

IMPACT EVALUATION WITH SOCIAL NETWORK ANALYSIS METHODS

**PROGRAM FOR SUPPLY CHAIN DEVELOPMENT IN THE PROVINCE OF CÓRDOBA, ARGENTINA
(ATN/ME-8112-AR)**



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Acronyms

ACC	Agencia Córdoba Ciencia
ADEC	Agencia para el Desarrollo de la Ciudad de Córdoba
API	American Petroleum Institute
ASME	American Society of Mechanical Engineers
CACEC	Cámara de Comercio Exterior de Córdoba
CACyDP	Centro de Abastecimientos Comunitarios y Desarrollo de Proveedores
CCT	Cluster Córdoba Technology
CDP	Cluster Development Programs
CIIECCA	Cámara de Industrias Informáticas, Electrónicas y de Comunicaciones del Centro de Argentina
CN	Communication Network
CSMT	Centro de Servicios Tecnológicos y de Manufactura con Tecnología de Montaje Superficial
CSR	Corporate Social Responsibility
FAdeA	Fábrica Argentina de Aviones
FOMIN	Fondo Multilateral de Inversiones
FONTAR	Fondo Tecnológico Argentino
FONTEC	Fondo Tecnológico Córdoba
IADB	Inter-American Development Bank
ICT	Information and Communications Technology
IN	Information Network
INTI	Instituto Nacional de Tecnología Industrial
IRAM	Instituto Argentino de Normalización y Certificación
IS	Import Substitution (Policies)
ISO	International Organization for Standardization
LAC	Latin American Countries
LIADE	Laboratorio de Investigación Aplicada y Desarrollo
MCMC	Markov Chain Monte Carlo
MIF	Multilateral Investment Fund
MNCs	Multinational Companies
MSMEs	Micro-Small-Medium Enterprises
PIP	Programas de Integración Productiva
PRODIS	Programa Córdoba Diseña
QAP	Quadratic Assignment Procedure
R&D	Research and Development
SMEs	Small and Medium Enterprises
SMT	Surface Mount Technology
SNA	Social Network Analysis
SAOM	Stochastic Actor-Oriented Model for Network Change

Executive Summary

- i. This report is based on the results of a study on the evaluation of Cluster Development Programs (CDP) in the electronics cluster of Córdoba, Argentina. It is a rigorous attempt to assess the relationship existing between the CDP and the formation and consolidation of local inter-organizational networks, which constitute one of the key targets of this CDP. The CDP took place in-between 2003 and 2007 and it was part of a wider set of CDPs, called Programas de Integración Productiva (PIP), co-funded by the Multilateral Investment Fund (FOMIN), the Inter-American Development Bank (IADB) and by local resources. The CDP, which targeted also other industry clusters beside electronics, was designed to achieve the following main objectives: (1) strengthening local linkages and cooperation among private actors, as well as between private actors and local institutions; (2) easing local firms' access to new production technologies and organizational innovations; (3) promoting the access to new markets; (4) using these CDP as demonstration effects for other industry clusters in Córdoba and the rest of the country. The program included a set of activities, like the setting up of real service centers such as the CSMT and the CACyDP, the promotion of industry fairs, and the organization of thematic workshops and coordination activities.
- ii. Prior to the starting of the CDP in the Province of Córdoba no baseline study had been carried out, and other policy evaluations have been undertaken in 2005 and 2006. This follow-up evaluation assesses the impact of the CDP after the policy has come to an end. Its key objectives are to: (1) analyze the evolution of the inter-organizational networks in the cluster; (2) explore the benefits of the CDP, with particular reference to the changes occurred in the inter-organizational networks; (3) explore whether the changes occurred in the inter-organizational networks have generated beneficial effects on the performance of firms. This study also aims at drawing recommendations for policy design and at suggesting best practices that can be useful for other future policy designs.
- iii. The study counts on primary data collected through interviews undertaken at the firm level in the cluster. A structured questionnaire has been designed to collect information that permits comparability with the baseline survey carried out in 2005, it has been administered to both treated and untreated firms in the cluster and it includes a special section for the collection of network data, which have been analyzed using both descriptive and stochastic Social Network Analysis methodologies. The study counts also on a focus group carried out after a first report with the analysis of data had been produced.
- iv. The study shows the existence of local inter-organizational networks formed both with the aim of transferring business information (the information network, IN) and of establishing collaborative projects (the collaboration network, CN). Such networks display a hierarchical network structure and each one is held together by a group of central firms that we name dominant players. These firms are vital to guarantee network connectivity and create the link between treated and untreated firms. Dominant players are medium-sized, long-established firms in the Córdoba electronics cluster, and are considered to be technological leaders in their sub-sectoral niche. While being considered local leaders, we do not find evidence of their superiority in terms of innovation and/or performance records as compared to the rest of the firms in the cluster. What appears to be a determinant factor for their emergence and consolidation is the presence of social ties among the owners of these firms, which have been formed during their educational and prior professional experiences.

- v. Over the period 2005-2012 the density of linkages in the two networks – the IN and CN – has generally weakened. However, we maintain that this is in line with the fact that firms strategize about their linkages, learn how to “economize” on the number of relationship they form, and select only partners from which they believe they can obtain tangible benefits. Hence, the reduction of density should not be seen as a failure of the CDP. In fact we do find a relatively stable pattern of interaction over time, characterized by the consolidation of a critical mass of firms – mainly the dominant players and their direct contacts – which are decisive to maintain active the local inter-organizational network. Dominant players have consolidated a collaborative model that makes their disconnection unlikely.
- vi. The CDP has led to the strengthening and creation of new technology-transfer ties between the electronics firms in Córdoba and other local/provincial or national institutions (among which are also local universities), but it has had no impact on the promotion of new ties aimed at promoting export-oriented activities. Our analysis also shows that the firms that have more intensively participated in the activities promoted by the CDP are also more likely to form new information ties over the period 2005-2012. This suggests that, although over the period of analysis a significant portion of relationships have been discontinued, some of the CDP policies have been relatively successful in promoting the formation of brand new ties among local firms.
- vii. We find that only some of the CDP activities stimulate the formation of new ties, but not others. In particular all the activities that were designed to promote networking (i.e. Affinity Group workshops and Institutional Activities) failed to do so. Instead, other more concrete activities like participation in the CACyDP and the Strategic Planning workshops were successful in promoting new ties.
- viii. We could not find a robust relationship between CDP, network participation and firm-level performance.
- ix. As a result of this analysis, our policy recommendations include the following:
 - The need to raise awareness among the beneficiaries about the need to set achievable and realistic targets, which can be gradually upgraded as the CDP progresses and the network of relationships consolidates.
 - The promotion of policies whose design allows the gradual and flexible engagement of different participants. This involves the identification and/or selection of an initial group of motivated beneficiaries, who can start up with a set of elected activities.
 - The promotion of activities addressing real problems and concrete challenges, rather than activities that promote networking *per se*.
 - The development of a code-of-ethics and/or a statutory agreement as soon as the project has attracted a critical mass of entrepreneurs, in order to avoid or deal with conflicts.
 - The need to ensure the engagement of the local Government as to guarantee continuity after the CDP has come to an end.
 - The importance of undertaking a baseline study and arrange an observatory providing updated information about the industry.

1 Introduction

1.1 The Cluster Development Program (CDP) in the Province of Córdoba

The Cluster Development Program (CDP) (“*Programa de Desarrollo de Cadenas Productivas*”) evaluated here took place in the Argentinean Province of Córdoba in-between 2003 and 2007. It was part of a wider set of CDPs, called *Programas de Integración Productiva* (PIP), co-funded by the Multilateral Investment Funds (FOMIN), the Inter-American Development Bank (IADB) and by local resources (Mitnik et al., 2005).

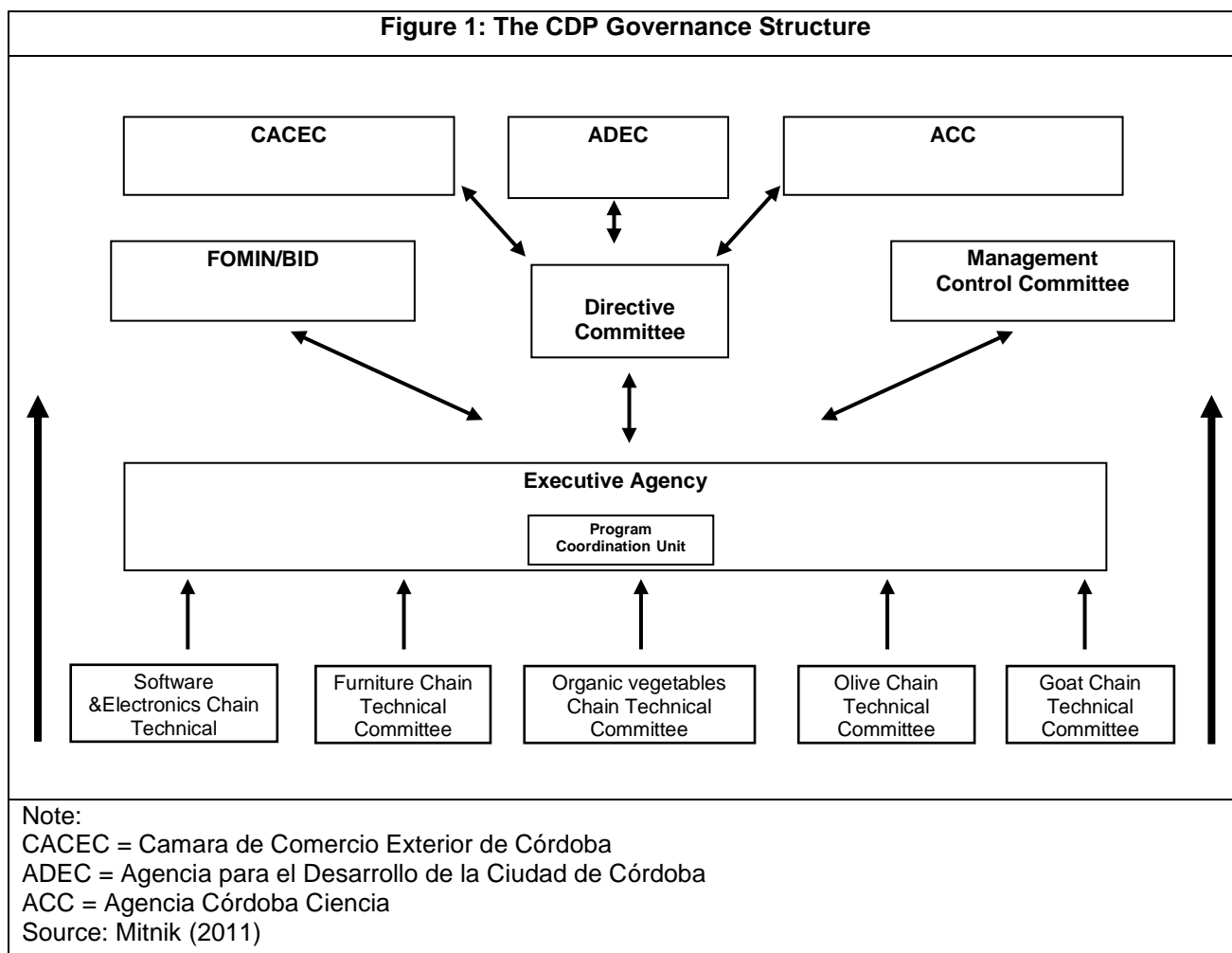
The CDP targeted five industry clusters, each showing peculiar characteristics in terms of development trajectories, size of business and market positioning, namely: software & electronics; furniture; organic farming; olive production and goat breeding. An exploratory study undertaken prior to the policy implementation suggests that the selection of these clusters has been driven by the fact that, prior to the starting of the CDP, they were characterized by a minimum level of inter-organizational coordination,¹ which the program aimed at strengthening (Mazzonis et al., 2002; MIF/BID, 2008; Mitnik, et al 2011). The CDP was designed to achieve the following main objectives: (1) strengthening local linkages and cooperation among private actors, as well as between private actors and local institutions; (2) easing local firms’ access to new production technologies and organizational innovations; (3) promoting the access to new markets; (4) using these CDP as demonstration effects for other industry clusters in Córdoba and the rest of the country.

The total investment (FOMIN/IADB plus local co-funding) accounted for Arg. \$3,979,798 (approximately 1,300,000 USD). These funds were distributed across different industry clusters, with the electronics & software industries receiving approximately 50% of the total project funding. In the same industries, these funds were also complemented by subsequent Government funding for about another 300,000 USD, which means that, on average, the project had a budget of Arg. \$29,504 (9,700 USD) per firm (Mitnik, 2011).

From an operational viewpoint, the program has been implemented by the joint effort of local public-private actors (see Figure 1). Responsible for the execution of the CDP were the *Agencia para el Desarrollo de la Ciudad de Córdoba* (ADEC), the *Agencia Córdoba Ciencia* (ACC) and the *Cámara de Comercio Exterior de Córdoba* (CACEC). Representatives of each of these public institutions formed part of a Directive Committee, which was in charge of defining the strategic goals of the project and of evaluating their achievements on an annual basis. The Management Control Committee, which was also formed by ADEC representatives, was in charge of the administrative and financial supervision of the program, while the Executive Agency (*Unidad Coordinadora del Programa*) did execute the CDP main tasks in coordination with the different industry Technical Committees (TC). The TC were formed by industry representatives, and were meant to give voice to the needs of local entrepreneurs, and to permit them the control on what was being funded and on whether what was being executed was efficient and likely to

¹ A baseline qualitative analysis was carried out to identify industry clusters, which were characterized by a certain degree of initial inter-firm coordination, as reported in Mazzonis et al (2002).

achieve its proposed objectives. Members of local business associations were part of such TC: for instance, the software & electronics industries' TC included members of the industry associations: the *Cluster Córdoba Technology* (CCT) and the *Cámara de Industrias Informáticas, Electrónicas y de Comunicaciones del Centro de Argentina* (CIIECA).



1.2 Córdoba CDP Prior Evaluation Studies

Prior to the starting of the CDP in the Province of Córdoba no baseline study had been carried out, with the exception of a general assessment of the characteristics of the local clusters (Mazzonis et al., 2002). Evaluations have been undertaken only during the CDP implementation – in 2005 and 2006 – based on a methodology, developed by the IADB and the NEXUS Associates Ltd.², named “Sistema de Monitoreo Común” (Nexus Associates, 2004). This methodology, which was designed to monitor and evaluate all of the IADB CDPs, was based on interviews to the CDP participants (i.e. treated firms) and intended to assess whether the CDP produced economic and organizational changes for the treated firms. One of the

² Nexus Associates, Inc. is an economics and management consulting firm based in Arlington, Massachusetts. Established in 1991, the firm specializes in research, planning, and evaluation.

weaknesses of this methodology was that it did not allow the measurement of the improvements in terms of inter-organizational cooperation, which was one of the key objectives of the policy intervention.

To address this limitation, ADEC entered into a formal cooperation agreement with the Faculty of Economics of the National University of Córdoba – more specifically with researchers at the *Instituto de Administración*, who added a new section to the Nexus questionnaire, oriented at collecting social network data for the analysis of inter-organizational networks (i.e. *social network analysis*, SNA). This new section was added to the Nexus questionnaire both in the 2005 and 2006 evaluation studies of software & electronics CDPs.³ Results of previous evaluation studies are in Dini (2007), Matta and Donadi (2007), Matta (2011) and Mitnik (2011). The role and relevance of SNA methodologies in the evaluation of CDPs has been discussed in a recent document by Giuliani and Pietrobelli (2011), who offer a primer on how to use SNA, which is based on graph theory, for policy evaluation purposes.

This follow-up evaluation study builds on prior evaluations and it constitutes an attempt to assess the impact of the CDP after the policy has come to an end.

1.3. Objectives of this Follow-up Evaluation Study

This evaluation study has **three key objectives**:

Objective 1

Analyzing the evolution of inter-organizational networks in the electronics cluster of Córdoba. Since one of the original objectives of the CDP was to strengthen cooperation between business and institutions (Section 1.1), and given that business interactions are considered to be crucial for the success of clusters, it is important to analyze how and whether such interactions have changed over time, whether they have been persistent and they have given rise to an inter-organizational networking model that has consolidated after the end of the policy treatment.

To address these objectives, this study will seek an answer to the following research questions:

1. What is the current status of the cluster inter-organizational networks?
2. What is the profile of the firms forming different types of linkages (e.g. cooperation, information sharing, advice giving, etc.) within the cluster and what are the characteristics of the linkages formed?
3. How have these networks evolved over the period 2005 (mid project) to 2012 (after project)? Has connectivity intensified or weakened? How has the structure of the network changed? Did changes in the network occur towards a more densely connected network structure or towards a more hierarchical structure?
4. Was there the emergence of dominant actors and, if so, what is their profile?

³ The research design originally included only treated firms. However, in 2005, the sample included also a small number of untreated firms.

5. What are the characteristics of “better connected” enterprises, and what are the characteristics of more peripheral or isolated enterprises?

Objective 2

Exploring the benefits of the CDP, with particular reference to the changes occurred in the inter-organizational networks. To address this objective, the following questions will be analyzed:

1. To what extent has the CDP facilitated network linkages between firms and between them and institutions within or outside the electronics cluster?
2. What are the specific benefits of the network linkages achieved as a result of the CDP?
3. What policy instruments have been particularly helpful in stimulating network interaction and the creation of new ties?

Objective 3

Exploring whether the changes occurred in the inter-organizational networks have generated beneficial effects on the performance of firms. In particular, the study will seek an answer to these questions:

1. Is it possible to identify a relationship between the formation of network linkages and the benefits on firms in terms of business practices, innovation, exports, etc.?
2. Is this relationship positive or negative? Why?

This study also aims at drawing recommendations for policy design and at suggesting best practices that can be useful for other future policy designs.

1.4 Organization of the Report

The report is organized as follows. Section 2 presents an overview of the electronics cluster in Córdoba and illustrates the activities promoted by the CDP. The methodology is discussed in Section 3. Section 4 presents the results of the empirical analysis and addresses the evaluation objectives. Section 5 draws implications for policy.

2 The Electronics Industry in Córdoba and the CDP

2.1 The Electronics Industry in Córdoba from its Origins

The electronics industry in Argentina is characterized by the presence of many small and medium enterprises (SMEs) and a few large firms – recent estimates on the industry suggest that about 80 per cent of the firms in the industry has less than 50 employees (Trends, 2007). From a geographical standpoint, about 75 per cent of the electronics activities are concentrated in the City and Province of Buenos Aires, while the rest is distributed across three regional poles: Rosario, Córdoba and the free zone of Tierra del Fuego, which is specialized in consumer electronics. The electronics industry as a whole targets the domestic market, with about 20 per cent of the firms being export-oriented (Trends, 2007).

