest time in fruitless trust-building, making the PPC unmanageable. The nomination should therefore be “political” as long as it fulfills these requirements. In the particular case of Chilean clusters, the role of the CEO is crucial, as the person must be able to adhere to an agenda and make it function. However, for this role to work, the support of the president of the cluster is also essential.
- **Build on established public-private coordination efforts:** effectively building on previous PPC seems to accelerate productive work, since trust and personal knowledge are already in place. The importance of previous trust-building was highlighted by all parties in the Global Services cluster as a positive prerequisite. On the contrary, it appears that ignoring the previous work done by part of the industry and SERNATUR alienated the private sector from the Tourism cluster. However, this also increases the chances of capture due to previous PPC. It is at the same time worrying to realize that the success was partly possible because there was a previous history and initiatives already in place,

casting some doubts on whether the cluster policy had a causal effect or whether we are just observing a previous trend that we cannot “difference out”.

- **Have carrots on the roundtable:** To attract private sector participation in the roundtable, there must be something to be gained from participating. This could be resources for incentives or new programs, but it could also be the urgency of a problem to be solved and the importance of being present in order to affect the outcome.
- **Private participation in defining the agenda is very important.** Defining the agenda is important: the private sector not only needs to validate the agenda but also to have participated in its development, since its goal is precisely to solve private sector bottlenecks and challenges. Conflicts in the Global Services cluster and criticism from the private sector mostly emerged because public agendas or decisions were imposed. By contrast, in Aquaculture, the institutions subcommittee reached consensus, and productive proposals emerged in part because of a decision-making methodology that was not characterized by unilateral decision making by the public sector. The experience of these clusters shows the importance of not imposing unilateral agendas, as doing so discourages private sector interest in participating.

### *Don't*

- **Do not use the roundtable for public-public coordination and discussions.** Using the cluster time as a battlefield of conceptual ideas or political power simply undermines all interest from the private sector to participate, since they feel their time is being wasted. Having a unified and coordinated public sector centers the discussions on private sector concerns and relevant bottlenecks, making the PPC relevant and productive. The contrast of Global Services with Tourism illustrates this point.
- **Do not have parallel, competing initiatives.** The case of Tourism, and to a lesser extent Aquaculture, shows that when other, more relevant forums of private interest are in place parallel to an initiative such as a cluster, interest in a given PPC dwindles. In Tourism, a parallel tourism bill, and in Aquaculture, the salmon roundtable (although the latter was not a full substitute for the cluster) are examples of this.

- **Do not use alternates.** Sending alternates is a first signal of dwindling interest, both from the public sector and the private sector. It also slows down the flow of information and the advances in agendas, since they then have to be validated by the absent leader.

#### 2.4.7 Other Important Issues

- Large PPC roundtables, used mostly to discuss general issues and approve the work of specific subcommittees, seem to be a necessary (if tedious) condition for clusters to work in Chile. Although there is no counterfactual, it is clear that large roundtables enabled a variety of interests to be represented, which reduced the chances of capture by a specific group. A wide spectrum of participation also validates the decisions made across an industry more broadly. However, its very nature and size can slow down work and outcomes significantly.
- For this reason, a good methodology oriented toward generating a proposal-driven agenda was acknowledged to be important in generating useful outcomes. In the Chilean clusters analyzed, besides hiring in some cases a consulting firm to guide the process, there was no thought about the methodology that should be used in the general and specific work-roundtables.<sup>31</sup> This could be due to the lack of structure and thought given to the cluster policy in general since its conception at CNIC. Also, the fact that there was no thought about how to evaluate the outcome of the clusters' work also mitigated against developing a work methodology. In any case, there was little variation in the methodologies used that could shed light on which mechanisms were more effective. Nevertheless, in all cases, the methodology was one of the issues most criticized.
- The election of participants in the roundtable does not seem to require private sector participation for it to be valid or for the work to be fruitful. Both “good” and “bad” outcomes were observed, irrespective of private sector representatives being chosen by the public sector roundtable leaders in all cases. Nevertheless, the representatives have to be well chosen. Public and private sector representatives need indeed to be *representative*, recognized as leaders among their peers.

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<sup>31</sup> The only partial exception was the Global Services cluster, where roundtable members were appointed with the idea of getting public sector allies on board. It was explicitly recognized that the logic was to have people that had already benefited from the cluster or would potentially benefit. This aligns incentives, but can also be thought of as a type of capture. It might be a good way to elicit active private sector participation.