In Córdoba, the first electronics companies started up in the 1970s. Three factors seem to have influenced this process: the setting up in Córdoba of a military plant for aircraft production – the Fábrica Argentina de Aviones (FAdeA) (former Fábrica Militar de Aviones) – and the presence of several local universities, which have provided the local area with a pool specialized technical human resources - the first wave of graduates in engineering was in 1968. Also, the Córdoba electronics industry has benefited from Import Substitution (IS) policies that protected the production of consumer products between the 1950 and mid 1970s.⁴ According to Berti (2006) before 1975 there were already twenty-two firms in Córdoba, specialized in the production of consumer electronics items (TV, radios, and their components).

During the military dictatorship (1976-1983), changes in macroeconomic policies towards a higher international openness of markets contributed to the out-competition of many electronics SMEs, and to processes of industrial concentration. According to Azpiazu et al. (1992, cited in Berti, 2006), over that period, the electronics component industry reduced its production volumes by 91 per cent, which meant that most of the firms in that sub-sector either closed up their activities or reconverted into importers of electronics components. The Alfonsín Government (1983-1989) has attempted to promote an industrial policy in favor of the electronics and informatics industries.⁵ Although largely unsuccessful (Berti, 2006), these policies eventually contributed to create a certain degree of diversification of the industrial activities, and strengthened specific market niches (telecommunication, electro-medicine, computer electronics for industry needs, video-games, etc.) which came to substitute consumer electronics firms. According to Blanco et al. (1986), in 1986 Córdoba counted with twenty-five firms operating in these sectoral niches. Only two of them were firms with more than 150 employees.

The trade and monetary policies of the 1990s contributed to the weakening of SMEs and their local value chains, and attracted foreign investors, which offered better working conditions and therefore attracted

⁴ During the ISI period, producers of consumer goods in the electronics industry benefited by the existence of trade barriers in the import of electronics products and by Government procurement policies. In contrast IS policies did not favor producers of semi-manufactured goods or other inputs in the electronics industry (Berti, 2006).

⁵ The policy consisted in three parallel initiatives: one oriented at the upgrading of the technology and infrastructure in the communication industry (*Plan Megatel*), a second one promoting the informatics industry (*Plan Nacional de Informatica*) and a third one promoting the electronics industry (*Plan Nacional de Electronica*) (Berti, 2006).

the most talented human resources available at the local level. To face such difficulties, the existing local electronics producers in Córdoba gathered into a new business association (CIIIECCA), which Berti (2006) considers to be the result of pre-existing strong social ties between the local entrepreneurs. In fact most of those entrepreneurs had either studied together at the university or they had been colleagues in either IA Electronica and Microsistemas, two of the largest companies of the area, which failed during mid 1990s giving rise to ten spin-off firms. Since the turn of the century, the new macroeconomic policy, the development of new industrial policies and the currency devaluation that followed the 2001 economic crisis, pushed competitiveness in the electronics industry, which resulted in new SMEs being started up in Córdoba, and in the location of new foreign multinational companies (MNCs) in the software industry– such as Motorola, Intel and EDS⁶ – attracted by both fiscal incentives and the local availability of skilled workers. Compared to the software industry, which has been characterized by a considerable number of start ups since 2000, the electronics industry has registered lower start up rates, but it has been characterized by the strengthening of existing firms in terms of their number of employees, revenues and, to a lesser extent, exports (Trends, 2007; Matta, 2012).

In spite of these achievements, the electronics industry still suffered from limited competitiveness, especially in the international markets and, according to Mazzonis et al. (2002), who undertook the first diagnostic study on the industry, CDPs could help the electronics industry in Córdoba to strengthen this dimension.

2.2 CDP Activities in the Córdoba Electronics Industry

The CDP consisted in a set of parallel activities in which treated firms have voluntarily decided to participate. Participation in one activity did not imply participation in all the other activities and initiatives promoted within the program. The activities consisted in:

- (1) **The development of real service centers like the “Centro de Servicios Tecnológicos y de Manufactura con Tecnología de Montaje Superficial” (CSMT) and the “Centro de Abastecimientos Comunitarios y Desarrollo de Proveedores” (CACyDP).** The CSMT has been set up to produce electronics components at higher productivity levels and better quality standards as compared to the standards achievable by individual local firms. In this way, local firms were given the opportunity to improve their quality and efficiency by assembling components in the center at a very competitive cost.⁷ One of our interviewees told us that *“thanks to the quality and higher*

⁶ The electronics industry has not experienced a major structural change as a consequence of the multinational corporations’ investments. They have rather interested the software industry, which is not the focus of the current analysis.

⁷ The CSMT has recently shifted from the production of 750,000 to 1,2 Millions components per month. This initiative was also conceded a new line of FONTAR credit, which will hopefully increase productivity further.

productivity achieved by the CSMT, we were able to satisfy clients that requested short delivery times and small production volumes, which otherwise we would have never been able to serve”.

Next, the CACyDP's activities consist in the joint acquisition of electronics components and other inputs, which has favored the achievement of economies of scale and reduced the acquisition costs for the firms that joined the initiative.

- (2) **The promotion of industry fairs.** Active participation in different fairs (Feria Expotrónica; FICO and SINPRODE), with the aim of improving the visibility of the Córdoba electronics firms in the national and international markets. The policy support in this case consisted in the funding for travel and promotion/marketing expenses.
- (3) **The organization of thematic workshops and coordination activities,** each led by a different contracted consultant, and meant to promote the following activities:
 - **Strategic planning workshops** (*talleres de planificación estratégica*): they were meant to help the firms delineate their future strategies and long-term activities for the development of the industry.
 - **Affinity group workshops** (*talleres de afinidad*): these workshops were organized to find opportunity of inter-sectoral collaboration and they were meant to host entrepreneurs from the electronics industry as well as entrepreneurs from other complementary industries.
 - **Institutional activities:** they consist of a set of heterogeneous initiatives to promote the CIIECA (Mitnik al., 2011). The activities included also the hiring of a consultant, who was meant to support the match-making between firms with similar interests, to promote the affiliation to the CIIECA, and to increase the visibility of the sector within the local social context, through e.g. higher media coverage and marketing or promotion programs.

3 Methodology

3.1 Methodological Overview

This evaluation study is based on the collection of primary data through interviews to the firms in the electronics cluster of Córdoba. As discussed in Section 1.1, the CDP in Córdoba targeted both the software & electronics cluster, among other industries. Prior to the main fieldwork, we have conducted interviews with representatives of both the software and the electronics sectors, and decided to focus only on the latter, because we figured that the response rate would have been higher than in the software industry, and electronics' industry representatives demonstrated high interest in this study.

A structured questionnaire has been designed to collect information that allows to answer the questions and to address the objectives of this study (outlined in Section 1.3). The questionnaire has been designed to collect information that permits comparability with our baseline survey carried out in 2005, and it has been administered to both treated and untreated firms in the cluster (see Section 3.2 for details on the sample). We choose 2005 as a baseline year because of the higher response rate as compared to 2006. The data collection has been carried out through face-to-face interviews to professionals occupying key management positions in the firms (in many cases to the owners themselves) and it included a special section for the collection of network data (Appendix I reports the questionnaires used for both treated and untreated firms). Data collection was followed by a complete codification of answers into variables and by the creation of different datasets (see Section 3.3).

The study counts also on a focus group carried out after a first report with the analysis of data had been produced (see Section 3.6).

3.2 Sample Selection

We have first proceeded to identify the universe of firms that were active electronics manufacturers in the City of Córdoba. Due to the lack of an official registrar of such companies and of census data, we opted for the CIIECA as a main source of information, complementing this source with ad-hoc interviews to key-industry informants, who provided us with a comprehensive list of firms active in the electronics industry. In 2012, CIIECA counted on seventy affiliated firms, but not all of them are relevant to our study – i.e. some are pure traders of imported goods, while others have been excluded because, though originally registered as electronics producers, they had changed their business activity at the time of the study. Upon suggestions of key informants, we have also included in our list firms that were not affiliated to the CIIECA at the time of the survey.

Based on these sources, we found that in 2012 the universe of electronics firms in Córdoba was of 49 firms. We have contacted all of them to proceed with interviews. Our interest in interviewing the universe of firms – rather than a random sample - is that it allows the collection of full network data, which gives more opportunities, as compared to other methods of data collection, for a comprehensive analysis of network structures and actor's positions in the network – thus allowing for a richer analysis of social

networks (on this, see also Giuliani and Pietrobelli, 2011). To achieve this, we have undertaken a number of sensitizing activities, including the diffusion of an endorsement letter by FOMIN-BID (reported in Appendix II) through the CIIIECCA to its affiliate firms. We were successful in interviewing 38 firms (78% response rate), while the rest of the firms were unavailable.

The final sample includes 22 treated and 16 untreated firms (see Table 1). In the table we also report information about the 2005 sample, our baseline. The total number of electronics firms existing in 2012 that were interviewed in 2005 is of twenty-seven firms, four of which did not allow to be interviewed in 2012. Hence, twenty-three firms have been interviewed in both years, whereas fifteen firms, which have been included in the 2012 study, did not exist (6), or did not answer our questionnaire in 2005 (9). Furthermore, 14 firms that were included in the 2005 study no longer existed or migrated to other industries in 2012.

TABLE 1 SAMPLE	2005	2012
Total number of firms in the electronic industry (treated and untreated)	50	49
Total number of treated firms in the electronics industry	35	26
Total number of untreated firms in the electronics industry	15	23
Total number of interviewed firms	41	38
Total number of treated firms interviewed	31	22
Total number of untreated firms interviewed	10	16
Total number of firms existing both in 2005 and 2012	27	
Total number of firms interviewed both in 2005 and 2012	23	
Total number of firms interviewed only in 2012	15	
Total number of firms interviewed only in 2005	14	

3.3 Data Collection

The collection of data was based on a questionnaire administered through face-to-face interviews to the entrepreneurs or to the managing directors of the firms. Prior to the main fieldwork, the questionnaire was tested in three different interviews and changes have been made according to respondents' suggestions. Each interview was carried out by an assistant of the person in charge of the 2005 evaluation study and it lasted on average about one hour.

The questionnaire (Appendix I) includes the following sections:

SECTION A: General firm-level data

Name, Address, Contact numbers/email, etc.

Size, Main activity/ies, Type of firm, etc.

SECTION B: Degree of participation in the CDP and relationship with CIIIECCA

Main activities undertaken during (and through) to the CDP
Perception of CDP impact on the Córdoba cluster and on firms' own activities
Activities that have benefited from the CDP

SECTION C: Networks

Inter-organizational networks with other business firms in Córdoba (in the electronics sector)
Networks with institutional actors
Indication of what linkages were created thanks to CDP interventions/initiatives

This section encloses a separate roster of firms and organizations.

SECTION D: Innovation, Entrepreneurship and Performance

Entrepreneurial capabilities, business practices
Sales, profits/losses, exports, innovative output
Expected performance in the absence of CDP

SECTION E

Open questions on the effectiveness of CDP and network management models.

Network data (Section C) were collected using a roster recall method (Wasserman and Faust, 1994), meaning firms were given a full list (roster) of the other electronics firms in the City of Córdoba and asked questions related to their transfer of information and to the existence of collaborations. Firms that did not answer our questionnaire were also included in the roster, and their relationships have been tracked if the interviewed firms declared to have established a relationship with a non respondent firm. In this research we consider a tie to exist if at least one of the respondents has indicated that tie to exist. We agree that this approach may give rise to concerns about the accuracy of data (Wasserman and Faust, 1994, p. 56), but in this way we can include relational data about non respondents as well. We have proceeded in this way because we consider that in this study the quality of the relational data is likely to be high due to the fact that we analyze a well bounded system (e.g. the population of firms is known, the numbers are workable, and firms do all belong to the same industry context) and, especially in the case of the CN, the relationships are institutionalized, which increase the chances that they give good response reliability (Calloway et al., 1993). Furthermore, the stability of our observed patterns of interaction over time (see later sections), the qualitative information gathered during this round of interviews and the focus group encourage use to think that our data are reliable. In particular, the non respondent firms do not appear to possess characteristics that would have influenced network structure in a significant way, and most of the respondents did not even mention them as partners in relationships.⁸ This is consistent with our 2005 data, which suggest that they occupied a very peripheral role in the network (Matta, 2011).

⁸ The QAP correlation between IN including all relational data about the non respondents and the IN including only incident relations to non respondents gives a Pearson coefficient of 0.9607.

Answers to the questionnaire were codified into a dataset (both in Excel and SPSS) and SNA data were codified into UCINET and STOCNET-compatible data files.

Beside interviews to entrepreneurs and managing directors, this study also counts on six further interviews to key stakeholders in the Córdoba electronics cluster: three involved in the promotion and coordination of different activities under the CPD, and three among the current and former presidents of the business association CIECCA.

3.4 Sample Characteristics

According to the answers of Section A of the questionnaire, our sample results to be constituted by Argentinean Micro-Small-Medium Enterprises (MSMEs) (Table 2-a). In 2011 they employed on average 32 employees, of which about 25 held permanent positions in the firm. Table 2-b shows that about 35 per cent of the firms in our sample was funded prior to 1990, while the remaining started operations during the 1990s (42%) and in the past decade (24%). Table 2-c shows that the firms in the cluster specialize in different segments of the electronics industry, which range from the production of basic electronics components and circuits to more sophisticated final products such as TLC equipment or electro-medical devices. There are an average of 3-4 firms per market segments and these segments are not part of the same value chain. Next, Table 2-d shows that the firms are vertically integrated, performing internally R&D and design activities (92%), manufacturing (100%), and marketing and distribution activities (around 90%). This clearly points at a specific characteristics of this cluster, where local division of labor seems to be rather limited, which also differentiates this cluster from the archetype of the Marshallian industrial district, characterized by high division of labor across local firms. The historical seeds of this cluster are to be found in the original existence of a military plant for aircraft production, in the presence of local universities, which have provided the local area with a pool of engineers, and in the generation of spin-off activities from two large companies that have ceased their activities in the 1990s (see Section 2.2).

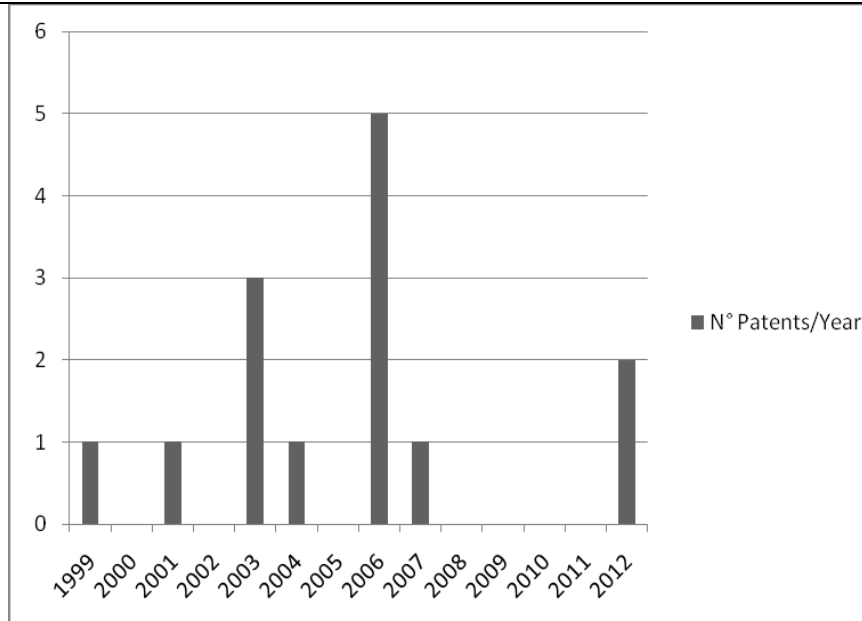
We report separate statistics for treated and untreated firms. As discussed in Section 3.7, the two samples have not been randomly selected, which means that these two groups may differ qualitatively. A clear distinction is about the size of the firm, as most of the treated firms are medium-sized (52.3%), while a third of untreated firms is classified as micro firm (29.4%). Also, whereas about a half of the treated firms are relatively old, having been founded prior to 1990s, untreated firms have been founded more recently: more than a third after the year 2000. Finally, only four firms in Córdoba are strongly export-oriented – i.e. they export between forty and sixty per cent of their production, mainly to Latin America and other emerging economies. In contrast, about half of the firms sell only to the domestic market.

TABLE 2. DESCRIPTIVE STATISTICS				
a) Size	N	(%)	Treated (N and %)	Untreated (N and %)
Micro (0-5 employees)	6	16	1 (4.8%)	5 (29.4%)
Small (6-20 employees)	16	42	7 (33.3%)	8 (41.6%)
Medium (21-150 employees)	15	39	12 (57,1%)	3 (17.6%)
Large (>150 employees)	1	3	1 (4.8%)	1 (5.9%)
b) Years of foundation	N	(%)	Treated (N and %)	Untreated (N and %)
Prior to 1990	13	34.2	10 (47.6%)	3 (17.6%)
1991-2000	16	42.1	8 (38.1%)	8 (47.1%)
2001-2009	9	23.7	3 (14.3%)	6 (35.3%)
c) Segments	N	(%)	Treated (N)	Untreated (N)
Electronics components	5	13,2	3	2
Measurement devices (e.g. electric weights)	6	15,8	4	2
Energy devices (e.g. transformers)	3	7,9	2	1
Industrial electronics	6	15,8	5	1
Electro-medical devices	4	10,5	3	1
TLC	3	7,9	1	2
TV & radio production (e.g. broadcasting devices, anthems)	3	7,9	1	2
Security & alarms	1	2,6	0	1
Audio-visual & entertainment devices (e.g. home theatre, video games)	3	7,9	2	1
Distribution services (e.g. ATM)	4	10,5	1	3
Industrial control and automation (e.g. CNC, mecatronics)	6	15,8	2	4
Others	11	28,9	5	6
d) Activities performed internally	N	(%)	Treated (N and %)	Untreated (N and %)
R&D	35	92.1	20 (95.2%)	15 (88.2%)
Design	36	94.7	21 (100%)	15 (88.2%)
Manufacturing	38	100	21 (100%)	17 (100%)
Marketing	34	89.5	18 (85.7%)	16 (94.1%)
Distribution and Logistics	18	47.4	11 (52.4%)	7 (41.2%)
Other (professional or technical services)	4	0.1	1 (4.8%)	3 (17.6%)
e) Export	N	% on total respondents*	Treated (N and % on treated respondents*)	Untreated (N and % on untreated respondents*)
Only domestic market	15	53.6%	9 (50%)	6 (60%)
Exporting between 1 and 20% of overall sales	9	32%	6 (33%)	3 (30%)
Exporting between 20% and 40% of overall sales	0	0%	0 (0%)	0
Exporting more than 40% of overall sales	4	14.4%	3 (17%)	1 (10%)
Notes: Data refer to 2011				
(*) 10 firms did not answer the question on exports.				

We have also traced the profile of the firms interviewed, on the basis of different management issues, such as strategy formulation, human resource training, innovation, market-orientation, funding and

social and environmental management (based on *Question D.a.* of the questionnaire). According to Table 3, firms are rather heterogeneous on several dimensions, although some common patterns can be identified. First, most respondents declare to have developed a clear, long term and ambitious strategy and consider their firm to be innovative and to be able to compete with leading international firms and products.⁹ However, the majority of them still fail to have ISO certifications to operate in international markets and only ten firms have at least one patent registered at the Argentinean Patent Office in the period 1999-2012 (see Figure 2).

Figure 2 Number of Patents Granted to Electronics Firms in Córdoba (1999-2012)



Source: Our elaboration on Argentinean Patent Office data (Instituto Nacional de la Propiedad Industrial (INPI)).

Second, they display little interest in addressing social issues through Corporate Social Responsibility (CSR) policies and, although more than ninety per cent of them consider the reduction of polluting emissions as critical, in practice only about a half of them have invested considerable resources in this task. In some cases, environmental issues are not considered to be a problem, as the manufacturing activity performed of this sector is not perceived as contaminating for the environment.¹⁰ Finally, virtually all respondents consider that the women benefit from the same working conditions and opportunities as men, but at the same time, in around forty per cent of the sample firms, women do not occupy leading management positions.

⁹ It should be remarked that the international orientation of these producers is mainly towards Latin American countries (LAC). Hence, when respondents declare to have products complying to international standards they mainly refer to LAC standards.

¹⁰ Qualitative insights from the interviews suggest that respondents are not particularly concerned about the contamination connected to the disposal of electronics components (e-waste).

TABLE 3 BUSINESS PRACTICES						
Scale: 1= totally disagree; 5=totally agree	1	2	3	4	5	Missing
Strategy:						
We have a clear, long term and ambitious strategy (N; %)	6 16,7	4 11,1	9 25,0	6 16,7	11 30,6	2
Innovation:						
We have a continuous innovation model (N; %)	0 0	1 2,6	9 23,7	17 44,7	9 23,7	3
We have improved the understanding of our product/Process faults (N; %)	2 5,6	2 5,6	4 11,1	19 52,8	9 25,0	2
We develop frontier technologies for the international markets (N; %)	8 21,6	3 8,1	15 40,5	6 16,2	5 13,5	1
Our firm is more innovative than the average firm in Córdoba (N; %)	3 9,7	5 16,1	7 22,6	9 29,0	7 22,6	7
Our products could easily compete with those of leading international producers (N; %)	3 8,1	9 24,3	13 35,1	12 32,4	9 24,3	1
Markets:						
We have made management changes to adapt and compete in new markets (N; %)	3 8,6	2 5,7	5 14,3	17 48,6	8 22,9	3
We have a very proactive attitude towards innovations needed by the market (N; %)	1 2,7	3 8,1	8 21,6	14 37,8	11 29,7	2
We have important international buyers which are important for technological and market learning (N; %)	13 36,1	4 11,1	6 16,7	8 22,2	5 13,9	2
We have introduced ISO certification to improve international trade (N; %)	17 47,2	1 2,8	4 11,1	6 16,7	8 22,2	2
Funding:						
We count on internal funding rather than on banks and public support (N; %)	0 0	2 5,6	7 19,4	10 27,8	17 47,2	2
Training:						
We have increased investment in HR training and retention (N; %)	3 8,8	2 5,9	13 38,2	12 35,3	4 11,8	4
We have taken important policies to improve our workforce skills and capabilities (N; %)	3 8,6	13 37,1	16 45,7	3 8,6	3 8,6	3
Our technical workers go regularly abroad to visit other firms and get trained (N; %)	23 65,7	4 11,4	4 11,4	3 8,6	1 2,9	3
Social and Environmental Issues:						
The firm has CSR policies to support the local community (N; %)	22 59,5	5 13,5	2 5,4	5 13,5	3 8,1	1
The owner of the firm considers that the reduction of polluting emissions is a priority strategic issue (N; %)	0 0	1 3,6	1 3,6	10 35,7	16 57,1	10
The firm has invested considerable resources to reduce pollution (N; %)	,0 0	4 26,7	3 20,0	3 20,0	5 33,3	23
Women have the same working conditions as men (N; %)	1 3,2	0 0	1 3,2	3 9,7	26 83,9	7
Women occupy managing or directive positions in the firm (N; %)	16 43,2	0	3 8,1	6 16,2	12 32,4	1

3.5 SNA Methodological Issues

In this section, we provide an overview of the SNA measures and methods used in this report,¹¹ The analysis of social networks needs the collection of social network data. For this purpose, we have elaborated

¹¹ Readers unfamiliar with SNA and its application to CDP should refer to Giuliani and Pietrobelli (2011).

two sets of relational questions, which permit the mapping of information and collaboration networks, reported in Section C of the Questionnaire, and below:¹²

Information Network (IN):

A- To which of the firms included in List 1() did you transfer business information (e.g. technological advice, marketing advice or any other kind of information that is relevant to the business) in the period 2008-2011?*

B- From which of the firms included in List 1() did your firm receive business information (e.g. technological advice, marketing advice or any other kind of information that is relevant to the business) in the period 2008-2011?*

- Please indicate the importance you attach to the information obtained in each case by marking the identified firms on the following scale: 0= none; 1= low value information, with minor impacts on your business; 2= information of moderate value; 3= information of strategic value, which generated technological change and/or better economic performance.

Collaboration Network (CN):

With which of the firms included in List () did your firm collaborate for e.g. the development of new products, the promotion of new marketing initiatives, the solution of common technological problems, etc., over the period 2008-2011?*

Note: Collaborative ties do not include market operations (e.g. sale of goods)

- Please indicate the importance you attach to the collaboration in each case by marking the identified firms on the following scale: 0= none; 1= only occasional collaborations that no longer exist today; 2= medium-term collaborations (2-3 years) that are likely to come to an end soon; 3= medium-term collaborations (2-3 years) that are likely last in the long term.

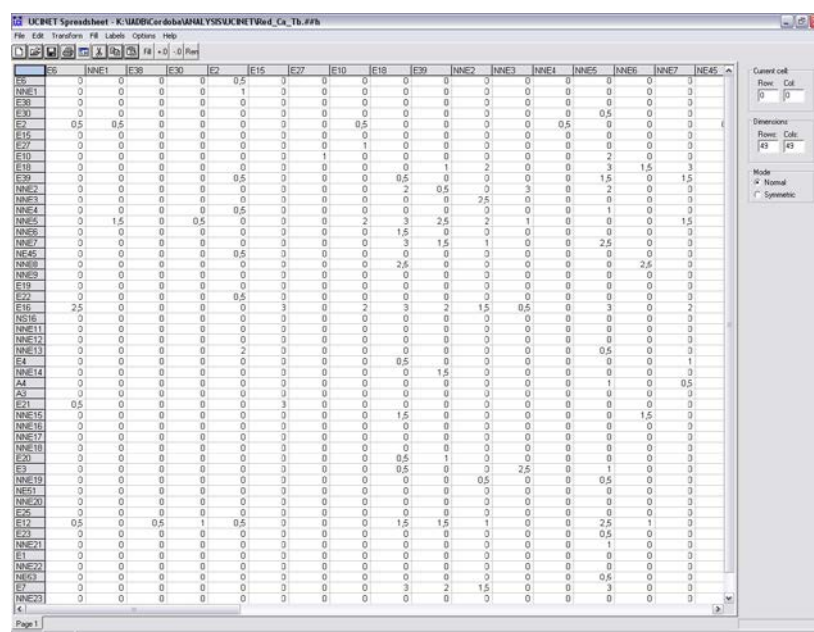
Note (*): List 1 included all the names of the 49 electronics firms that we identified as the universe of electronics firms operating in the City of Córdoba.

Relational data resulting from answers to these questions are expressed in a matrix composed of n rows and n columns, corresponding to the number n of firms in the study (49 in the case of the 2012 relational matrixes).¹³ Each cell in the matrix reports the occurrence of a given relationship existing between firm i in the row to firm j in the column. Each cell can contain valued data, according to the importance of the relationship, or dichotomous data (0,1) according to the existence or not of a given relationship (see Figure 3 for an illustration of an UCINET matrix). Given the nature of the questions, the IN is a directed network, which means that its ties are not symmetric (i.e. the information transfer is not necessarily reciprocated), whereas the CN is symmetrical because collaborations are by definition mutual relationships.

¹² To allow comparability over time, in the formulation of relational questions we have taken into account, and proceeded to do only minor modifications to, the questions that were included in the 2005 questionnaire.

¹³ The networks include also non-respondent firms.

Figure 3. An UCINET Matrix



We have performed both descriptive and dynamic SNA. The objective of the former is that of describing certain characteristics of networks, while the latter investigates the factors that influence the change of a certain network over time, based on stochastic actor-oriented models for network change (SAOM).

Table 4-i reports the measures used to analyze the characteristics of the local networks in 2012, namely: density, fragmentation, dyad-based reciprocity, number of isolates, size of largest component, and degree centrality. All these measures are calculated using the software UCINET. As explained in the table, some of these measures refer to the network as a whole, as in the case of density, fragmentation and components; while others are network statistics at the level of pairs of firms (dyad-based reciprocity) and at the level of individual firms (actor-level degree centrality). Degree centrality is selected here as a measure indicating how central is a firm, in terms of the number of ties established by each firm with other firms in the network.¹⁴ Table 4-ii reports the measures used to identify the dominant players in the network, based on *k*-core analysis and on Gould and Fernandez (1989) brokerage roles. In terms of Gould and Fernandez's roles, we use here only the gatekeeper role, connecting treated and untreated firms.

¹⁴ We have considered only degree centrality as a measure of actor centrality because, given the structural properties of the network, most of the centrality indicators were highly correlated. For instance correlations between degree centrality and betweenness centrality were above 0.80. There was also no real justification for adopting other centrality indicators in this case.

TABLE 4 DESCRIPTIVE SNA: KEY CONCEPTS AND MEASURES			
Concepts		Description	Measures
(i) Network Characteristics			
	1. <i>Density of the network</i>	The overall connectedness of firms in a network.	Network density (<i>ND</i>) is defined as the proportion of possible linkages that are actually present in a graph. <i>ND</i> is calculated as the ratio of the number of linkages present, <i>L</i> , to its theoretical maximum, $n(n-1)/2$, with <i>n</i> being the number of nodes in the network (Wasserman and Faust, 1994): $ND = \frac{L}{[n(n-1)/2]}$ It ranges from 0 (total disconnection) to 1 (maximum connection).
	2. <i>Fragmentation of the network</i>	The degree to which some firms are disconnected from the network	The number of components (see below) divided by the number of nodes.
	3. <i>Dyad based reciprocity</i>	An indicator of the degree to which firms establish reciprocal tie	The number of reciprocated dyads (i.e. two nodes with bi-directional ties) divided by the number of adjacent dyads (i.e. two nodes with at least an uni-directional tie).
	4. <i>Isolates</i>	The number of disconnected nodes in a network	Firms with no connections to other firms in the network.
	5. <i>Component</i>	A group of firms that are connected in a network	Components are separate sub-sets within a network. The size of the larger component is the number of firms that form part of the largest component.
	6. <i>Actor-level degree centrality</i>	Number of ties a firm maintains with other actors in the network	Degree centrality is defined as the number of links incident upon a node (i.e., the number of ties that a node has). The indicator can be standardised by <i>n</i> , with <i>n</i> the number of nodes in the network: $DC_i = \frac{\sum_j x_{ij}}{n-1}$
(ii) Dominant Players			
	1. <i>k-core analysis</i>	A k-core is a maximal group of actors, all of whom are connected to some number (<i>k</i>) of other members of the group. We selected as dominant players the firms with the highest <i>k</i> -cores in the network.	
	2. <i>Gould & Fernandez gatekeeper indicator</i>	Actors connecting different communities or subgroups (in this case treated and untreated firms) have access to resources that are different, and they can also exert control on the actors that they are connecting. The <i>gatekeeper</i> is defined here as a dominant player that connects treated and untreated firms through information and/or collaboration ties.	

Table 5 reports the variables that we have included in our SAOM analysis (Snijders, 2001; 2005). SAOM are based on Markov Chain Monte Carlo (MCMC) simulations, and model the change of one tie variable by one actor at a time (a so-called network micro-step) by specifying a multinomial logit distribution that maximizes a random utility function (the so-called evaluation function) that describes actors satisfaction with their local network neighborhood configurations. Through this statistical approach, SAOM estimates the probability with which a firm will create a new tie. In this estimation we analyze the impact of CDP participation on the formation of new information ties with other electronics firms in the cluster over the period 2008-2012, controlling for other possible effects that could also influence the formation of ties, like: structural effects (reciprocity, transitivity and preferential attachment); firm-level characteristics (size, age, number of patents, and exports) and proximity effects among the firms (friendship and kinship,

geographical distance, type of sub-sector, and participation in the directive committee of the CIIECCA). This exercise is based on the 2005 and 2012 dichotomous information networks.

TABLE 5 STOCHASTIC ACTOR-ORIENTED MODEL FOR NETWORK CHANGE (SAOM)		
	Variables	Measure/Description <i>A positive and significant coefficient means...</i>
	CDP effects:	
	CDP participation intensity	Firms with higher involvement in different CDPs' activities, proxied by the number of initiatives in which they have participated during the CDP, have higher propensity to form new ties.
	CSMT	Firms that have participated in the CSMT have higher propensity to form new ties.
	CACyDP	Firms that have participated in the CACyDP have higher propensity to form new ties.
	Fairs	Firms that have participated in the trade fairs have higher propensity to form new ties.
	Strategic Planning workshops	Firms that have participated in the Strategic Planning workshops have higher propensity to form new ties.
	Affinity Group workshops	Firms that have participated in the Affinity Group workshops have higher propensity to form new ties.
	Institutional Activities	Firms that have participated in the Institutional Activities have higher propensity to form new ties.
	Controls	
	(a) Structural effects	
	Reciprocity	The formation of new ties is based on the search for reciprocation.
	Transitive triplets	A new tie is more likely to occur between A and B at time t2, if A and B are tied to a common actor (C) at time t1.
	Preferential attachment	Firms with high out-degrees (i.e., outgoing ties) at time t1, have a tendency to generate extra outgoing ties at time t2.
	(b) Firm-level effects	
	Size	Larger firms, measured by the number of employees in 2012, are more likely to form new ties.
	Age	Older firms are more likely to form new ties.
	Patents	Firms with more patents are more likely to form new ties (based on Argentinean Patent Office data).
	Exports	Firms that export are more likely to form new ties. We use a binary variable which takes the value of 1 if the firm exports, and 0 otherwise.
	(c) Proximity effects	
	Friendship and kinship	Firms whose entrepreneurs were tied in 2005 by friendship or kinship relationships are more likely to form ties with each other.
	Geographical distance	The higher the geographical distance between two firms the higher the probability that they would form new ties (a negative sign of the coefficient points at the opposite relationship).
	Sector	Firms belonging to the same electronics sub-sector are more likely to form new ties with their peers.
	CIIECCA Directive Committee Membership	Members of the Directive Committee of the CIIECCA are more likely to form new ties with their peers.

3.6 Focus Group

The objective of the focus group was to discuss the validity of our results and gain interpretative insights (a list of questions discussed during the meeting is reported in Appendix I-3). Invited to the focus group were six entrepreneurs affiliated to the business association CIIIECCA, of which five participated to the CDP and one did not. The meeting was held at one of the meeting rooms of the CIIIECCA and lasted about a hour. The questions were asked by Andrés Matta in an interactive group setting where participants were free to talk with other group members. The climate was relaxed and highly interactive, although some entrepreneurs were more prominent than others in addressing the proposed issues.

3.7 Limitations of the Study

This evaluation study has methodological limitations that are discussed below:

1. **Baseline data had not been properly collected.** We do not have information about the characteristics of the firms and the cluster prior to the starting of the CDP in 2003. Two evaluation studies were undertaken during the CDP implementation in 2005 and 2006 and we use 2005 data as our baseline, as explained in Section 3.1.
2. **Earlier evaluation studies were not designed to collect data about a control group** of firms. Hence, we do not count on a control group in this analysis. We have collected information about untreated firms, but the treated and untreated firms that we interviewed were not randomly selected: as explained in Section 3.2, the study sought to interview the universe of treated and untreated firms in both 2005 and 2012, hence our sample includes only firms whose representatives have agreed on being interviewed. It is plausible that the response rate of treated and untreated firms varies according to different motivations (e.g. treated firms have higher incentives in participating to the evaluation study; untreated firms that participate in the study are particularly active and dynamic firms), which suggests that in theory there can be a qualitative difference between the treated and untreated firms that are part of the evaluation study. In fact, the two samples are rather different in terms of firm size and year of foundation (see Table 2), and for this reason we cannot consider our group of untreated firms as a proper control group for this analysis.
3. **A 78% response rate** in 2012 may bias our network data, because we could not collect relational data from non-respondent firms (see Section 3.3 and, more in general, see Giuliani and Pietrobelli, 2011). We have thus asked each respondent to tell us about relationships with all the cluster actors, including non-respondents.
4. Another problem is the **low response rate about performance indicators** (i.e. sales, profits/losses, exports, innovative output; see Section D of the questionnaire). About half of the respondents did not answer these questions as they considered them confidential. Nor did they allow the consultation of financial data or

documents. In some cases we have tried to contact the firms after the interviews to convince them to provide us with this information, but we have succeeded only in few cases.

These caveats have implications on the type of evaluation study that can be undertaken in this particular case. The low response rate on performance indicators, the lack of a proper baseline and of a control group impede the adoption of policy impact assessments based on econometric analysis and quasi-experimental approaches (see e.g. Ubfal and Maffioli, 2010; Maffioli et al., 2011). In contrast, this evaluation study takes a mixed-method approach, by combining case-study methodology with statistical analysis on firm-level and network variables. Our approach is therefore not meant to *prove causality* between the policy treatment and firm-level performance, but to *analyze*, through both qualitative and quantitative evidence, the effectiveness of the CDP on local coordination and firm-level behavior, with particular reference to the objectives presented in Section 1.3.

4 Empirical Results

4.1 Evaluation of Objective 1: the Networks

4.1.1 Network characteristics

In this study we focus on two types of local networks (see also Section 3.5): the information network (IN), which measures the transfer of business information – including any information that is relevant for the business, e.g. technological, marketing-related information, etc. – that has occurred among the electronics firms, and the collaboration network (CN), which measures the existence of collaborative projects between firms. All connections are between the electronics firms in Córdoba.