### **3. Technology Consortia Program<sup>32</sup>**

#### ***3.1 Description of the Policy***

The main goal of the Technology Consortia program was to develop new firms with the capacity to develop cutting-edge applied research. It sought to pool innovation efforts of different firms and at the same time increase their collaboration with universities. The outcomes should be relevant to the productive sector to which the consortium belongs, in terms of providing new insights (positive externalities and demonstration effects) that could enhance the competitiveness of the sector (Busco, Retamal, and Rodriguez, 2008 and CNIC, 2007).<sup>33</sup>

The program was embedded within the Bicentennial Program on Science and Technology (PBCT), a World Bank initiative hosted by CONICYT that provided technical assistance and a loan to the government (with counterpart funds provided by the government) to fund different policies designed by the program.<sup>34</sup> The PBCT received support World Bank experts for the design of the Consortia program and looked to the Australian experience for inspiration. However, unlike the Australian consortia policy, which provided funds for a period of 10 years for each consortium, the Chilean policy only considered a period of five years of co-financing for each project.

Even though CONICYT was in charge of the program, since its beginning they realized that an essential part of the program management and goals had to do with firm action. Thus, they fully incorporated CORFO as a convening and evaluating institution.<sup>35</sup> Since some of the projects were specific to agriculture, the Foundation for Agrarian Innovation (FIA), the innovation promotion program within the Ministry of Agriculture, was also invited to be part of the process. These three agencies issued a call for proposals in 2004. This joint initiative was a rather unique experience in the Chilean public sector, which is used to compartmentalizing

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<sup>32</sup> The description of the program is based on the interviews to José Miguel Benavente, Andrés Benavides, Fernando Lefort, Isabel Reveco and Isabel Meneses.

<sup>33</sup> The policy had additional goals, such as improving the links between domestic and global research and business communities (CONICYT, 2004), academic goals (such as providing research possibilities for Ph.D. dissertations and generating study programs) and patents (according to interviewees from government and consortia).

<sup>34</sup> See PBCT (2003) for details.

<sup>35</sup> Some interviewees gave an alternative view for the inclusion of CORFO: CORFO might have exerted political pressure to be included, since firm innovation was its purview.

policies within specific agencies. The applications were received in the three agencies, each of which would usually (though not always) end up being the corresponding counterpart of the applicants.

There have been three rounds of bids for projects: in 2004, 2005, and 2009. The three institutions made the first two bids. However, in the second call for proposals, even though it was a joint call, the specifics for each call were different for each institution.<sup>36</sup> The third call was a thematic bid, on biofuels, launched and managed exclusively by CORFO. In the first bid, nine consortia were selected for funding. In the second bid, 10 additional groups were selected.

### *3.1.1 Application Requirements and Selection*

To apply, a group of at least three firms and some research institutions had to come together and submit a research program (rather than a single research project) to any of the three agencies. This program had to be undertaken by creating a new firm. This new firm had to have the participating institutions as partners and undertakes the research and innovation. The government provides up to US\$5 million, an amount that the consortium partners had to match (part of it in cash and part in kind). The money would be rolled over in a period of five years, after yearly evaluations by international experts.

The decision to award a grant to a consortium was made jointly by the three agencies, based on the opinion of international evaluators. Having international evaluators reduced the risk of capture from the applicants because it provided an independent appraisal of the potential of each group. The evaluation panel was coordinated by CONICYT. After selection, each consortium was assigned to a particular agency, according to the agencies' preferences, for the actual funding and monitoring. Once a project was assigned to one public agency, that institution exclusively handled project management. Thus CONICYT handled only the Consortia that it agreed to host.

Most of the applications selected were in sectors that had revealed comparative advantage, but a few of them were in new sectors. This had been previously discussed and was an implicit objective of the team in charge of the program, even though at that time Chile's innovation policy was mostly horizontal.<sup>37</sup>

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<sup>36</sup> For example, FIA issued its call with a more specific focus on the agriculture sector.

<sup>37</sup> The policy was launched before the CNIC decided and launched the National Cluster Policy.



### *3.1.2 Evolution of the Program*

Since its inception, the program had two important changes. A first change was the cancellation of the second part of the World Bank loan by the Chilean government, after the new government decided not to continue with the second stage of the project. Despite this drastic change in the policy horizon, the program continued regularly with the planned five-year first phase. Second, starting in 2006 the control of the Consortia program was transferred to CORFO because CONICYT decided to focus exclusively on basic research and assign only those programs that had a productive component to CORFO, the institution with the most expertise and specialization in firm innovation. The calls for new consortia became CORFO's responsibility. CORFO tried to fashion the program along the Finnish model, linked to clusters or other initiatives. However, the new calls (after the biofuels bid of 2009) involved fewer resources (CORFO contributed with at most US\$1.2 million) and had a much narrower focus. It no longer required joining academia and industry together, and only required a technological institute, and fewer total participants.