The study carried out prior to the starting of the CDP (Mazzonis et al., 2002; MIF/BID, 2008) suggests that, in spite of there being a minimum level of connectivity among the firms, such connectivity was still poor and collaboration minimal, as described by the following quote:

“Un estudio previo al diseño del Programa...detectó...escasa evidencias sobre la existencia de relaciones dinámicas de cooperación entre competidores o entre diferentes actores vinculados a una cadena productiva. Tampoco existían vínculos entre empresas e instituciones estatales o privadas.”
(MIF/BID, 2008, p. 42)

In contrast to this initial evidence of weak connectivity, a study undertaken in 2005, two years after the starting of the CDP, shows the presence of significant inter-organizational networks, aimed at the local exchange of knowledge or based on collaborative inter-firm projects (Matta, 2012). In this new study we corroborate this earlier finding about local networks, but show that the network has evolved towards higher levels of concentration and has slightly decreased its density. Table 6 compares a set of indicators about the structural properties of IN and CN in 2005 and 2012. We observe a decrease in the density of linkages over time in both networks: density has decreased from 0.17 in 2005 to 0.08 in 2012 (for the IN) and to 0.06 in the case of the CN,¹⁵ and in 2005 the number of isolated firms was lower in both networks. Moreover, the network structure seems to have moved towards higher polarization and centralization: the GINI coefficient values¹⁶ for degree centrality have increased for both networks, which indicates that linkages have become more concentrated.

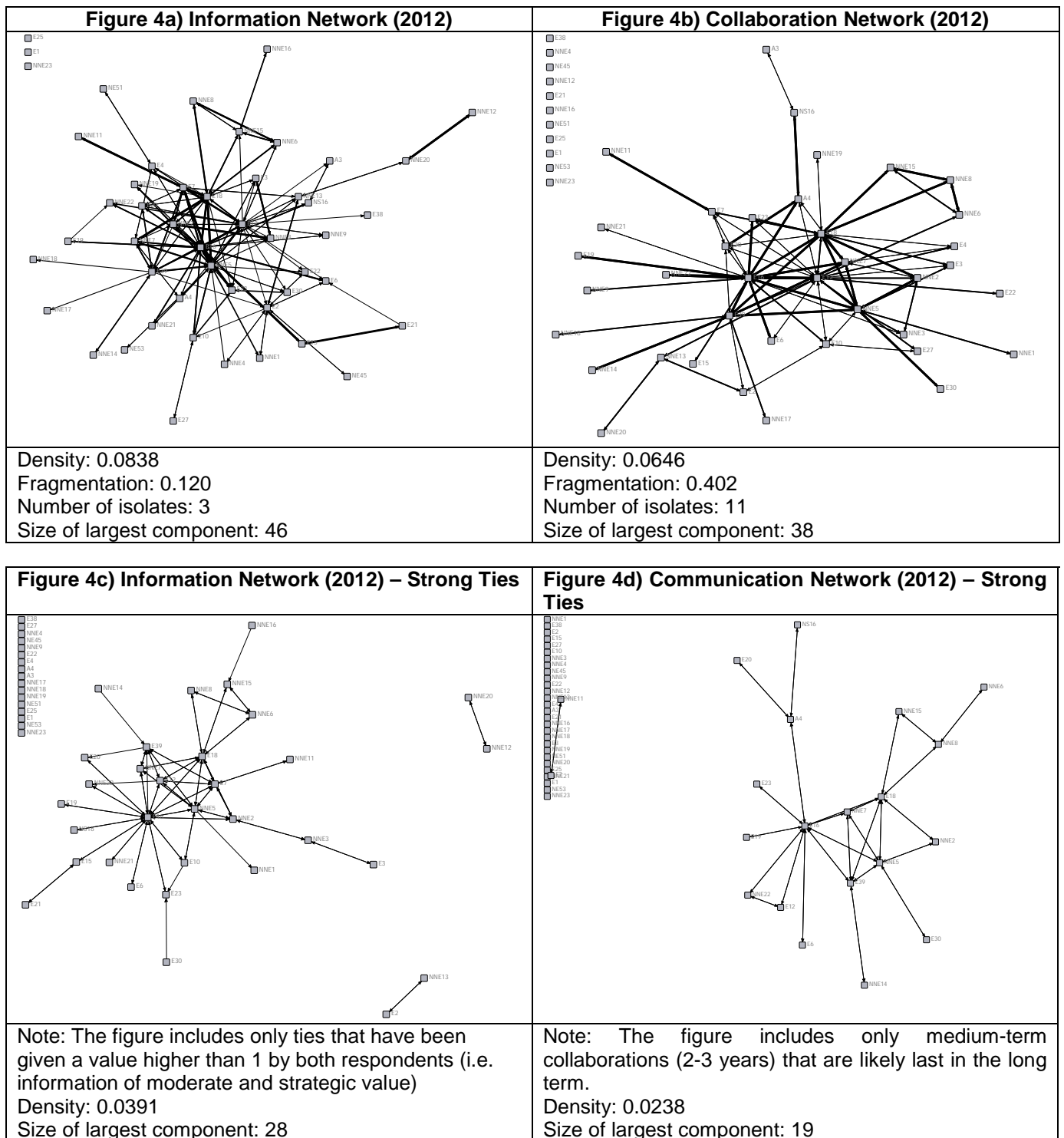
¹⁵ We have carried out a bootstrap t-test to check that the two networks' densities are statistically different and found a t-statistics of 2.7, which rejects the null hypothesis of no difference (Snijders and Borgatti, 1999, p. 65).

¹⁶ The Gini coefficient is a measure of statistical dispersion and is often used to measure the inequality among values of a frequency distribution. A Gini coefficient of zero expresses perfect equality where all values are the same (for example, where all firms have exactly the same number of ties). A Gini coefficient of one expresses maximal inequality among values.

TABLE 6 NETWORKS' CHARACTERISTICS IN 2005 AND 2012				
	Information Network		Collaboration Network	
	2005	2012	2005	2012
Number of firms in the network	41	49	41	49
Density	0.17	0.08	0.17	0.06
Number of isolates	1	3	5	11
GINI Coefficient on Degree Centrality	0.4028	0.5417	0.5384	0.6264

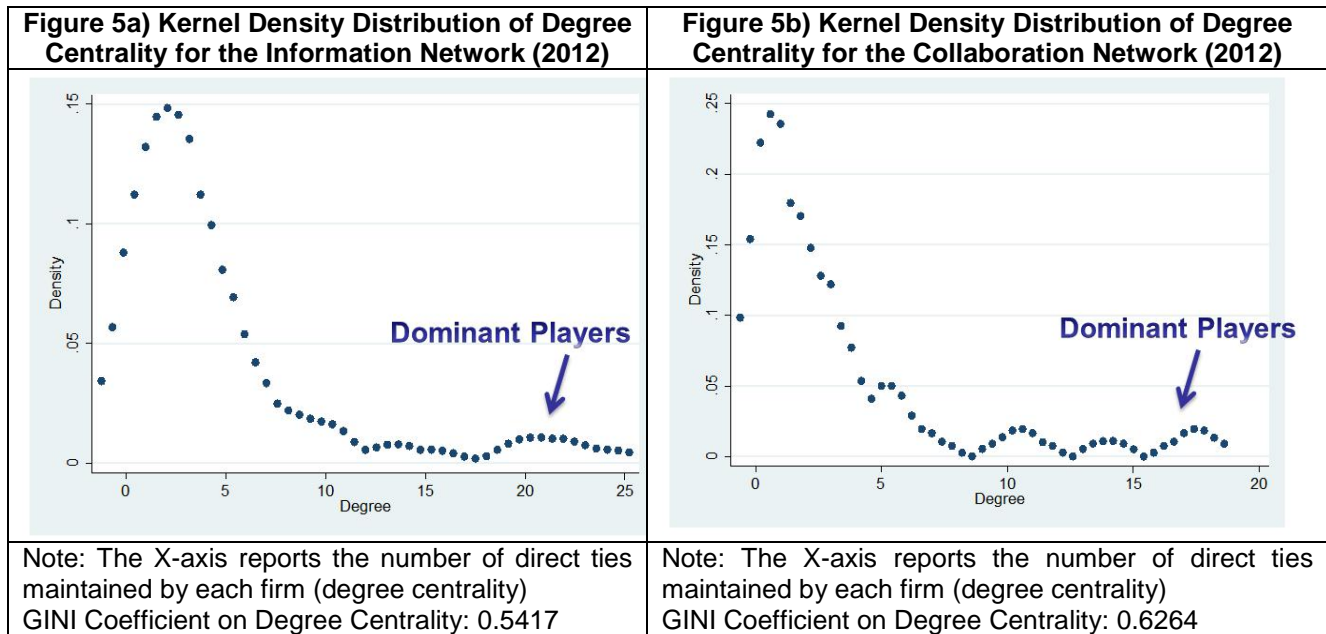
Figures 4a and 4b depict the 2012 IN and CN respectively. The former is denser than the latter: a density value of 0.08 (for the IN) means that, on average, firms in the cluster ask or transfer information to/from about 8 per cent of the other cluster firms. Likewise a density of 0.06 (for the CN) means that firms collaborate with 6 per cent of other cluster firms. Although these density values may not appear to be especially high (i.e. they are closer to 0 than to 1), in reality, the density of linkages tells very little about the beneficial effects of a network. As forming and maintaining ties requires considerable time and resources, firms do often “economize” on the number of ties they form, by selecting only partners from which they believe they can obtain some kind of benefit. In fact, most of the linkages formed in the IN are reciprocated – with a dyad-based reciprocity of 0.74 – indicating that firms tend to establish mutually enriching relationships.

More important than density is the way the network is structured, which tells more about the way in which resources are transferred and/or shared at the local level. A comparative analysis of the two 2012 networks shows that the CN is slightly more fragmented than the IN, counting on 11 isolated firms (i.e. firms holding no collaborative tie with other cluster firm), whereas only 3 firms in the IN are isolated. This is consistent with the fact that the CN requires a higher commitment by the interactive parties – i.e. the collaboration on given projects - which makes connections more selective and harder to maintain as compared to relationships characterized by pure transfer or sharing of information. Figures 4c and 4d display only the strong ties of both IN and CN respectively. In the former case, strong ties correspond to linkages that are considered by the respondents to be from moderate to high strategic value for the firm in terms of the impact on the firm’s own business activities and performance (see questions in Section 3.5). In the latter, strong ties are collaborative relationships that have lasted for a period of 2-3 years and that the respondents consider that will last over the long term. In both cases, strong ties are sparse but we observe a group of firms that maintain strong and valuable ties, which entrepreneurs consider that will last over the long term.



Results of the descriptive SNA suggests that both the IN and CN display rather “centralized” structures, which are held together by a group of central firms that we call here ‘**dominant players**’. This is consistent with the distributional analysis of the degree centrality indicator, which reveals that ties are rather unevenly distributed across firms: the GINI coefficient discussed above. Figures 5a and 5b illustrate the Kernel density distributions of degree centrality values for IN and CN, showing that both networks are characterized by the

presence of few firms with many ties, while the majority of the other firms display much lower connectivity levels.¹⁷



4.1.2 Dominant players

We identified **seven** firms with characteristics of **dominant players**, defined as those firms that have strong connectivity both in the IN and CN (see Figure 6).¹⁸ Five of them are medium-sized firms funded in the 1980s, which we also central firms in 2005, one is a new entrant firm and another one existed already in 2005, but came out prominently as a central firm only in 2012. The latter two are smaller and more recently funded firms whose entrepreneurs show a very dynamic and collaborative attitude towards local initiatives, including participation in CPD and CIIECA's activities. Dominant players are considered to be the technological leaders of different market niches, spanning the production of TV electric devices, TLC devices, industrial electronics, electro-medicine products, control systems for public transport, and automation systems for the industrial sector. Qualitative insights from fieldwork suggest that these firms are tied together by the strong social linkages their owners have established even prior to the creation of the business association CIIECA (see Section 2.1) and the starting up of the CDP. Currently they are all active members – many with directive responsibilities – of the CIIECA and, with one exception, their owners have been enthusiast participants in the many initiatives of the CDP. At the local level these firms are also recognized to be leading actors in their respective sub-sectoral niches, and are often imitated and taken as reference point by the other firms in the same sub-sector. Among the entrepreneurial and performance indicators (Section D of the questionnaire), the only significant differences from the rest of the electronics

¹⁷ The high correlation values between the degree centralities of IN and CN (Pearson coefficient is above 0.9) reveals that actors central in one network are also central in the other.

¹⁸ See Table 4 in Section 2.5 for reference on the measurement of dominant players.

firms in Córdoba is that they declare to have international clients in Latin America, which they consider important for their technological upgrading, and that they have invested considerable resources in ISO standards certifications. For instance, a dominant player set up an exporting consortium with other firms to sell electronics equipment to LAC, the Emirates and Iran. Such relationships are considered important learning sources about the business. Likewise, another dominant player, specialized in TV electronics, has as clients all the major broadcasting companies in Chile, Peru, Bolivia, Paraguay and Uruguay and this stimulates technological learning and also more investments in frontier broadcasting technologies like the satellite technologies.

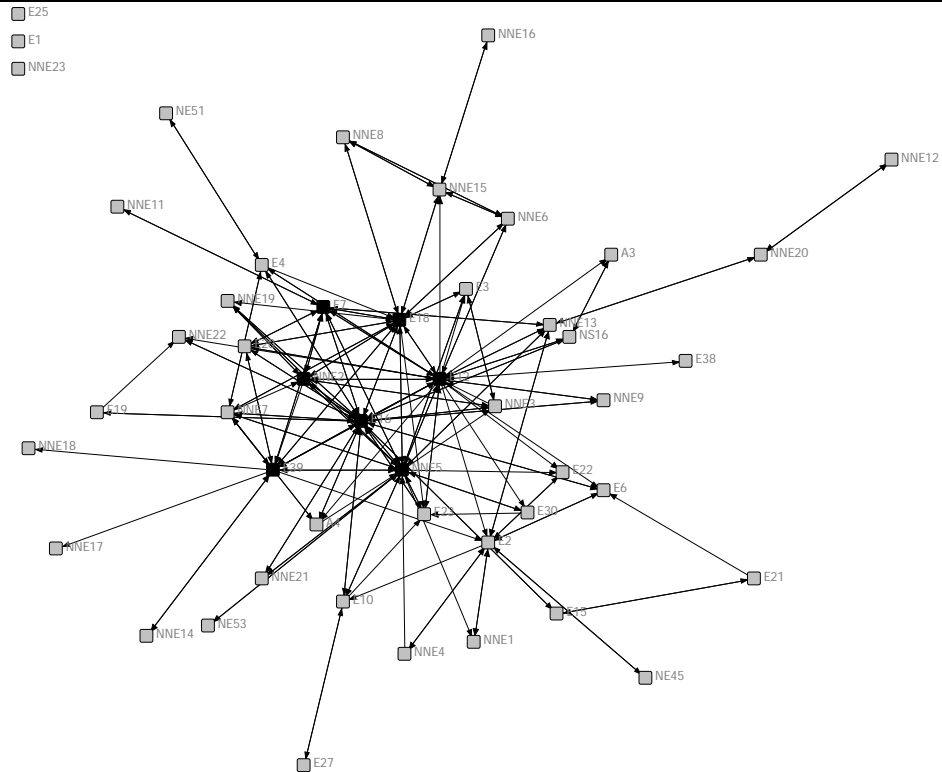
Dominant players are among the firms that mobilize more knowledge resources in the cluster, through the formation of information and collaborative ties with other cluster members. Beside benefiting themselves from the initiatives promoted by the CDP, dominant players generate spillovers in the cluster, by engaging in interactions not only with treated firms, but also with untreated firms, which we call here indirect beneficiaries of the CDP (Maffioli et al., 2011). Figure 7 shows the first tier indirect beneficiaries.¹⁹ This indirect effect of the CDP should be considered a potentially important outcome of the policy – a positive side effect of belonging to the same cluster.

The spillovers generated by dominant players are significantly higher than spillovers generated by other firms in the cluster, as they establish **more direct ties** to other firms. With reference to the collaboration network, Table 7 shows that dominant players have on average eight direct collaborative ties to treated firms (versus an average value of 1.6 of the other firms in the cluster) and they maintain three direct collaborative ties to indirect beneficiaries, a value that is threefold the value of the other firms in the cluster (1.3). Finally, based on Gould & Fernandez measures, we find that these actors play the role of **gatekeepers**, connecting treated and indirect beneficiaries on average 37 times vs. an average of 0.96 the of other firms in the cluster. Hence, these results are consistent with the fact that dominant players **are key actors to diffuse the benefits of the policy treatment to other untreated actors in the cluster.**

TABLE 7 DOMINANT PLAYERS' SPILLOVERS THROUGH COLLABORATION TIES				
	Type of firms	N	Average	Sig. (2-tail)
Number of direct ties (degree centrality) with treated firms	Dominant players	7	<u>8.3</u>	0.002
	Other firms	31	1.6	
Number of direct ties (degree centrality) with untreated firms	Dominant players	7	<u>3.1</u>	0.005
	Other firms	31	1.3	
Number of times the firm play the role of G&F gatekeeper	Dominant players	7	<u>36.7</u>	0.023
	Other firms	31	0.97	

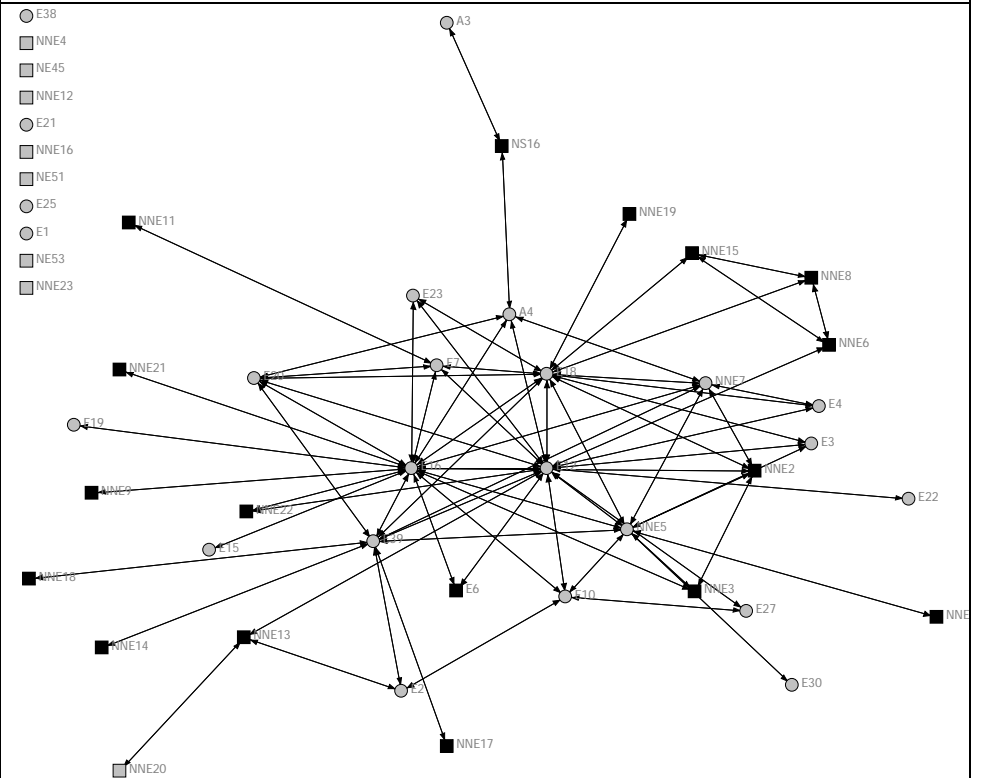
¹⁹ It is important to remark that indirect beneficiaries are not free riders. They do not connect to dominant players to access knowledge or resources that have been generated during the CDP. Rather, the connection is made because there is an interest in collaborating with a given firm, not because there is an intention to behave as a free rider.

Figure 6 Dominant Players in the Information Network



Note:
Dominant players are marked as **black nodes**.

Figure 7 Indirect Beneficiaries in the Collaboration Network



Note:
Circle nodes indicate treated firms
Squared nodes indicate untreated firms
Black squared nodes indicate first tier indirect beneficiaries (i.e. untreated that have at least one tie with treated firms (of the collaborative type))
Grey nodes indicate all other firms.

4.2 Evaluation of Objective 2: The Effects of CDP on Networks

4.2.1 Drivers of network change: the role of CDP initiatives

In this section we perform the SAOM analysis on the information network (2005 and 2012 data) to assess whether the participation in CDP over the period 2003-2007 has influenced the formation of *new* ties in the period 2008-2012, and to understand what CDP initiatives have contributed more to generate such an effect. Table 8 shows the CDP effects, controlling for a set of other factors that could influence the formation of new ties as well, which have been discussed in Section 3.5.

In Model 1 of Table 8, we find that the more a firm has been involved in different CDP activities, the more it is likely to generate new ties for the transfer of information to other electronics firms (the coefficient is 0.29 with a s.e. of 0.13). Hence, we do find evidence that firms that more intensively participated in the CDP activities were more likely to generate new ties after the end of the program. More specifically, in Model 2 we observe that the firms that participated in the CACyDP (coeff. is 1.34 and s.e. of 0.57) and the Strategic Planning workshops (coeff. 1.91 and s.e. 0.77) were the most likely to form new ties. In contrast, firms that have participated to the hiring of the consultant for the promotion of Institutional Activities are less likely to generate extra outgoing ties over the period 2008-2012. Other activities that are important for increasing production efficiency, like the CSMT, or for promoting of the industry through fairs, do not have a clear effect on networks.

Among the control variables it is interesting to notice that reciprocity is significant, which means that new ties tend to reciprocate existing ties, which indicates that local firms have a tendency to form stable and mutually enriching relationships. Also, in line with our observation about the emergence and consolidation of a group of dominant players (Section 4.1.2), we find that preferential attachment is significant, indicating the tendency of the most connected actors to increase connectedness over time. In other words, firms with high connectivity in 2005 (i.e. high number of outgoing ties, that is, ties formed with the aim of transferring information) have a tendency to send extra outgoing ties in the following period.

None of the firm-level effects turns out significant, while two proximity effects appear particularly important. First, firms whose owners were tied to friendship or kinship relationships in 2005 were more likely to form new ties with each other over the period 2008-2012, which means that a pre-existing social structure is important to determine the evolution of the network. Second, members of the CIECCA's directive committee are likely to form new ties among themselves, highlighting the importance of being active members of the business association. Finally, belonging to the same sub-sector or being geographically proximate do not make interactions more probable.

TABLE 8 RESULTS OF SAOM ANALYSIS		
	Model 1	Model 2
	Estimate (s.e.)	Estimate (s.e.)
1. CDP effects		
CDP participation intensity	0.29 (0.13)**	
SMT		-0.02 (0.53)
CACyDP		1.34 (0.57)**
Fairs		-0.72 (0.68)
Strategic planning workshops		1.91 (0.77)**
Affinity group workshops		0.89 (0.69)
Institutional activities		-1.51 (0.66)**
2. Controls		
(a) Structural effects		
Reciprocity	3.61 (0.72)**	4.25 (0.91)**
Transitive triplets	0.09 (0.06)	0.07 (0.08)
Preferential attachment	0.06 (0.03)**	0.05 (0.03)*
(b) Firm-level effects		
Size	0.17 (0.33)	0.26 (0.45)
Age	-0.01 (0.03)	-0.03 (0.04)
Patents	0.06 (0.21)	0.36 (0.36)
Exports	0.21 (0.42)	0.94 (0.67)
(c) Proximity effects		
Friendship and kinship	1.19 (0.50)**	1.07 (0.50)**
Geographical distance	0.02 (0.02)	0.00 (0.02)
Sub-sector	0.47 (0.35)	0.55 (0.37)
Member of CIIIECCA Dir. Com.	0.93 (0.27)**	1.20 (0.33)**
Rate parameter	13.23 (2.71)**	12.83 (2.34)**
Out-degree (density)	-4.66 (0.74)**	-5.09 (0.80)**
Note: ** < 0.05; * < 0.10 All convergence diagnostics (t-ratios for deviations from targets) are close to 0.		

In sum, the descriptive SNA and the SAOM analyses have shown that the information network of the electronics firms in Córdoba has evolved in a path-dependent fashion towards the consolidation of a structure where dominant firms continue to occupy a central position in the network. What contributes to the consolidation of this structure is the pre-existence of a social structure, based on friendship and kinship ties, and the institutional framework tied to the participation in the CIIIECCA and its directive committee. Also, network's structural forces like the search for reciprocity and the preferential attachment effect contribute to

reinforce existing ties and to strengthen the centrality of dominant players. Within this context, **the CDP seems to have further contributed to this trajectory**, it has led to the generation of new ties, but it has not generated a disruptive effect in the pre-existing structural characteristics of the local network.

A key question at this point is whether this should be considered a positive result of the CDP or not.

To answer this question we should abandon the idea that there is an optimal network structure that all cluster policies should promote. Rather, we should be aware of the fact that a given structure is associated with certain benefits as well as with certain drawbacks. In this case, the benefits of the presence of a group of dominant players is that these act as leaders that invest time and resources for the promotion of initiatives that can be beneficial for the whole local community of firms, and that generate spillovers to other local firms, including untreated firms. Dominant players are at the core of the network and are strongly connected to each other, and have consolidated a collaborative model that makes their disconnection unlikely. Because of this, this group of firms is also going to be receptive to future policy initiatives and may act as a permanent platform for any collective activity that is promoted within the industry.

Moreover, the fact that not all firms are equally or similarly connected to the local network, is not a sign of its weakness. We rather agree with one of our interviewees in the focus group: *“we should give up thinking that these kind of projects should involve **most** or **all** of the local entrepreneurs. They should involve those that are persuaded this is the right way to go.”* Hence, network members can economize on their ties and a network structure can work perfectly without giving prominence to all its members. A major drawback of this kind of centralized structure is the risk of further marginalization of peripheral actors. However, in this study, we have seen that the group of dominant firms is generally very open to collaborations and have an interest in promoting the Córdoba electronics industry as a whole. In fact, one of the achievements of the CDP has been that of promoting a culture of partnership and collaboration. The bottom-line is that the consolidation of a group of leading firms is a positive outcome of the CDP provided that a mentality oriented towards the creation of collective goods (like the CSMT and the CACyT) and the sharing of knowledge and resources is maintained and nurtured over time.

4.2.2 The role of CDP in promoting networks with local institutions

Another objective of the CDP was that of fostering connections with different types of Government organizations (at the local, provincial, or national level), universities, and business associations. Key Government organizations include:

- (1) The Provincial office for the Ministry of Industry, Commerce and Employment (*Ministerio de Industria, Comercio y Trabajo*), which played a critical role in the recent years for the promotion of initiatives in support of the software & electronics industries.
- (2) The Science, Technology and Innovation Ministry (*Ministerio de Ciencia, Tecnología e Innovación Productiva*), which, through the Argentinean Technological Fund (FONTAR), supports projects

aimed at enhancing productivity and technological innovation. FONTAR, for instance, has contributed to the funding of the CSMT center and will probably contribute to its enlargement in the future.

- (3) The Provincial office of the Ministry of Science and Technology is also important for the electronics industry. It has supported the development of the “*Programa Córdoba Diseña*” (PRODIS), which funds the improvement of design activities of local firms.
- (4) The Ministry of Industry (*Ministerio de Industria*), which hosts a number of funding programs for new productive investments, and other technical support services and training services. In the recent years, the Ministry of Industry has established direct connections with the Córdoba electronics firms.

Relevant university partners include:

- (1) The National University of Córdoba (*Universidad Nacional de Córdoba*) which is the main local university and counts on several scientific and technical faculties and with a Laboratory of Applied Research and Development (LIADE), which are both very important for the training of local human resources and active participants in several FONTEC projects connected to the CDP and to the PRODIS program, oriented at improving the design capabilities of local electronics firms.
- (2) The National Technological University (*Universidad Tecnológica Nacional*), also based in Córdoba, which entertains relationships with the electronics industry both on the training and technical assistance sides.
- (3) The National Institute of Industrial Technology (*Instituto Nacional de Tecnología Industrial*), which also supports the local electronics industry through training and technical assistance – for instance, it has undertaken a joint project with CIIIECCA to develop a laboratory for electronics design.

Other important actors are the *Instituto Argentino de Normalización y Certificación* (IRAM), which plays a key role in fostering and controlling quality certification processes (e.g. ISO standards); the ADEC and the Córdoba Industrial Association (*Unión Industrial de Córdoba*). Key institutions for the support of export-oriented activities include: the Provincial office of the *Agencia ProCórdoba*, a public-private organization that promotes the internationalization and foreign trade of firms located in Córdoba and that supports trade fairs participation and international business trips; the Córdoba Chamber of Foreign Trade (*Cámara de Comercio Exterior de Córdoba*), a business association created by exporting firms in Córdoba, which promotes exporting initiatives.

4.3 Evaluation of Objective 3: CDP, Networks and Performance

4.3.1 Perceptions about the Relevance of the CDP

(a) Insights from treated firms

We have asked our interviewees about their participation in the CDP and about the perceived benefits that CDP activities have had on their own business. We find, first, that about 90 per cent of the treated firms used the real service center SMT, and, second, more than 70 per cent of the firms participated in trade fairs promoted by the CDP. Other activities were less popular, as shown in Table 9. These choices are also reflected in the degree of satisfaction the respondents expressed about those initiatives, with CSMT receiving a very high score (4.25 on a 1-5 scale). This is considered to be the most successful initiative: the CSMT has become an asset for the territory, providing advantages also to firms that have not participated in the CDP. Qualitative insights from the interviews suggest that the CSMT has contributed to increase the overall productivity of the Córdoba electronics industry and it has allowed many firms to survive in the market and face difficulties in exporting. Other institutional activities, like the workshops for joint Strategic Planning and the contracting of a consultant for the identification of Affinity Groups are perceived to be relatively less successful in generating tangible improvements for the business activity (average values lower than 3). Instead, the contracting of consultants to promote coordination activities (i.e. the Institutional Activities) has been valued positively by the firms that have participated in this initiative (about 40% of treated firms), and have received an average score of 3.20 – although, as we have seen in Section 4.2, participation in Institutional Activities does not help the generation of new ties. In fact, one has to bear in mind that some activities may have been beneficial for some aspects of the business (e.g. improving production efficiency), but not necessarily for the generation of networks.

TABLE 9 CDP ACTIVITIES' PARTICIPATION					
		NUMBER OF PARTICIPANTS (% ON TREATED FIRMS)	SATISFACTION OBTAINED 1-5 (MIN-MAX)		
			Min	Max	Average
i.	CSMT	19 (90,5)	3	5	4.25
ii.	CACyDP	7(33,3)	2	5	3.00
iii.	Trade fairs	15 (71,4)	3	5	3.82
iv.	Strategic planning workshops	8 (38,1)	2	4	2.87
v.	Affinity groups workshops	9 (42,9)	1	4	2.38
vi.	Institutional activities	9 (42,9)	2	5	3.20

When asked about the general benefits of having participated to the CDP, 62 per cent of the respondents at treated firms declared that their overall judgment was positive and that they believe the policy

has produced some beneficial effects for their activities (see Table 10-a). Some 10 per cent did not answer this question and 30 per cent of the respondents considered not to have benefited from the CDP at all. As shown in Table 10-b, respondents at treated firms consider that the CDP has had the important benefit of having contributed to the improvement of local relationships (an average value of 3.54 on a 1-5 scale). Two quotes illustrate the perceived importance of the CDP to foster local relationships:

“The program contributed mainly on relational grounds. Everybody talked about clusters, but no one had prior experience in the practice of taking part of a cluster and its consequent networking activities. Now we know how to do it and we moreover have developed a common identity through a set of institutional activities ” (based on interview to firm E12).

“The CDP contributed to create a positive attitude towards inter-firm cooperation. Before, we had very closed attitudes and all the projects we are developing now with local and nationals institutions are mainly due to our participation in the program” (based on interview to firm E23).

Qualitative insights do also suggest that local entrepreneurs participating in the CDP would have welcomed a more structured and organized governance of the network since the beginning of the policy. Codes of ethics, for instance, have been introduced only at the very end of the program, while some respondents believe that an earlier introduction would have avoided conflicts among local entrepreneurs. As concerns other achievements, respondents at treated firms believe that the program has contributed only moderately to improve product and process innovation (an average value of 2.62 on a 1 to 5 scale), that it has not improved their financial performance (1.69), nor their commercial and marketing potential (0.54), their management skills (1.92), and the management of social and environmental issues (CSR etc.) (1.46). Finally, respondents at treated firms, who were not satisfied with the CDP, declared that this was due mainly to problems internal to the firm (2.2) or to the way the CIIECA managed the program (3.0), while the CDP *per se* was not considered to have limitations or problems (1.0).

TABLE 10 CDP’S PERCEIVED BENEFITS				
NUMBER OF RESPONDENTS (% ON TREATED FIRMS)		IMPORTANCE 1-5 (MIN-MAX)		
		Min	Max	Average
a) Overall assessment:				
Yes, the firm has obtained benefits from the CDP	13 (61.9%)	-	-	=
b) What type of benefits				
1) Financial/Economic	13(61.9%)	0	4	1.69
2) Improvement in the management of the firm	12 (57.1%)	0	4	1.92
3) Higher product and process innovation	13(61.9%)	0	5	2.62
4) Improvement in trade and marketing	13(61.9%)	0	4	0.54
5) Increased local embeddedness and better relationship management	13(61.9%)	1	5	<u>3.54</u>
6) Improved management in social and environmental issues	13(61.9%)	0	4	1.46
c) Why they did not benefit:				
1) Internal problems of our firm	5 (24%)	1	3	<u>2.20</u>
2) Problems and limitations of the CDP	3 (14%)	1	1	1.00
3) Problems and limitations of the CIIECCA	4 (19%)	1	5	<u>3.00</u>
4) Other external factors (e.g. macro-economic context, wider institutional context. etc.)	3 (14%)	1	5	<u>2.33</u>

(b) Insights from untreated firms

Our survey did also target a group of untreated firms. Most respondents at untreated firms did not answer our questions about their view on the CDP or had no opinion about it. As shown in Table 11-a, most of them did not participate in the CDP as they were not aware of its existence: respondents agree with this statement with an average value of 3.8 on a 1-5 scale. Other motivations for not participating in the CDP were definitely of lower importance. Also, the lack of awareness about the CDP is considered to be due to the fact that local entrepreneurs did not receive sufficient information by the CIIECA, by not being affiliated to it when the policy was launched.²¹ However, by observing the beneficial effects of the policy on treated firms, respondents at untreated firms believe that the policy was successful and they would be keen to participate in such a policy in the future (respondents agree with this statement with a 3.25 average value on a 1-5 scale, see Table 11-b). Next, some believe that they have lost an opportunity by not participating to the CDP (respondents agree with this with a 3.00 average value). Accordingly, our respondents largely disagree

²¹ It is worth to highlight however, that interviews to key informants, such as CDP former directors, suggest that, although recommendable, the affiliation to CIIECA was not a requirement for being included in the CDP.

with the idea that the CDP has not been useful for treated firms, and with the fact that they would not join such a policy initiative in the future (in both cases the average score was lower than 2, Table 11-b).

TABLE 11 INSIGHTS FROM UNTREATED FIRMS				
	N° RESPONDENTS (% OF UNTREATED FIRMS)	1-5 (FULLY DISAGREE- TOTALLY AGREE)		
		Min	Max	Mean
a) Reasons for not participating in the CDP				
1) We were not aware of its existence	10 (59%)	1	5	<u>3.80</u>
2) We wanted to participate but the administrative load for participation was to high for us	4 (24%)	1	5	2.00
3) We did not think it was useful or relevant for our firm	5(29%)	1	5	2.40
4) We thought the CDP was not well designed and/or organized	3(18%)	1	1	1.00
5) The CIECCA gave us too little information about it	6(35%)	1	5	<u>3.33</u>
6) Several external factors impeded our participation	4(24%)	1	3	1.50
7) We do not trust CIECCA as a coordinator body	5(29%)	1	1	1.00
8) Our firm did not need the help of policies	4 (24%)	1	4	1.75
9) In the past we participated to similar policies but with no results	4 (24%)	1	1	1.00
10) We did not want to share with other local firms our assets and information	5(29%)	1	5	2.20
11) We would have needed other types of policy support, not CDP	4 (24%)	1	1	1.00
12) The ownership do not believe CDP to be useful	5(29%)	1	4	2.00
13) We were not affiliated to CIECCA and it did not allow non-affiliates to participate	3(18%)	1	1	1.00
14) Costs and timing related to participating in CDP are too high for us	4 (24%)	1	4	1.75
b) What is your opinion about the CDP				
	(% OF UNTREATED FIRMS)	1-5 (FULLY DISAGREE- TOTALLY AGREE)		
		Min	Max	Mean
1) We know nothing about the CDP and for this reason we have no opinion about it	11 (65%)	1	5	<u>4.36</u>
2) We observed positive results for other participating firms and would like to participate in similar policies in the future	8 (47%)	1	5	<u>3.25</u>
3) We would not participate in the CDP in the future	10 (59%)	1	3	1.40
4) We think the CDP was not useful to participating firms	4 (23%)	1	4	1.75
5) By not participating , we have lost an opportunity to improve our competitiveness	3(18%)	1	5	<u>3.00</u>

4.3.2 Performance Indicators

On the basis of our interviews, over the period 2008-2011, there has been an increase in the revenues and profits of the Córdoba electronics firms (Table 12).²² But we found no evidence of statistical difference between treated and untreated firms' performance indicators, nor there is a correlation between network centrality indicators and performance (we report statistical tests and correlations in Appendix III). Moreover,

²² These data need to be taken with caution. As explained in Section 2.6 the response rate on performance indicators has been extremely low. For this reason, these data cannot be considered representative of the whole electronics cluster in Córdoba.

our research design does not allow to measure the existence of a *causal* relationship between CDP treatment and firm-level performance (see Section 3.7 for a discussion). Hence, we can only rely on firms' own perceptions and qualitative evidence about the repercussions of the CDP on performance indicators.