### *3.1.3 Private Involvement in Design and Public-private Interaction during Implementation*

The private sector was not involved in the design of the instrument. The program was designed by CONICYT with assistance from the World Bank, using the Australian experience as a model. However, after feedback provided by the consortia themselves, the program was modified to provide funds to applicants at the initial stages of the process.<sup>38</sup> This was an important change, and a consequence of public-private interaction in the implementation of the program.

During implementation, there were two periods of public-private interaction. First, in the period following the awarding of funds to a consortium and before the contract was signed, there were negotiations between the consortium participants where they established the rules of operation inside the new firm. This agreement had to be communicated and accepted by the public agency in charge of the consortium, which required active information and flexible participation from the public agency. Second, over the five years that the project was implemented, there were yearly evaluations and other types of contacts between the consortium and the public agencies.

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<sup>38</sup> An important source of collective feedback was a seminar organized in May 2007 to evaluate progress, problems, and suggestions for improvement from each consortium. See Yammal (2008) for an analysis of that seminar.

## 3.2 CTI- Salud Consortium Case<sup>39</sup>

### 3.2.1 Brief History and Description

CTI Salud can be considered a “at the large” component of the Consortia policy, since it operated in an undeveloped sector in Chile: advanced health research and biotechnology. It is a consortium that originated in the academic community. The idea came from a researcher at Universidad de la Frontera. To apply for Consortia funds, he brought together firms and researchers from different universities to study gene therapies for gastrointestinal cancer, which is highly prevalent in Chile and particularly in indigenous populations of the region where the University is located. CONICYT was the public counterpart entity of the consortium. It played a role in its initial setup, as the executive director of PBCT helped it find a CEO, and it also participated in the project’s implementation phase.

In 2005, after the joint committee between CORFO, CONICYT, and FIA had selected the full proposal from CTI, the CEO led the negotiations between the participants to establish CTI as a corporation and set up an internal property and incentive structure that would allow the consortium to achieve its goals. From a government perspective, he had complete flexibility to do this, since CONICYT had established no requirements other than a minimum number of firms and universities to participate in the project. As firms were reluctant to contribute with money to a black box, as the CEO called it, because they had no control of what would happen inside the consortium, he designed a structure based on spinoffs<sup>40</sup>: CTI would receive the government’s contribution to conduct basic research, but the firm’s contributions would not go to CTI, but to one or more spinoffs designed to group together firms and research groups associated with specific research lines. CTI in turn would monitor the spinoffs, where researchers, professionals, and investors could also participate. Without this configuration, some of those interviewed felt that it would have been much more difficult to have firms on board with funding, allocate responsibilities and resources, and generate incentives for research teams.

In terms of the institutions participating in the consortium, CTI Salud was a “value chain” consortium, that is, one where each participating institution played different roles along the

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<sup>39</sup> Based on interviews with Ivan Mimica, Manuel Gidekel, Andrés Benavides, Isabel Reveco, and Isabel Meneses.

<sup>40</sup> These were not spinoffs in the usual meaning of the word. They did not spin out of CTI, but were considered from the beginning as a way to make CTI as a whole work better. However, they could potentially spin off from CTI if the products developed were commercially successful.

research and development chain, in contrast with a “sector-based consortium”.<sup>41</sup> Their health-related products required different stages of clinical trials (in vitro, with animals, and with humans) to reach the commercial stage. All of these steps involved money and different technological capabilities. Chile does not have a well-functioning venture capital market, making it difficult to fund basic research or create market-ready products for which it is feasible to find investors. The Consortia program and its startup funding were useful in the first phase, when developing a patentable idea, but not beyond. Everything was made more difficult by the fact that the bio-medicine sector did not exist in Chile. Thus, several stages of the process required foreign partners, which some researchers saw as a threat.

Over the years, CTI has worked in three areas of research: the identification of tumor markers for diagnosis, prognosis, and treatment of gastrointestinal cancer; the development of cancer therapies based on genetic vaccines; and phytotherapies (the use of vegetable substances for health purposes). There have been seven spinoffs, two patent applications for prevention, one for diagnosis, four for gene therapy for gastric cancer (*Diario Financiero*, 2011)—one of which was recently granted—and one in Maqui research.<sup>42</sup> The five-year funding period ended recently, but the consortium still had some resources left for operation. The consortium needs to obtain new funding to complete many of its research projects and is currently looking to obtain funds with the patents already granted. There are some patents generated both in cancer research and in Maqui, apparently with the potential to generate resources.