TABLE 12 PERFORMANCE INDICATORS				
	2008	2009	2010	2011
Revenues (in Arg Pesos) (Avg.)	3,992,287	3,849,138	4,593,207	8,454,762
Revenues (in Arg Pesos, real values base year 2007)	3,724,148	3,333,903	3,587,352	6,030,388
Profits (in Arg Pesos) (Avg.)	206,162	155,346	320,079	493,591
Profits (in Arg Pesos, real values base year 2007)	192,315	134,552	249,986	352,055
Exports (% on total revenues) (Avg.)	8.44	10.35	6.0	9.34
Employees (n) (Avg.)	28.88	23.59	23.94	32.19
R&D (in Arg Pesos) (Avg.)	257,353	227,206	181,550	357,674
R&D (in Arg Pesos, real values base year 2007) (Avg.)	240,068	196,793	141,793	255,112
Source: Our own data.				

Treated firms' own perceptions about the benefits of the CDP²³ is that none of the changes obtained over the period 2008-2011 in terms of performance – i.e. revenues, profits, exports on total production, size, R&D investments and share of innovative products on total production - is connected to the CDP. Table 13 shows that the average scores about the importance of CDP on the performance indicators are all lower than 2 (on a 1-5 scale).

TABLE 13 CDP AND PERFORMANCE INDICATORS (2008-2011)				
	NUMBER OF RESPONDENTS (% ON TREATED FIRMS)	IMPORTANCE 1-5 (MIN-MAX)		
		MIN	MAX	Average
Revenues	19 (90%)	1	3	1.37
Profits	17 (81%)	1	3	1.41
Exports	19 (90%)	1	3	1.26
N. of Employees	18 (86%)	1	3	1.22
R&D Investment	18 (86%)	1	3	1.22
Commercialization of Innovative products	6 (29%)	1	2	1.17

²³ This is based on answers to *Question D-b* of the questionnaire

Coherently with these findings, during the focus group it was agreed that the CDP has not produced an impact “*on the numbers*”, but, still, it had important beneficial effects on the *process* of doing business, in particular in the improvement of local inter-firm coordination and in the more intense use of some of the joint activities promoted by the CDP. In this respect, we report a quote from the focus group:

Even if the CDP has not had a strong impact on numbers, the majority of us knows that it has been indispensable: without it, today, we would have been in a totally different condition.” (E12)

Other respondents to our interviews have also remarked that:

“Nowadays the firms that do not get together or associate with each other are likely to exit the market....I have no doubt that if our firm had not participated in the CSMT initiative, it would have gone bankrupt by now. In the past four years, all the Buenos Aires firms that were similar to ours disappeared due to the competition of importing firms. There is one firm that has downsized from 200 to 10 employees because of its isolation. Our reduced production scale leaves no option but to cooperate with other firms to reach economies of scale”. (E16)

“Here (in Córdoba) there are several firms – not just mine – that have survived thanks to the CSMT initiative. This has increased quality and productivity. Now I can satisfy clients’ requests much more easily than before.” (E18)

“The CSMT was an absolute success, very prominent, very strong. Other activities that made us stronger were the Expotronicas fairs. During the first years, this fair made us more visible and contributed to create a group identity. Also, the workshops based on the development of a strategic plan were very good.” (NNE5)

4.4 Summary of Results

In this section we summarize the main findings of this evaluation study, based on the questions that we have formulated under the three objectives of the study in Section 1.3.

Objective 1

1. What is the current status of the cluster inter-organizational networks?

In this study we focus on two types of local networks (see Sections 3.5 and 4.1): the information network (IN), which measures the transfer of business information – including any information that is relevant for the business, e.g. technological, marketing-related information, etc. – that has occurred among the electronics firms, and the collaboration network (CN), which measures the existence of collaborative projects between firms. All connections are between the electronics firms in Córdoba. The study carried out prior to the starting of the CDP (Mazzonis et al., 2002; MIF/BID, 2008) suggests that, in spite of there being

a minimum level of connectivity among the firms, such connectivity was still poor and collaboration minimal. A study undertaken in 2005, two years after the starting of the CDP, shows the presence of significant inter-organizational networks, aimed at the local exchange of knowledge or based on collaborative inter-firm projects (Matta, 2012). In this new study we corroborate this earlier finding about local networks, but also find a decrease in the density of linkages to have occurred between 2005 and 2012 in both networks. Moreover, the network has become more centralized, which means that a selected number of firms have become more central over time, while others have become progressively more peripheral or isolated. We called such central firms as ‘dominant players’, and we showed that these firms are vital to guarantee network connectivity and create the link between treated and untreated firms.

2. *What is the profile of the firms forming different types of linkages (e.g. cooperation, information sharing, advice giving, etc.) within the cluster and what are the characteristics of the linkages formed?*

We observe that firms that are central in the IN are also central in the CN, hence there are no qualitative differences among the actors that are central in either one of the two networks. Moreover, we do find that over time, the firms that maintain the connections with other electronics firms have tended to reinforce linkages through the establishment of mutually-enriching relationships, and that dominant players establish strong and durable ties. Finally, we observe that dominant players generate important spillover effects, as compared to the rest of the other firms, both towards treated and untreated firms.

3. *How have these networks evolved over the period 2005 (mid project) to 2012 (after project)? Have connectivity intensified or weakened? How has the structure of the network changed?*

Over the period 2005-2012 the density of linkages in the two networks has generally weakened. However, we maintain that forming and enduring ties requires considerable time and resources, which implies that firms learn to “economize” on the number of relationship they form, by selecting only partners from which they believe they can obtain tangible benefits. Hence, the reduction of density should not be seen as a failure of the CDP. In fact we do find a relatively stable pattern of interaction, characterized by the consolidation of a critical mass of firms – mainly the dominant players and their direct contacts – which are decisive to maintain active the local inter-organizational network. Dominant players have consolidated a collaborative model that makes their disconnection unlikely. Because of this, this group of firms is also going to be receptive to future policy initiatives and may act as a permanent platform for any collective activity that is promoted within the industry.

4. *Did changes in the network occur towards a more densely connected network structure or towards a more hierarchical structure?*

The local networks – both the IN and the CN – have become more hierarchical, consistent with the presence of a positive preferential attachment effect that leads central firms to become more central over time, and

with the emergence and consolidation of dominant players. Parallel to this selective process of network change, we do also find that firms have tended to establish more reciprocal information linkages over time. Hence there is a selectivity *cum* embeddedness effect that reinforces the linkages of those firms surviving the selection and remaining connected to the local networks.

5. *Was there the emergence of dominant actors and, if so, what is their profile?*

As remarked earlier, we found the emergence of a few dominant players, which are medium-sized, long-established firms in the Córdoba electronics cluster, each considered to be a leader in its sub-sectoral niche. While being considered local leaders, we do not find evidence of their superiority in terms of performance records. What seemed to be a determinant factor for their emergence and consolidation is the presence of social ties among the owners of these firms, which have been formed during their educational and prior professional experience (e.g. spin-off experiences from IA Electronica and Microsistemas). This is also supported by the SAOM analysis, which shows that the existence of friendship relationships among the entrepreneurs contributes to the formation of new ties after the end of the CDP.

6. *What are the characteristics of “better connected” enterprises, and what are the characteristics of more peripheral or isolated enterprises?*

Beside what highlighted under Question 5 above, our evidence is consistent with the fact that dominant players differ from the rest of the firms especially for their history in the cluster – as long established firms and as firms that have a strong interest and commitment toward the territory through active participation in local joint actions, such as affiliation to the CIIIECCA and participation in the CDP. More connected firms have taken advantage of the CDP more intensively than other more marginal firms.

Objective 2

1. *To what extent has the CDP facilitated network linkages between firms and between them and institutions within or outside the electronics cluster?*

The CDP has lead to the strengthening and creation of new technology-transfer ties between the electronics firms in Córdoba and other local/provincial or national institutions (among which are also local universities), but it has had no impact on the promotion of new ties aimed at promoting export-oriented activities. Our analysis also shows that the firms that have more intensively participated in the activities promoted by the CDP are also more likely to form new information ties over the period 2005-2012. This suggests that, although over the period of analysis a significant portion of relationships have been discontinued, CDP policies have been relatively successful in promoting the formation of *brand new* ties among local firms.

2. *What are the specific benefits of the network linkages achieved as a result of the CDP?*

Given our data limitations, we could not find direct evidence of the impact of CDP-generated new linkages on firms' economic performance (see Objective 3 below). The linkages that are formed are important to

guarantee the exchange of resources, recombination of ideas and projects, the sharing and solving of problems and should be considered a positive externality for the local electronics industry, and a positive result of the CDP.

3. What policy instruments have been particularly helpful in stimulating network interaction and the creation of new ties?

The CDP consisted in a set of real activities whose primary objective was not that of increasing networking but that of solving practical problems: the CSMT was set up to increase productivity; the CACyDP was meant to reach economies of scale in the acquisition of inputs, and the Strategic Planning workshops were meant to help firms defining their strategic horizons. Beside this, the CDP promoted also a set of networking and match-making activities, mainly through the Affinity Group workshops and the Institutional Activities (see Section 2.2 for a description of each activity). The results of our analysis show that all the activities that were meant to impact the formation of new ties – i.e. Affinity Group workshops and Institutional Activities – failed to do so: networking-oriented activities did not stimulate networking. Instead, firms that participated in the CACyDP and the Strategic Planning workshops were successful in generating new ties with other local firms after the completion of the program. One plausible interpretation of this result is that networks are formed when there is a real need to fulfill, and not when actors are invited to do so in a set of workshops. Lack of network ties is not due to the fact that entrepreneurs do not know each other. Entrepreneurs get connected when they have a problem to solve, an idea to promote, etc., and the activities connected to the CACyDP and the Strategic Planning workshops have been successful in creating new opportunities for interaction, new needs and initiatives that finally brought to the generation of new ties. Hence our recommendation is to promote activities addressing real problems and rather concrete challenges, rather than activities that promote networking *per se*.

Objective 3

1. Is it possible to identify a relationship between the formation of network linkages and the benefits on firms in terms of business practices, innovation, exports, etc.?

Given our data limitations, we could not find direct evidence of the impact of CDP-generated new linkages on firms' economic performance. Our qualitative insights suggest that, beside stimulating connectivity (see earlier points), the CDP was successful in promoting activities that improved firms' efficiency (like the CSMT and the CACyDP) and that supported the visibility of the industry and the development of its firms' long-term strategies.

2. Is this relationship positive or negative? Why?

Our data show that there has been a general increase in the performance indicators of the electronics industry in Córdoba, but these data are only partial (see Section 3.7) and, moreover, we could not prove that this increase is due to the policy treatment.

5 Policy Lessons

In this section we outline and discuss the main implications for policy deriving from this study, drawing on both the results of the SNA as well as on the insights gathered during the focus group. Below we present a list of recommendations:

- **Promote selective and gradual network development.**

The success of a network stands often in the existence of a group of dominant players, visionary and motivated entrepreneurs, who invest time and resources in network-enhancing initiatives, and in avoiding the disruption of the network over time. But entrepreneurs are not all alike. Some decide to take funds from the CDP and to invest their own resources as well, others rather free ride and take funds without contributing. As an entrepreneur declared during the focus group: *“when you start the program (i.e. the CDP), the opportunities are the same for all the participants, the rules of the game are the same and each entrepreneur has the same value as the others. But when you start working, then you see that there are some entrepreneurs that invest when it is necessary, and others that say: “I am not going to invest money for this activity, I’d rather go playing golf.””* This has implications on the promotion of effective network formation: forcing unmotivated entrepreneurs or entrepreneurs with a free-riding mentality to be part of a network is likely to be detrimental for the whole project. Another entrepreneur was even more direct: *“one of the lessons I have learnt after years of participating in CDPs is that collaborative projects should stop pursuing the engagement of many or all of the local entrepreneurs. To breed a project, at the beginning you only need to engage those that are truly convinced about it and want to invest in it. Trying to force the other entrepreneurs to participate into a network – and its connected initiatives - can easily lead to the failure of the overall program. Those that do not participate at the beginning, will participate at a later stage if they see that the CPD is producing positive outcomes.”*

Our analysis suggests that it is not necessary to pursue the commitment of *all* the potential beneficiaries at once. A group of well-motivated entrepreneurs – selected, for instance, by competitive bids – will suffice to create and breed an initial coordination process. If some of the CPD activities prove to be successful, other entrepreneurs will be interested in getting connected to the local network, at a later stage. Hence, failure to engage all possible beneficiaries in the CDP is not a failure *per se*. Instead, it can be a strength: it reduces the probability of free-riding and intra-group conflicts, and it allows a more efficient use of the project resources. As shown in the SNA and SAOM analysis, firms interact when they have an interest to do so – i.e. when they need advice or support – and that relationships that persist over time are likely to be reciprocal – i.e. mutually enriching. We also know that entrepreneurs are selective in their relationships, and careful in devoting resources cleverly: they do not want to spend too much time interacting with anybody, but only with a selected number of other entrepreneurs from whom they think they can learn something or take some advantage. As shown in this study, advice is often sought asking to the most central firms (preferential attachment) as they are perceived as the most

valuable sources at the local level. Even if selectivity appears somewhat in contrast to the whole idea of promoting linkages and social capital, in reality it is one of the best ways through which networks are formed and maintained over time for they allow mainly valuable, and, therefore sustainable relationships to be formed. These kinds of relationships are likely also to breed creative destruction and to avoid problems of over-embeddedness and lock-in.

Our recommendation for policy is that CDPs should allow for the gradual engagement of different participants, and should not consider lack of engagement of *all* or most of the local entrepreneurs to be a failure of the project. This involves the identification and/or selection of an initial group of motivated beneficiaries, who can start up with a set of elected activities. Accordingly, the CDP should allow enough flexibility for new participants to enter the program and its connected activities at a later stage and should arrange ways to facilitate the exit of participants that, along the CDP development process, become uninterested in the program or show a free-riding behavior.

- **Avoid over-ambitious targets: success breeds success.**

Qualitative insights from the interviews and the focus group have suggested that obtaining success in some initiatives breeds new initiatives and renovated enthusiasm in maintaining alive the routines established by the firms during the CDP development. For this reason it is important to set reachable and not too ambitious targets along the whole project. Ambitious targets are not simply those that are too difficult to reach, but also those that are likely to hamper the development of the local network, by giving network participants the opportunity to free-ride. The creation of a network is a very fragile process. It is grounded on the gradual accumulation of trust and on the growing awareness that there will be benefits at the end of the whole project.

Through SNA we have learnt that the CDP has not introduced dramatic changes in the network structure. Parallel to some ties being discontinued, it has also stimulated the formation of new ties, which have contributed to a path-dependent evolution of the local inter-organizational network. We have seen the consolidation of a group of dominant players, which not only have had the merit to keep the network connected over time, but have contributed to the generation of local spillovers to untreated firms. In this path dependent process network members will reinforce their connections (as it has occurred here in the case of dominant players). However, if something along the way fails, trust and connections may suddenly disappear and their re-building is unlikely.

Hence, it is important that the activities and the targets are set by the beneficiaries themselves, and the role of the CDP coordinator should be that of avoiding them to pursue too ambitious activities. For instance, in our case, local entrepreneurs agreed that the first goal of the program *was not* to increase exports – which would have constituted an ambitious target - but to improve the quality and efficiency of their production activities. They rightly thought that without such prerequisites any export promotion effort would have been useless. Illustrative is the following quote: “*The software entrepreneurs started up with a set of initiatives to promote and stimulate exports and they all ended up in conflict with one*

another. We instead considered that we were not mature enough to be able to export and thought we should improve our competitive capacity in the domestic market first.”

Our recommendation for future CDPs is to raise awareness among the beneficiaries about the need to set achievable and realistic targets, which can be gradually upgraded as the CDP progresses and the network of relationships consolidates.

- **Promote ‘real’ activities, rather than networking activities *per se*.**

The CDP consisted in a set of real activities whose primary objective was not that of increasing networking but that of solving practical problems: the CSMT was set up to increase productivity; the CACyDP was meant to reach economies of scale in the acquisition of inputs, and the Strategic Planning workshops were meant to help firms defining their strategic horizons. Beside this, the CDP promoted also a set of networking and match-making activities, mainly through the Affinity Group workshops and the Institutional Activities (see Section 2.2 for a description of each activity).

The results of the SAOM analysis show that participants to all the activities that were meant to impact the formation of new ties – i.e. Affinity Group workshops and Institutional Activities – failed to generate new ties. Instead, participation in CACyDP and the Strategic Planning workshops were successful in promoting new ties.

The interpretation of this result is that networks are formed when there is a real need to fulfill, and not when actors are invited to do so in a set of workshops. Lack of network ties is not due to the fact that entrepreneurs do not know each other. Entrepreneurs get connected when they have a problem to solve, an idea to promote, etc., and the activities connected to the CACyDP and the Strategic Planning workshops have been successful in creating opportunities for interaction, new needs and initiatives that finally brought to the generation of new ties. Hence our recommendation is to promote activities addressing real problems, rather than activities that promote networking *per se*.

- **Maintain a strong orientation towards bottom-up and flexible CDPs.**

The CDP in Córdoba was designed and managed in a way that allowed the strong participation and decision-making of local entrepreneurs. It was markedly flexible because it did not simply offer beneficiaries a set of possible activities and initiatives to choose from, but it allowed beneficiaries to decide freely about the initiatives, the magnitude of the investments and the timing in which the different initiatives were put in place. It was also a real bottom-up-approach because, differently from other bottom-up projects, it did not merely involve a consultation of local stakeholders followed by donor’s decision-making. Here, the bottom-up approach was institutionalized through the constitution of technical committees. Acting within the technical committees, local beneficiaries were given absolute centrality in the decision-making process. In the words of one CDP beneficiary entrepreneurs: “*The strength of this CDP was that it did exactly what we asked for. That was the true big advantage of this*

program.” (...) “Key was the fact that the CDP was an “activator” and not an inventor of initiatives. Otherwise it would have definitely failed.”

Based on this positive experience, we strongly recommend, wherever possible, to replicate this type of markedly bottom-up and flexible approach in other CDPs. The caveat is that this type of approach is likely to be valuable when local entrepreneurs possess a level of maturity to be able to discern what are the important activities for the collective benefit of the industry cluster. In the case of the Córdoba electronics cluster, where a group of visionary entrepreneurs was present at the beginning of the CDP, that has been possible.

- **Promote the development of a code-of-ethics and/or statutory agreements at the beginning.**

Conflicts are likely to occur in CDPs that promote public goods and collective actions. Even if we recommend to involve only motivated entrepreneurs (see earlier point), there will be cases of entrepreneurs that appear motivated at the beginning, but become free-riders at a later stage. The generation of a public good like a trade fair or, in this specific case, the CSMT, can breed conflicts. During the focus group, a call was made in favor of instruments for the management of conflicts, like codes-of-ethics: *“thinking that conflicts will not arise is simply immature... What we have learnt is that beside agreeing on a joint business, it is important to develop legal and statutory instruments to solve conflicts in case they arise.”*

Our recommendation is that a code-of-ethics and/or a statutory agreement should be developed as soon as the project has attracted a critical mass of entrepreneurs, in order to avoid or deal with conflicts. Firms that decide to take part to CDP activities at a later stage should be required to adhere to the code-of-ethics. These documents should be developed by the CPD beneficiaries with the support of CPD coordinator, who should promote them since the early stages of the CDP.

- **Seek the engagement of the local Government**

Since FOMIN projects are experimental and do generally rely on relatively small budgets, it is fundamental that their continuity is guaranteed once the policy has come to an end. As the process of change is not immediate and the achievements of a policy intervention may materialize also over the medium-long term, it seems important that local and national Governments mainstream at least the projects that in the short term proves to be cost-effective and successful. Such support does not necessarily require large scale budgets but at least adequate and continuous funding over a sizeable period. While securing support of Governments is already part of BID/FOMIN CDP promotion activities, the participants of our focus group commented that a higher involvement of local and national Government representatives during the CDP implementation phase could raise the chances of obtaining more consideration and support after the end of the CDP. Moreover, it was remarked that CDPs should not be seen in isolation, but as an element of the overall industrial development strategy. The initiatives implemented within the CDP should be coherent with the other programmes and initiatives to promote

development – and later some practices and programmes experimented with the CDP could be mainstreamed into local industrial policies.

- **Undertake a baseline study and arrange an observatory providing updated information about the industry.**

The lack of a baseline study hampers any evaluation study. But it also means that the decision-making of local entrepreneurs counts only on their own perceptions about the industry. As remarked during the focus group, at the beginning of the CDP *“our understanding of the sector was from our individual perception, not from the perspective of an industry analyst. At some stage we thought of undertaking a study but the CDP covered only part of the expenses and no entrepreneur is willing to pay for a study prior to the starting of the program.”* Baseline data are useful to assess the historical antecedents of the industry, its economic features and the level of coordination existing prior to the CDP commencement.

Assessing the level of coordination through SNA methodologies is useful to identify the structural properties of the network, its central actors, the degree of marginalization or isolation of other actors, etc. and, on this basis, to discuss and agree ex-ante about a target network structure – i.e. some basic network features that the CDP is expected to produce at the end of the whole process. One possible important outcome of a baseline study would be the identification of dominant actors. This would help to improve and fine-tune the policy intervention, for instance, by developing initiatives in support of dominant leaders and their active engagement with other treated but more marginal firms. A focus on dominant actors should however be oriented at enhancing their developmental role in the cluster, not at privileging them vis a vis other cluster members.

This recommendation about a baseline study faces a number challenges due to entrepreneurs unwillingness to invest in a baseline study. Hence, we recommend that the donor institutions, in coordination with the local Government and the private-public institutions supporting the policy, dedicate budget to this important activity. The focus group also suggests that industry-specific information should be updated along the CDP development and made available to all the beneficiaries through either an observatory, or a dedicated web-site or other means of dissemination.

Our recommendation for future CDPs is therefore to dedicate budget to undertake a baseline study. The study should not be simply a general qualitative assessment of the industry cluster. Beside a historical understanding of the socio-cultural context in which the industry is embedded, it should gather information about the economic features of the industry (revenues, exports, investments in R&D, etc.) and social network data. To be sure that baseline data are properly collected, it is important that the cost of this study is not covered exclusively by entrepreneurs themselves. The latter can instead be asked to contribute to the funding of an observatory that provides updated industry-wide information.

Beside these key recommendations, insights from our research bring forward other issues, which could be used to think about the design of future CDPs. Some of our respondents valued particularly positively all the initiatives to build awareness of the existence of the electronics industry. For example, the industry fair that was organized in Córdoba – Expotronica – has been very important to raise the awareness about the relevance of the electronics industry, both outside and inside the industry. It was also effective in reinforcing the sense of belongingness. Finally, other comments concern the role of the CDP coordinator. In this project he played an important role in vitalizing the network, and his salary was anchored in part to the results obtained. This model could be adopted in other CDPs as it proved successful.

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Appendix

Appendix I: Questionnaires

1) Questionnaire used for treated firms



ENCUESTA DE EVALUACION DEL IMPACTO DEL PROGRAMA DE DESARROLLO DE CADENAS PRODUCTIVAS (ADEC-FOMIN) EN EL SECTOR ELECTRONICA DE LA CIUDAD DE CÓRDOBA

ENCUESTA PARA EMPRESAS PARTICIPANTES DEL PIP

Este cuestionario se propone analizar el impacto que tuvo el programa de Desarrollo de Cadenas Productivas (PIP) financiado por ADEC y FOMIN sobre las Micro Pequeñas y Mediana Empresas (MPMEs) del complejo Electrónico de la Ciudad de Córdoba. Este estudio es un seguimiento de los estudios llevados a cabo por el FOMIN en los años 2005 y 2006.

CONFIDENCIALIDAD

Los datos que Ud. proporcione se hallan bajo los **principios de confidencialidad y reserva** y no podrán comunicarse, en ningún caso, en forma nominativa o individualizada, ni constituirán prueba ante autoridad administrativa o fiscal, ni en juicio o fuera de él. Se garantiza por lo tanto la máxima confidencialidad de las informaciones proporcionadas.

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¡Gracias por su colaboración!

A – DATOS GENERALES DE LA EMPRESA

a) Nombre de la firma o Razón Social	
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b) Dirección	
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c) Teléfono		d) Fax	
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e) E-mail y web site	
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f) Nombre del Entrevistado	
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g) Cargo	
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h) Sub-sectores	Por favor indique con una cruz (X) el/los subsector(res) que corresponden
Componentes	
Medición	
Energía	
Electrónica Industrial	
Electromedicina	
Telecomunicaciones	
Tele-radiodifusión	
Seguridad	
Automotor	
Audio, Entretenimiento	
Comercialización	
Control y automatización industrial	
Otro (mencionar)	

i) Año de fundación	
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j) Estructura de propietarios de la empresa	Por favor indique con una cruz (X) los tipos de propietarios que han tenido una participación directa importante en el capital de su empresa en el año 2011. Para las empresas extranjeras se indique además el % de participación extranjera
Empresa Argentina	
Empresa Extranjera	

k) Número total de ocupados en promedio anual 2011	
l) De los cuales:	
l.1) Permanente regular remunerado	
l.2) Temporario remunerado (contrato a prueba, por	

agencia, corto plazo, etc.)	
l.3) Autoempleo (trabajadores por cuenta propia, familiares no remunerados)	

m) ¿Cuáles de estas actividades lleva a cabo la empresa internamente?	Por favor indique con una cruz (X) las actividades llevadas a cabo internamente
m.1) I+D	
m.2) Diseño	
m.3) Ensamblaje/Producción	
m.4) Distribución, Logística	
m.5) Comercialización	
m.6) Otra: _____	

n) ¿A cuáles sectores productivos pertenecen sus clientes directos? Esta pregunta pretende investigar para cuales sectores Ud. diseña, desarrolla, y/o produce sus productos. La pregunta se refiere a sus clientes directos.	Por favor indique con una cruz (X) los sectores donde operan sus clientes Indicar también si para algunos de estos sectores la empresa realiza diseños/adaptaciones específicas (I.e. no productos estándar) (marcando con una X sobre AD HOC)
n.1) Agroindustrias. Industrias alimenticias	AD HOC
n.2) Audio	AD HOC
n.3) Automotriz	AD HOC
n.4) Bancos. Servicios financieros	AD HOC
n.5) Componentes electrónicos	AD HOC
n.6) Construcción	AD HOC
n.7) Consumo Masivo. Mayorista. Distribución	AD HOC
n.8) Control y automatización industrial	AD HOC
n.9) Educación	AD HOC
n.10) Electromedicina	AD HOC
n.11) Entretenimiento	AD HOC
n.12) Investigación	AD HOC
n.13) Medición	AD HOC
n.14) Retail. Centros comerciales	AD HOC
n.15) Salud	AD HOC
n.16) Seguridad	AD HOC
n.17) Seguros	AD HOC
n.18) Software. Informática	AD HOC
n.19) Suministros de electricidad, gas, agua	AD HOC
n.20) Telecomunicaciones	AD HOC
n.21) Tele-radiodifusión	AD HOC
n.22) Transporte	AD HOC
n.23) Otro: _____	AD HOC

B – PARTICIPACION EN EL PROGRAMA DE CADENAS PRODUCTIVAS Y RELACIONES CON CIECCA

Su empresa participó del Programa de Cadenas Productivas (PIP) financiado por ADEC y FOMIN (2003-2007). UD encontrará preguntas acerca de su participación en el PIP.

a) ¿Cuáles fueron las actividades en las que UD's participaron?	Por favor indique con una cruz (X) las actividades en las que su empresa participó durante la ejecución del PIP
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i.	Centro de Servicios Tecnológicos y Manufactura CSMT	
ii.	Centro de Abastecimientos Comunitarios y Desarrollo de Proveedores. Pool de compras.	
iii.	Participación en Ferias comerciales (Expotrónica, FICO, SINPRODE).	
iv.	Coordinación talleres de alineación y planificación estratégica conjunta para el sector	
v.	Contratación de consultor en detección de grupos de afinidad	
vi.	Contratación de consultor para la coordinación de actividades institucionales para grupo de empresas de electrónica	

b)	¿En su opinión, el PIP tuvo algún beneficio para la empresa en los años sucesivos al terminar el PIP (2008-2011)?	SI/NO
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Si la respuesta anterior fue negativa, pasar a la pregunta B.e.

c)	Si la repuesta anterior fue afirmativa, ¿puede decirnos qué tipos de beneficios derivaron de la participación en el PIP en el período 2008-2011?	Indicar también en qué medida considera que se dieron gracias a las actividades impulsadas por el PIP
i.	Beneficios económicos y financieros (margen de ganancia)	SI/NO 1 (min)-2-3-4-5(max)
ii.	Mejora en la organización de la empresa y actividades de gestión (Ej. Prácticas gerenciales, innovaciones en la organización, desarrollo de plan de negocios, etc.)	SI/NO 1 (min)-2-3-4-5(max)
iii.	Innovaciones en procesos y/o productos	SI/NO 1 (min)-2-3-4-5(max)
iv.	Mejoras en las actividades de comercialización (Ej. Branding, distribución, nuevos mercados, etc.)	SI/NO 1 (min)-2-3-4-5(max)
v.	Mejoras relacionales (mejor integración con otras empresas y/o instituciones locales)	SI/NO 1 (min)-2-3-4-5(max)
vi.	Mejoras en las actividades sociales y ambientales (Ej. nuevas medidas para reducir impacto ambiental, mejora de las condiciones laborales de los trabajadores, adopción de prácticas de responsabilidad social empresarial)	SI/NO 1 (min)-2-3-4-5(max)

d)	Si la repuesta a la pregunta B.b. fue afirmativa, puede expresar su grado de satisfacción con respecto a las diferentes actividades en las que participó en el PIP? Nos interesa saber si esas actividades resultaron tener beneficios para la empresa en los años sucesivos al terminar el PIP (2008-2011)	Marque el nivel de satisfacción según la siguiente escala: 1= Muy insatisfecho (la actividad del PIP no generó algún beneficio en el mediano plazo, al terminar el programa)
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	2= Insatisfecho 3= Algo satisfecho 4= Bastante satisfecho 5= Muy satisfecho (la actividad del PIP generó muchos beneficios en el medio/largo plazo, al terminar el programa)
i. Centro de Servicios Tecnológicos y Manufactura CSMT	
ii. Centro de Abastecimientos Comunitarios y Desarrollo de Proveedores. Pool de compras.	
iii. Participación en Ferias comerciales (Expotrónica, FICO, SINPRODE).	
iv. Coordinación talleres de alineación y planificación estratégica conjunta para el sector	
v. Contratación de consultor en detección de grupos de afinidad	
vi. Contratación de consultor para la coordinación de actividades institucionales para grupo de empresas de electrónica	

e) <u>Sólo para los que contestaron NO a la Pregunta B.b.</u> ¿Puede explicar por qué piensa que la participación en el PIP no aportó algún beneficio a su empresa?	Marque en una escala de 1=en desacuerdo a 5=muy en acuerdo
i. Problemas internos a la empresa (Ej. No supimos aprovechar de las oportunidades del PIP, no le dedicamos demasiado tiempo y/o recursos, no nos comprometimos demasiado con el programa)	
ii. Problemas del PIP (Ej. El programa no estaba bien organizado o diseñado)	
iii. Problemas en la organización de la CIIECA (Ej. Falta de coordinación, baja información)	
iv. Factores externos (Ej. la crisis del mercado internacional; el manejo de la política industrial en la Argentina)	
v. Otras motivaciones (explicar_____)	

f) <u>Con respecto al período 2008-2011</u> ¿Podría mencionar las actividades en las que ha trabajado en forma conjunta con otras empresas?	Por favor indique con una cruz (X) las actividades en las que su empresa participó
Centro CSMT	

Centro de Abastecimiento	
Constitución de UTE o grupos para proveer al Estado	
Exportación conjunta	
Participación en Ferias	
Otros _____ _____	

C. REDES

Uno de los objetivos del PIP era fortalecer las relaciones locales de las empresas sea con otras empresas o con instituciones publicas o privadas. UD encontrará preguntas acerca de la formación de redes de esta empresa.

<p align="center"><u>REDES CON OTRAS EMPRESAS</u> En la Lista 1 UD encontrará los nombres de otras empresas de Electrónica de la Ciudad de Córdoba Con respecto a esas empresas, ¿puede UD contestar las siguientes preguntas?</p>

<p>a) ¿A cuáles de las empresas de la Lista 1 ha brindado información relacionada con los negocios (Ej. información tecnológica, comercial) en el período 2008-2011?</p> <p>Nota: Si hay empresas relevantes que no estén mencionadas en la Lista 1, por favor agregue el nombre. Para cada una de las empresas con las que se tiene este tipo de relación indicar:</p> <p>1) <u>El valor de la información brindada según la siguiente escala:</u> 1= información de valor reducido (con impactos menores a nivel productivo, económico) 2= información de valor moderado 3= información de gran valor estratégico (que permitió mejoras o innovaciones a nivel productivo y/o económico)</p> <p>2) <u>Si esa relación se originó gracias a la participación en una de las actividades del PIP</u> Marcar 1 si fue así, y dejar vacío en caso contrario</p>
<p>b) ¿Cuáles de las empresas de la Lista 1 han brindado a esta empresa información relacionada con los negocios (Ej. información tecnológica, comercial) en el período 2008-2011?</p> <p>Nota: Si hay empresas relevantes que no estén mencionadas en la Lista 1, por favor agregar el nombre. Para cada una de las empresas con las que se tiene este tipo de relación indicar:</p> <p>1) <u>El valor de la información brindada según la siguiente escala:</u> 1= información de valor reducido (con impactos menores a nivel productivo, económico) 2= información de valor moderado 3= información de gran valor estratégico (que permitió mejoras o innovaciones a nivel productivo y/o económico)</p> <p>2) <u>Si esa relación se originó gracias a la participación en una de las actividades del PIP</u> Marcar 1 si fue así, y dejar vacío en caso contrario</p>
<p>c) ¿Cómo considera Ud el valor de la relación con las empresas que ha seleccionado?</p> <p>1= solamente relaciones ocasionales y que no perduran hasta hoy 2= interacciones que han perdurado en el mediano plazo (2-3 años), pero que probablemente se</p>

interrumpan pronto

3= interacciones que han perdurado en el mediano plazo (2-3 años), y que van a perdurar en el largo plazo

d) ¿Con cuáles empresas trabajó de forma conjunta (Ej. para el desarrollo de nuevos productos, nuevas iniciativas comerciales, solución de problemas comunes en la producción, etc.) en el período 2008-2011?

Nota: Trabajar en forma conjunta no incluye relaciones de mercado como compra y venta de productos.

Si hay empresas relevantes que no estén mencionadas en la Lista 1, por favor agregar el nombre.

Para cada una de las empresas con las que se tiene este tipo de relación indicar:

1) El valor de la relación según la siguiente escala:

1= solamente relaciones ocasionales y que no perduraron hasta hoy

2= interacciones que han perdurado en el mediano plazo (2-3 años), pero que probablemente se interrumpan pronto

3= interacciones que han perdurado en el mediano plazo (2-3 años), y que van a perdurar en el largo plazo

2) Si esa relación se originó gracias a la participación a una de las actividades del PIP

Marcar 1 si fue así, y dejar vacío en caso contrario

3) Si esa relación ha permitido mejorar los procesos de innovación y adaptación de productos para los clientes que pertenecen a sub-sectores diferentes del sector de la empresa

Marcar 1 si fue así, y dejar vacío en caso contrario.

e) Algunas de estas empresas ¿están colaborando entre ellas?

☐ a Sí

☐ b No → pase a pgta. g

☐ c No Sabe → pase a pgta. g

f) Si la respuesta fue afirmativa, marcar los nombres de las empresas que colaboran:

Nombre de la empresa		Nombre de la empresa
	colabora con	
	colabora con	
	colabora con	
	colabora con	
	colabora con	
	colabora con	

REDES CON INSTITUCIONES LOCALES

En la Lista 2 UD encontrará los nombres de diferentes instituciones públicas y publico-privadas relevantes para el sector

Con respecto a esas instituciones, puede UD contestar las siguientes preguntas?

g) Por favor, indique las instituciones más importantes con las cuales ha mantenido vínculos en el área de capacitación y transferencia de conocimiento técnico y de tecnologías durante el período 2008-2011 y que UD considera una fuente valiosa o importante de conocimiento, información y/o recursos para su firma o empleados.