### 3.2.2 Public-Private Interaction

CONICYT’s interaction with CTI can be divided into two periods: First, the negotiation period to form the corporation, and then the five-year execution of the project. According to a public official, CTI was a particularly easy consortium in its first stage. It did not require help from CONICYT, and in fact it was one of the first to sign the contract and begin operations. Having an experienced businessman leading the initial negotiation process seems to have made a big

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<sup>41</sup> The final setup of the consortium, at the time the contract was signed and funding started (2006), included three universities (Austral, de Concepción, and La Frontera); two international research alliances (Weizmann and Leloir institutes, in Israel and Argentina respectively); a local cancer treatment institution (Fundación López Pérez); and three firms (Indena, an Italian company that works on phytotherapies and cancer research; Farminustria, a Chilean pharmaceutical; and Southern Technology, an ICT company).

<sup>42</sup> Two spinoffs can be highlighted. Maqui New Life has international purchase orders for around two million dollars (CTI, 2010 and Mimica), and Bioterapéutica expects to sell a gene therapy based colon cancer vaccine in three years (DF, 2011).

difference.<sup>43</sup> Second, during the execution of the project, there were several instances of interaction: yearly evaluations, applications for other funding lines, and informal contacts. The only formal interaction was the yearly evaluation. To proceed with yearly partial money transfers from the government, a technical report was sent every year to international evaluators. This report was reviewed by the agency together with the evaluators, who then discussed their comments with the consortium before approving the next payment. Additionally, the consortium issued periodic financial and expenditure reports. According to the agents in charge of CTI and the written evaluations, the consortium had very good technical and financial evaluations.

In addition, it appears that the PBCT team at CONICYT acted as facilitator for the bureaucratic processes required to make the project run smoothly from the government side, and particularly to allow for institutional and funding allocation changes that were very common in CTI and other consortia, given the uncertain and volatile nature of the innovation being carried out. Closely related to the above, another moment of interaction of the consortium with public agencies was when they applied for other funding lines for particular projects, in addition to the consortium grants. The CONICYT executive was important in this process, not influencing the results of the applications, but providing CTI with all the necessary documentation to help them prove additionality.

Other opportunities for interaction were the frequent visits from CTI's leaders to the CONICYT agent in charge of the consortium. These visits were purely on their initiative, to report on their progress and plans and possibly to prepare the groundwork before asking for authorization for changes in the operational plans.

With respect to the change of government and the continuity of the policy, there were complaints about the lack of an overarching government policy, as opposed to a short-term government policy. The continuous turnover of officials in charge of the program and in charge of relationships with the consortia, which was particularly severe when new administrations took office, weakened the government's capacity and the depth of interaction with the consortia.

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<sup>43</sup> According to Busco, Retamal, and Rodriguez (2008: 55) for the case of CTI "the CEO is actually empowered with the firm's vision and projects the development practices of new business, informing the board. The organizational structure is well defined, there are interesting international links and the consortium is actively thinking in achieving commercial products in the medium and long run. In other words, the CEO is successfully accomplishing his role of visualizing the future of the firm."

### *3.2.3 Changes within the Consortium and Government Reaction*

At some point during the initial stage of the consortium, a new research line was added to the consortium's objectives: the phytotherapies research, through its Maqui New Life project. This line started gaining ground inside CTI, at the expense of the original cancer-related research. This was raised as an issue in the yearly international evaluations, but CONICYT gave CTI flexibility and accepted these changes.

As the Consortia funding was only for five years, apparently the strategy followed by CTI was to focus resources on those projects that could provide returns first. But, as expected, this was not in the interest of cancer researchers and thus generated increasing conflict between the researchers and management.<sup>44</sup> CTI partly overcame the lack of funding with other public instruments and international investors. However, the five-year period was not long enough, and unless additional funding can be secured for the next period, some of the research will be stopped in the middle of the process.<sup>45</sup>

### *3.2.4 Summing Up*

Besides public funding for basic research and bringing firms and researchers together, the flexibility of the program managers was the main feature of the public-private relationship that seems to be actually relevant for the operation and results of CTI. Flexibility might have been especially important in the beginning, when the objectives were broadened from cancer to health, including nutraceuticals, or phytotherapies. Without this change, the consortium might have had difficulties in finding the private partners it needed after some of the initial ones exited, and Maqui New Life, the most successful spinoff to date, might not exist. However, it is important to stress that the design of the incentive structure, as well as most of the negotiations to leverage resources and scale up research to marketable products, occurred largely independently of the public sector, and were led by an experienced and well-connected manager. Our assessment is that public-private interaction was important but not key for the outcome, while having a competent CEO to setup and lead the consortium was crucial.

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<sup>44</sup> Actually, CTI's CEO left the consortium in mid-2011 to head one of its spinoffs (Maqui New Life), together with a former PBCT official who had moved to CTI some time before to work on technological transfer. There is currently a legal battle between them for the patents related to maqui generated during the period.

<sup>45</sup> An example of this is that evaluators in the final stages of the project were worried about the little amount of money remaining given the horizon of the research lines. Shifting towards more short-run potential results was thus consistent with this concern. See CONICYT (2010) for details.

### ***3.3 Fruit Consortium<sup>46</sup>***

#### *3.3.1 Sectoral Context*

Chile exports more than 75 different fruit species to more than 100 countries, with total exports amounting to over US\$5 billion.<sup>47</sup> Fruits are the main subsector within the food exporting industry. The sector is organized around two main business associations. Fruit producers, which comprise many small firms and also large producers, are organized in FEDEFRUTA.<sup>48</sup> Huge packing firms that purchase fruit from farmers do most of the exporting. They are grouped under Chilean Exporters Association (Asociación de Exportadores, or ASOEX), the most powerful association in the sector. ASOEX has a research-related sister association, the Foundation for Fruit Development (Fundación para el Desarrollo de la Fruta, or FDF). There is a high degree of antagonism between these two groups, since they have to share the income from fruit exports. This antagonism is relevant to the development of this case. There is also significant research capacity in this area in several research universities. The Agricultural Research Institute (Instituto Nacional de Investigación Agrícola, or INIA) is another relevant actor in research.

#### *3.3.2 Intellectual Property Issues*

Until the mid-1980s, Chile produced and exported varieties that were in the public domain. However, since the Biological Convention on Diversity (1982), people realized that there was a business opportunity in the exploitation and generation of new genetic resources, since new varieties could be legally protected with intellectual property rights (IPR). Today, the key agricultural inputs are plant varieties. The privatizing dynamic of genetics has generated a new way of competing in the export market in Chile.

Not having its own varieties implies that exporters and producers must pay royalties to the foreign owners of fruit varieties.<sup>49</sup> Another issue has to do with the cycle of generating a new variety. The most relevant issue is timing, since it takes at least 10 years to have a commercially profitable new variety for a given fruit.

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<sup>46</sup> Analysis based on interviews with Jaime Kong, Rodrigo Cruzat, and Isabel Reveco.

<sup>47</sup> According to Central Bank figures.

<sup>48</sup> There is also an association of Viveristas, or firms that produce fruit plants, which is close to FEDEFRUTA.

<sup>49</sup> For instance, New Zealand accused Chile of taking the kiwi and blueberry market from them, which led to the development of new varieties that are prohibited from being grown in Chile.

### *3.3.3 History of the Consortium*<sup>50</sup>

A few years ago, the fruit industry became aware of the need to improve quality, novelty and country image to compete with countries that got better prices for fruit than Chile. Actually, most fruit development was based on genetics but came from foreign programs, which were not developed and designed for the agriculture and weather conditions of Chile. The country did not have genetic programs tailored to geographic conditions besides those of public institutions.

In response to these issues, the fruit industry represented by ASOEX and FDF decided to invest in an research and development program in genetic improvement, biotechnology, and genomics that would allow it to expand local scientific capacities and develop new products using these technologies. The first publicly supported initiative was the Iniciativa Genoma Chile, also known as the Genoma I project, under a FONDEF grant. Several universities participated in it.<sup>51</sup>

### *3.3.4 Formation of the Consortium and Emerging Problems*

Midway through the Genome I research project, the fruit sector participated in the first call for proposals under the Consortia program in 2004. There were two separate applications, one sent to FIA and the other to CONICYT. The most important research institutions applying in each consortium were doing common research together in Genoma I. The government accepted and awarded funds to both consortia, separately. This is very unusual, since funds were limited and there was no ex-ante reason to fund two consortia not only in the same sector, but doing the same type of research. This immediately raises two questions: why did the private sector divide its efforts and limit funds and research capacity into two consortia; and why did the public sector fund two consortia in the same area? Both of these questions will be addressed below in the context of the existence, or lack, of PPC.

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<sup>50</sup> An important part of the information from this section is taken from the webpage of the Consorcio de la Fruta (<http://www.consorciodelafruta.cl/historia.php>)

<sup>51</sup> Universidad de Chile, Universidad Técnico Federico Santa María (UTFSM) ,along with INIA participated. In 2007, a second stage of the Iniciativa Genoma began. The same institutions were involved in this stage plus Universidad Andrés Bello, and Catholic University (PUC).

### *3.3.5 Intellectual Property Disputes and Business Issues*

In the view of the private sector, the main reason why two applications to form consortia were submitted has its origin in IPR disputes and differences under the Genoma I project. In the project there was no clarity about who owned what percentage of the intellectual property, particularly since there were no successful commercial outputs. There were thus diverging views between ASOEX and FDF, which held that research institutions had no property rights to what had been done up to that point, and the research institutes, which claimed part of these rights. Those interviewed claimed that there were significant problems between the business associations and their specific roles in the dissemination and commercialization of intellectual property outputs.<sup>52</sup>

Under these circumstances there were no grounds for reaching an agreement, as the positions were diametrically opposed. Cooperation between the associations and the research institutes broke down. A first group comprising most of the research institutes from Genoma allied itself with FEDEFRUTA. The other group consisted of ASOEX and PUC. The final break between the two groups led to two different applications being submitted to the program. The former, under the name of Biofrutales, applied to CONICYT and the latter, under the name of Consorcio de la Fruta, applied to FIA.

### *3.3.6 Political Economy Issues*

From the public sector side, an important aspect that could have influenced the allocation of resources to the two projects had to do with sectoral interests on the part of the agencies. Suppose that the agency with the smallest amount of funds had only a few uncompetitive applicants. Since the agency had its own funds to allocate, it was still likely for some of these noncompetitive applicants to get funds. The fact that the three agencies made decisions together might diminish this risk, but the lack of centralized provision of government funds for these purposes gave power to the agencies over their own funds' administration and eventually over the final outcome of the call for proposals under the Consortia program. There are signs that this might have happened in FIA.

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<sup>52</sup> According to one of our interviewees, while ASOEX and Catholic University and their partners were more prone to sell their intellectual property to anyone, Fedefruta, INIA, and Universidad de Chile apparently were more prone to licensing this property to national producers of nurseries and fruits.



After two separate consortia were applied for, both national and international evaluators suggested that the two consortia be merged into one. Hence, the profiles were approved conditional on the fusion into a single consortium. The Minister of Agriculture, who was the political head of FIA and had close relations with both ASOEX and the fruit producers, got personally involved and requested the fusion into a single consortium as a condition to allocate any public funds, and assumed a direct and leading role in the negotiation between the parties. This is a first interesting public-private (imposed) interaction on the setup of the consortium, which was present in other consortia, but which was stronger here than elsewhere given the direct involvement of the higher authority.

Why were two consortia funded? Partly because of political economy issues, an agreement was never reached and, worse, each consortium received public financing anyway. During the period they had to reach a unified structure, a new government (under the same coalition) took office, which included a new minister of agriculture and a new director of FIA, neither of whom had any personnel connection to the agreement. Moreover according to one interviewee, the head of FIA had incentive to show short-term results.<sup>53</sup> Consequently, FIA granted the funds to Consorcio de la Fruta without the merger requirement, while CONICYT and the other applicants were still trying to make them negotiate. This left the government without any real bargaining power. Thus, out of considerations of fairness, CONICYT had to assume FIA's mistakes and hence also granted funds to Biofrutales.

### *3.3.7 Consortium Operations and PPC*

Several of those interviewed for this study clearly identify at least two stages in the relationship between the public agencies and the consortia. In the formation stage, the agencies collaborated closely with the consortia, helping them to hire managers and set up a working structure in some cases. Moreover, both agencies showed flexibility on successive reformulations of the projects. This could have proved problematic. On the one hand, allowing for substantial changes poses a moral hazard incentive by promising strong commitments while applying for the funds (and thus beating out other applicants) and then withdrawing such commitments due to unfeasibility or other reasons. On the other hand, once the funds were allocated, it might be a good practice to

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<sup>53</sup> She reports significant pressure from the industry too.

allow reformulation and adjustments, as the consortia are based on applied science and research results were not preordained. Thus, no clear and obvious prescription emerges in this regard.

The agencies also helped the consortia with the bureaucratic monitoring tasks imposed on the manager of the consortia by the public agency. In general, they showed an important degree of flexibility mostly oriented toward fulfillment of the administrative requirements, rather than to punish the failure to satisfy some formal aspects of these. However, CONICYT and FIA have shown different standards for carrying out the administrative requirements. These different standards mostly related to FIA, who in the view of one interviewee lowered the completion standards during a change in management, suggesting that FIA could have been subject to pressures by the private sector involved in the consortium. The veracity of this claim is difficult to evaluate. However, we considered this particular interviewee to be a reliable source.

The teams in the public agencies seem to have shown two major deficits when monitoring the consortia. The first was a lack of knowledge about IPRs and their negotiation and implementation, which we already explained. The second was how to deal with high turnover of personnel within the public agencies. The transfer of formal and informal information seems to have been discretionary and without formal mechanisms of keeping and transferring records, procedures, and expertise related to the supervision of the consortia. The transfer of information and managerial practices is a frequent complaint on the part of new public servants.

### *3.4 Appraisal of the Consortia Program from a Private-Private and Public-Private Collaboration Perspective*

The Technology Consortia policy centers its action much more on private-private collaboration than on public-private collaboration. The public-private cooperation conducted under this policy can be instrumental in generating productive cooperation between universities and firms. Consortia proposals triggered private-private collaboration that would not have existed otherwise, according to all those interviewed.<sup>54</sup> Thus, first we provide an assessment of policy in terms of its contribution to private-private collaboration.

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<sup>54</sup> All interviewees stress that most of the applied research, patents and potential business opportunities would not have happened without a program like this and its public funding. This obviously does not prove causality, but the fact that these firm-university alliances were not present previously for most cases suggests that some additionality existed. Moreover the fact that the current government launched a 2.0 version suggests that the program was effective.

In light of the cases analyzed through interviews and documents, the most important necessary conditions for successful implementation and outcome of the policy have mainly to do with an intellectual property and incentive structure that fosters coordination and motivation towards results, which in turn requires a hired manager, from the outset, with the appropriate skills. The government's role is as a facilitator and provider of expertise. However, it seems that the public sector was never able to build enough skilled human capital to help with the private-private intellectual property negotiations, incentives, and structure. Most of the consortia interviewees coincided that this was a clear weakness on the part of the public sector that was never fully resolved. Starting in the 2009 bid, a consortium manager was allowed to be hired at the beginning of the process, but unfortunately only after the program as a whole had already significantly changed. Thus, there should have been more public-private collaboration during the initial setup of consortia.

The role of facilitating the work of the consortium extends to the implementation of the program, where flexibility and formal and informal interaction are very important. Helping the consortia is one side of the coin, but monitoring and oversight is the other. We infer from the cases analyzed that it is difficult to keep both at a high standard. The more government officials try to help and get involved in the results of the consortium, the higher the chances of better work, lower transaction costs, and bureaucracy. But, there is a lower probability of exerting tougher control when needed, as suggested by some interviewees.

The risk of capture of public officials is inherent to instances of public-private interaction and collaboration. They may feel responsible (or have related pecuniary or non-pecuniary rewards for success) for the project and help beyond what their job responsibilities require. Public officials also have incentives to move to the private sector (higher pay and job flexibility vis-à-vis the public sector). Finally there is also the risk of direct capture through corruption. This could induce inappropriate behavior and attempts to influence the allocation of public funds toward the consortia, including toward an eventual second stage of the consortia.

We did not identify explicit cases of direct capture in the two consortia analyzed. However, it is also true that there was not a single consortium (at least in the first two calls) that was cancelled or did not receive a payment from the government. This could reflect a very good selection process. But it could also reflect insufficient monitoring by public officials.

### ***3.5 Public Sector Learning from PPC***

An important issue related to the design of the program and how it conditions the relationship between private agents and the public sector is having an appropriate duration of the program, for which international experience can bring important insights. Financing only five years of a large-scale, long-term, multi-party coordination initiative has been not only insufficient in hindsight for achieving outcomes in many cases, but alters the incentives within the consortium towards short-run results. It thus stresses the relationship between academia and management, making it even more difficult to sustain an already difficult-to-manage relationship. The conflict that unraveled in CTI could have to do partially with this.

A final political economy issue had to do with having three very different institutions in the program. Such an arrangement might work as long as there is full coordination and transparency between them. But this is very difficult to sustain given different visions and focus and way of working, as well as the negative effect of the political cycle in maintaining the key policymakers in the right positions. Thus, it can be positive but it is also particularly challenging. Agencies can and should transfer good practices and share identified problems between them to improve the program, and they should have clear common procedures.

On the other hand, having institutions with different human and financial resources dedicated to the program generated important inefficiencies in three aspects. First, the fact that each institution got specific resources to manage a certain number of consortia might have incentivized approval of some consortia that were in the sectoral interests of each institution. Second, having three possible ways of pushing for approval of a consortium might have increased the effectiveness of lobbying. Finally, it is difficult to maintain the quality and the vision originally proposed by PBCT when other institutions manage the program with very different work methods and orientations. Thus, overall, the net effect of having three institutions managing the program is at best ambiguous.

## 4. Conclusions

The most significant conclusion that emerges from the five cases analyzed is the importance of having institutions that allow the government to learn from the implementation of new policies in order to improve them over time. In Chile, the capacity to learn from the right decisions as well as from mistakes depends critically on specific public servants in charge of the policies and the fact that they stay to build, or more exactly *become*, a corporate memory of the policy. Consequently, policies are dependent on the political cycle. Such institutionality for learning simply does not exist in Chile and has rarely been thought of, at least for innovation policies. This is particularly worrisome.

This situation was evident in both the consortia policy and the clusters policy. In the consortia policy, the turnover of public servants and the change in government, even under the same coalition, progressively weakened the policy and its original goal, as there was no knowledge repository in PBCT or CONICYT. In the case of the cluster policy, apparently its closure was not accompanied by any evaluations and thus an opportunity to learn what worked and what did not was lost. Even though CORFO centralized the policy, there is no information on any thought process about, for example, the best way to choose members of a public-private roundtable, the best work methodologies, or actual outcomes.

One way to generate institutionality is through evaluation mechanisms that can show the achievements and weaknesses of the policy and the mechanisms that are key for successful outcomes. This allows weaknesses to be corrected and makes it harder to eliminate the programs for political reasons. Ideally, this evaluation process should be independent of the government in power, and could be done internally or externally. In Chile, such an evaluation mechanism does not exist in PDPs with relevant levels of PPC. The budget office is the only institution today that actually conducts regular evaluations of policies around the government, although this process lacks an institutional perspective.

Second, the five cases analyzed suggest that the possibility of capture is higher the more intense and informal PPC is. Clusters represent a more intense PPC than the consortia. They are, however, a double-edged sword, as they have a greater chance of profound and diverse outcomes the more trust and joint work that has developed between the public and private sector, but this also increases the chances of capture. These chances are constrained when this PPC space is

formal and multiparty, and where methodologies for decision making can be guided by external parties.<sup>55</sup> The consortia analyzed represent cases of less intense formal PPC, but where informal PPC (in the negotiations to grant one or two consortia) gave hints of important chances of capture. Thus, having formal venues for PPC, such as roundtables, seems very important.

A third conclusion is related to private-private interaction and the role of PPC, and the tradeoff between flexibility and capture. When one analyzes the consortia policy in a historical context of other demand-driven instruments of different complexity, it is possible to assess that the more complex the private-private interaction is within a PDP, the more important it is to have a more direct and intense PPC, in the sense that it should provide flexibility and a disposition to help the private-private interaction happen. This is particularly true when the private counterparts come from different worlds, such as business and academia. However, flexibility increases the chances of corruption or capture, so it should be accompanied by stronger monitoring mechanisms to oversee expenditures. The alternative is to allow flexibility but in formal open settings, such as cluster roundtables, where diversity and transparency in discussions limit opportunities for rent seeking. The consortia experience also shows that when there is little knowledge on the public sector side of how to elicit private-private collaboration, there can be a forum for exploration in order to learn how to solve coordination issues and reduce transaction costs. However, the experience of establishing the fruit consortia shows that when flexibility implies informal interaction, the chances of exerting political influence are significantly greater.

Fourth, work on PDPs in new sectors seemed actually smoother than in competitive or existing sectors where the issue became not how developed they were, but how important vested interests were. It is interesting that the most productive cluster roundtable was precisely the one that represents the most “at the large” case. However, at the same time it was apparently the riskiest bet of all. In consortia something similar could be seen, since in CTI-Salud (a clearly at-the-large case) the issues revolved around the consortium and its work methods. In the case of the fruit consortia, a lot of time and resources were lost due to political pressures from powerful business and academic interests.

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<sup>55</sup> The lack of solid institutional mechanisms for them to work also made them extra-sensitive to the people that were actually on the roundtable. In those cases, choosing the right public and private sector counterparts is important.

Last but not least, a caveat. The lessons derived from this analysis have to take into account the Chilean “policy culture” context in order to extrapolate lessons that could be applied elsewhere. Chilean PDPs (and policies in general) have been designed for the last 30 years with an eye toward avoiding capture and consequently with a clear arms-length logic of the state in general and government support in particular (and thus with little tradition of PPC in its policies). This implies that PDPs have an institutional firewall against capture which, on the one hand, might limit the productivity of PPC, since this obsession might limit many initiatives, but on the other, it may make it more likely that PPC will achieve outcomes that generate social benefits. In other settings, it is possible that similar setups might be more easily prone to capture or corruption and, if not captured, might work more smoothly than in the Chilean context.

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