Nota: Por favor añadir las instituciones locales o nacionales no mencionadas en la lista.
Para cada una de las instituciones con las que se tiene este tipo de relación indicar:

- 1) El valor de la relación según la siguiente escala:
1= relación de valor limitado (Ej. que aporta poco a la empresa y suele ser ocasional)
2= relación bastante duradera y con algo de valor (que aporta algo de beneficios a las actividades de las empresas y es generalmente bastante frecuente en el tiempo)
3= relación duradera y altamente valiosa (que aporta muchos beneficios a las empresas y suele ser muy duradera)
- 2) Si esa relación se originó gracias a la participación en una de las actividades del PIP
Marcar 1 si fue así, dejar vacío en caso contrario
- 3) Si esa relación ha permitido mejorar los procesos de innovación y adaptación de productos para los clientes que pertenecen a sub-sectores diferentes del sector de la empresa.
Marcar 1 si fue así, y dejar vacío en caso contrario.

h) Por favor, indique las instituciones más importantes con las cuales ha mantenido vínculos en el área de soporte comercial, y/o para la exportación y comercialización durante el período 2008-2011 y que UD considera una fuente valiosa o importante de conocimiento, información y/o recursos para su firma o empleados

Nota: Por favor añadir las instituciones locales o nacionales no mencionadas en la lista.
Para cada una de las instituciones con las que se tiene este tipo de relación indicar:

- 2) El valor de la relación según la siguiente escala:
1= relación de valor limitado (Ej. que aporta poco a la empresa y suele ser ocasional)
2= relación bastante duradera y con algo de valor (que aporta algo de beneficios a las actividades de las empresas y es generalmente bastante frecuente en el tiempo)
3= relación duradera y altamente valiosa (que aporta muchos beneficios a las empresas y suele ser muy duradera)
- 3) Si esa relación se originó gracias a la participación en una de las actividades del PIP
Marcar 1 si fue así, dejar vacío en caso contrario
- 3) Si esa relación ha permitido mejorar los procesos de innovación y adaptación de productos para los clientes que pertenecen a sub-sectores diferentes del sector de la empresa.
Marcar 1 si fue así, y dejar vacío en caso contrario.

D. INNOVACION, EMPRENDEDORISMO Y DESEMPEÑO

<p>a) Con respecto al perfil innovador y estratégico de la empresa ¿Podría indicar el grado de acuerdo o desacuerdo con cada una de las siguientes descripciones de su empresa? Esas afirmaciones se consideran validas en la temporada 2008-2011</p>	<p>Marque el grado de acuerdo/desacuerdo según la escala 1-5: 1= totalmente en desacuerdo 5= totalmente de acuerdo</p>
<p>i. Nuestra tecnología está actualizada a los requerimientos y normas de calidad de los mercados internacionales</p>	<p>1-2-3-4-5</p>

ii. El personal de mi empresa es alentado continuamente a innovar y probar nuevas y mejores formas de realizar el trabajo	1-2-3-4-5
iii. Nuestra empresa mejoró sustancialmente la comprensión de las causas de los defectos de los productos	1-2-3-4-5
iv. En esta empresa hay mujeres ocupando cargos gerenciales o con responsabilidades de gestión importantes	1-2-3-4-5
v. Nuestros productos podrían fácilmente competir con los de los grandes productores internacionales líderes en el sector	1-2-3-4-5
vi. Desarrollamos tecnologías de punta para el mercado internacional	1-2-3-4-5
vii. Nuestra empresa ha tomado medidas importantes para mejorar las habilidades de nuestra fuerza de trabajo	1-2-3-4-5
viii. Nuestros técnicos visitan regularmente otras empresas del sector en el exterior	1-2-3-4-5
ix. Nuestro gerente/propietario considera prioritaria la reducción de emisiones nocivas en el proceso productivo	1-2-3-4-5
x. Cuando hay nuevas oportunidades de mercado la empresa es muy proactiva en invertir para satisfacerlas	1-2-3-4-5
xi. La empresa es más dinámica en desarrollar nuevos productos y nuevas estrategias de mercadeo que las otras empresas del sector en la Ciudad de Córdoba	1-2-3-4-5
xii. La empresa tiene o ha participado de programas de responsabilidad social para mejorar las condiciones de la comunidad local	1-2-3-4-5
xiii. Cuando se requiere financiamiento, lo usual es resolverlo con financiamiento propio, sin recurrir al sistema financiero o a apoyos públicos	1-2-3-4-5
xiv. La empresa invirtió muchos recursos para reducir la cantidad de contaminantes del aire , agua y tierra que enviábamos al medioambiente	1-2-3-4-5
xv. La empresa ha incrementado la inversión para capacitar y retener al personal	1-2-3-4-5
xvi. Las mujeres que trabajan en esta empresa tiene las mismas condiciones de trabajo que los hombres	1-2-3-4-5
xvii. La empresa ha realizado cambios de gestión para adaptarse a nuevos mercados	1-2-3-4-5
xviii. La empresa ha desarrollado una clara y ambiciosa estrategia de largo plazo	1-2-3-4-5
xix. La empresa tiene importante clientes internacionales que son relevantes para el aprendizaje tecnológico y/o comercial de la empresa	1-2-3-4-5
xx. La empresa introdujo nuevas certificaciones internacionales (ISO) para favorecer la exportación y las relaciones con clientes internacionales	1-2-3-4-5

b) Por favor proporcione las siguientes cifras	2008	2009	2010	2011	Variación % 2008-2011	Por favor indique en que medida considera que estos cambios se debieron a la participación en el PIP, en una escala de 1 a 5 con 1= Sin ninguna relación 5= Totalmente atribuibles al PIP
i. Monto total de ventas (en miles de Pesos) Comprende la venta realizada por la empresa a precio de venta en fábrica, durante 2005, de bienes elaborados en su local o mandados a elaborar a terceros con materia prima de la empresa. No debe incluir IVA, ni impuestos internos.						1 (min)-2-3-4-5(max)
ii. Ganancias netas (en miles de Pesos) antes de impuestos						1 (min)-2-3-4-5(max)
iii. Exportaciones (% sobre ventas totales (i))						1 (min)-2-3-4-5(max)
iv. Número de empleados totales (promedio anual (A.k))						1 (min)-2-3-4-5(max)
v. Inversión en I+D (en miles de Pesos)						1 (min)-2-3-4-5(max)
vi. % de ventas totales que correspondieron al (los) nuevo(s) producto(s) y/o servicio(s) desarrollado(s) por la empresa						1 (min)-2-3-4-5(max)

E. PREGUNTAS ABIERTAS

1. Durante la experiencia del PIP ¿Considera que Uds. han aprendido a manejar las relaciones de cooperación o interacción con las otras empresas del sector en la Ciudad de Córdoba de una forma diferente al pasado?
2. ¿Desarrollaron un nuevo “modelo de gestión” para gestionar relaciones? ¿Puede describirlo?
3. ¿Sirvió eso para reducir comportamientos oportunistas, asimetrías informativas y desconfianza entre las empresas?
4. ¿Cuáles fueron los errores más importantes que Ud. observó en la experiencia de PIP y que recomendaría no se reiteren en el futuro en otros proyectos parecidos?

2) Questionnaire for untreated firms



ENCUESTA SOBRE LA COMPETITIVIDAD DEL SECTOR ELECTRONICA DE LA CIUDAD DE CÓRDOBA

Este estudio se propone analizar la competitividad de las Micro Pequeñas y Mediana Empresas (MPMEs) del complejo Electrónico de la Ciudad de Córdoba. Esta encuesta está desarrollada en el marco de un proyecto de evaluación del programa de Desarrollo de Cadenas Productivas (PIP) financiado por ADEC y FOMIN (2003-2007).

CONFIDENCIALIDAD

Los datos que Ud. proporcione se hallan bajo los **principios de confidencialidad y reserva** y no podrán comunicarse, en ningún caso, en forma nominativa o individualizada, ni constituirán prueba ante autoridad administrativa o fiscal, ni en juicio o fuera de él. Se garantiza por lo tanto la máxima confidencialidad de las informaciones proporcionadas.

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¡Gracias por su colaboración!

A – DATOS GENERALES DE LA EMPRESA

a) Nombre de la firma o Razón Social	
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b) Dirección	
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c) Teléfono		d) Fax	
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e) E-mail y web site	
----------------------	--

f) Nombre del Entrevistado	
----------------------------	--

g) Cargo	
----------	--

h) Sub-sectores	Por favor indique con una cruz (X) el/los subsector(res) que corresponden
Componentes	
Medición	
Energía	
Electrónica Industrial	
Electromedicina	
Telecomunicaciones	
Tele-radiodifusión	
Seguridad	
Automotor	
Audio, Entretenimiento	
Comercialización	
Control y automatización industrial	
Otro (mencionar)	

i) Año de fundación	
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j) Estructura de propietarios de la empresa	Por favor indique con una cruz (X) los tipos de propietarios que han tenido una participación directa importante en el capital de su empresa en el año 2011. Para las empresas extranjeras se indique además el % de participación extranjera
Empresa Argentina	
Empresa Extranjera	

k) Número total de ocupados en promedio anual 2011	
l) De los cuales:	
l.1) Permanente regular remunerado	
l.2) Temporario remunerado (contrato a prueba, por agencia, corto plazo, etc.)	
l.3) Autoempleo (trabajadores por cuenta propia,	

familiares no remunerados)	
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m) ¿Cuáles de estas actividades lleva a cabo la empresa internamente?	Por favor indique con una cruz (X) las actividades llevadas a cabo internamente
m.1) I+D	
m.2) Diseño	
m.3) Ensamblaje/Producción	
m.4) Distribución, Logística	
m.5) Comercialización	
m.6) Otra: _____	

n) ¿A cuáles sectores productivos pertenecen sus clientes directos? Esta pregunta pretende investigar para cuales sectores Ud. diseña, desarrolla, y/o produce sus productos. La pregunta se refiere a sus clientes directos.	Por favor indique con una cruz (X) los sectores donde operan sus clientes Indicar también si para algunos de estos sectores la empresa realiza diseños/adaptaciones específicas (I.e. no productos estándar) (marcando con una X sobre AD HOC)
n.1) Agroindustrias. Industrias alimenticias	AD HOC
n.2) Audio	AD HOC
n.3) Automotriz	AD HOC
n.4) Bancos. Servicios financieros	AD HOC
n.5) Componentes electrónicos	AD HOC
n.6) Construcción	AD HOC
n.7) Consumo Masivo. Mayorista. Distribución	AD HOC
n.8) Control y automatización industrial	AD HOC
n.9) Educación	AD HOC
n.10) Electromedicina	AD HOC
n.11) Entretenimiento	AD HOC
n.12) Investigación	AD HOC
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n.14) Retail. Centros comerciales	AD HOC
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n.17) Seguros	AD HOC
n.18) Software. Informática	AD HOC
n.19) Suministros de electricidad, gas, agua	AD HOC
n.20) Telecomunicaciones	AD HOC
n.21) Tele-radiodifusión	AD HOC
n.22) Transporte	AD HOC
n.23) Otro: _____	AD HOC

B –PROGRAMA DE CADENAS PRODUCTIVAS Y RELACIONES CON CHIECCA

Su empresa no participó del Programa de Cadenas Productivas (PIP) financiado por ADEC y FOMIN (2003-2007).

a) ¿Puede explicar por qué su empresa no participó al PIP?	Marque en una escala de 1=en desacuerdo a 5=muy en acuerdo
vi. No sabíamos de la existencia del PIP	1-2-3-4-5
vii. Queríamos participar pero las tareas administrativas relacionadas con la participación al programa estaban fuera de nuestro alcance	1-2-3-4-5
viii. No pensamos que fuera útil participar	1-2-3-4-5

ix.	Pensamos que el PIP no estaba bien organizado o diseñado	1-2-3-4-5
x.	La CIIECA nos otorgó poca información respecto del PIP	1-2-3-4-5
xi.	Diferentes factores externos (Ej. la crisis del mercado internacional; el manejo de la política industrial en la Argentina) dificultaron nuestra participación	1-2-3-4-5
xii.	No confiamos en la CIIECA como institución de coordinación de políticas	1-2-3-4-5
xiii.	Nuestra empresa no necesitaba el soporte de políticas como PIP	1-2-3-4-5
xiv.	Participamos en políticas similares en el pasado y no dieron beneficios	1-2-3-4-5
xv.	Participar en el PIP hubiera significado compartir información y conocimiento con empresas competidoras con las cuales no queríamos compartir	1-2-3-4-5
xvi.	Necesitábamos otros tipos de apoyos, los otorgados por el PIP no se ajustaban a nuestras necesidades en ese momento	1-2-3-4-5
xvii.	Nuestra gerencia/propietarios no creen en las políticas de este tipo y por eso nunca participa	1-2-3-4-5
xviii.	Como no participamos de la CIIECA no se nos permitió participar	1-2-3-4-5
xix.	Los costos (tiempo, recursos, etc) relacionados con participar al PIP son demasiado altos	1-2-3-4-5
xx.	Otras motivaciones (explicar_____)	1-2-3-4-5

c) ¿Cuál es su opinión <u>actual</u> acerca del PIP?		Marque en una escala de 1=en desacuerdo a 5=muy en acuerdo NA= si no saben la respuesta
i.	No tenemos ninguna información al respecto del PIP y por eso no tenemos ninguna opinión	1-2-3-4-5 NA
ii.	Observamos los beneficios del PIP en otras empresas y nos animaríamos a participar en un PIP o en iniciativas similares en el futuro	1-2-3-4-5 NA
iii.	No participaríamos en el PIP o en iniciativas similares en el futuro	1-2-3-4-5 NA
iv.	Pensamos que el PIP no sirvió tampoco a las empresas que participaron	1-2-3-4-5 NA
v.	Perdimos una ocasión de mejorar nuestra competitividad al no haber participado	1-2-3-4-5 NA
vi.	Otras motivaciones (explicar_____)	1-2-3-4-5 NA

c) Con respecto al período 2008-2011 ¿Podría mencionar las actividades en las que ha trabajado en forma conjunta con otras empresas?	Por favor indique con una cruz (X) las actividades en las que su empresa participó
Centro CSMT	
Centro de Abastecimiento	
Constitución de UTE o grupos para proveer al Estado	
Exportación conjunta	
Participación en Ferias	
Otros _____ _____	

C. REDES

Uno de los objetivos del PIP era fortalecer las relaciones locales de las empresas sea con otras empresas o con instituciones publicas o privadas. UD encontrará preguntas acerca de la formación de redes de esta empresa.

<p align="center"><u>REDES CON OTRAS EMPRESAS</u> En la Lista 1 UD encontrará los nombres de otras empresas de Electrónica de la Ciudad de Córdoba Con respecto a esas empresas, ¿puede UD contestar las siguientes preguntas?</p>

<p>a) ¿A cuáles de las empresas de la Lista 1 ha brindado información relacionada con los negocios (Ej. información tecnológica, comercial) en el período 2008-2011? Nota: Si hay empresas relevantes que no estén mencionadas en la Lista 1, por favor agregue el nombre. Para cada una de las empresas con las que se tiene este tipo de relación indicar:</p> <p>3) <u>El valor de la información brindada según la siguiente escala:</u> 1= información de valor reducido (con impactos menores a nivel productivo, económico) 2= información de valor moderado 3= información de gran valor estratégico (que permitió mejoras o innovaciones a nivel productivo y/o económico)</p>
<p>b) ¿Cuáles de las empresas de la Lista 1 han brindado a esta empresa información relacionada con los negocios (Ej. información tecnológica, comercial) en el período 2008-2011? Nota: Si hay empresas relevantes que no estén mencionadas en la Lista 1, por favor agregar el nombre. Para cada una de las empresas con las que se tiene este tipo de relación indicar:</p> <p>a. <u>El valor de la información brindada según la siguiente escala:</u> 1= información de valor reducido (con impactos menores a nivel productivo, económico) 2= información de valor moderado 3= información de gran valor estratégico (que permitió mejoras o innovaciones a nivel productivo y/o económico)</p>

c) ¿Cómo considera Ud el valor de la relación con las empresas que ha seleccionado?

- 1= solamente relaciones ocasionales y que no perduran hasta hoy
2= interacciones que han perdurado en el mediano plazo (2-3 años), pero que probablemente se interrumpan pronto
3= interacciones que han perdurado en el mediano plazo (2-3 años), y que van a perdurar en el largo plazo

d) ¿Con cuáles empresas trabajó de forma conjunta (Ej. para el desarrollo de nuevos productos, nuevas iniciativas comerciales, solución de problemas comunes en la producción, etc.) en el período 2008-2011?

Nota: Trabajar en forma conjunta no incluye relaciones de mercado como compra y venta de productos.

Si hay empresas relevantes que no estén mencionadas en la Lista 1, por favor agregar el nombre. Para cada una de las empresas con las que se tiene este tipo de relación indicar:

3) El valor de la relación según la siguiente escala:

- 1= solamente relaciones ocasionales y que no perduraron hasta hoy
2= interacciones que han perdurado en el mediano plazo (2-3 años), pero que probablemente se interrumpan pronto
3= interacciones que han perdurado en el mediano plazo (2-3 años), y que van a perdurar en el largo plazo

2) Si esa relación ha permitido mejorar los procesos de innovación y adaptación de productos para los clientes que pertenecen a sub-sectores diferentes del sector de la empresa

Marcar 1 si fue así, y dejar vacío en caso contrario.

e) Algunas de estas empresas ¿están colaborando entre ellas?

☐ a Sí

☐ b No → pase a pgta. g

☐ c No Sabe → pase a pgta. g

f) Si la respuesta fue afirmativa, marcar los nombres de las empresas que colaboran:

Nombre de la empresa		Nombre de la empresa
	colabora con	
	colabora con	
	colabora con	
	colabora con	
	colabora con	
	colabora con	

REDES CON INSTITUCIONES LOCALES

**En la Lista 2 UD encontrará los nombres de diferentes instituciones públicas y publico-privadas relevantes para el sector
Con respecto a esas instituciones, puede UD contestar las siguientes preguntas?**

g) Por favor, indique las instituciones más importantes con las cuales ha mantenido vínculos en el área de capacitación y transferencia de conocimiento técnico y de tecnologías durante el período 2008-2011 y que UD considera una fuente valiosa o importante de conocimiento, información y/o recursos para su firma o empleados.

Nota: Por favor añadir las instituciones locales o nacionales no mencionadas en la lista.
Para cada una de las instituciones con las que se tiene este tipo de relación indicar:

3) El valor de la relación según la siguiente escala:

1= relación de valor limitado (Ej. que aporta poco a la empresa y suele ser ocasional)

2= relación bastante duradera y con algo de valor (que aporta algo de beneficios a las actividades de las empresas y es generalmente bastante frecuente en el tiempo)

3= relación duradera y altamente valiosa (que aporta muchos beneficios a las empresas y suele ser muy duradera)

2) Si esa relación ha permitido mejorar los procesos de innovación y adaptación de productos para los clientes que pertenecen a sub-sectores diferentes del sector de la empresa.

Marcar 1 si fue así, y dejar vacío en caso contrario.

h) Por favor, indique las instituciones más importantes con las cuales ha mantenido vínculos en el área de soporte comercial, y/o para la exportación y comercialización durante el período 2008-2011 y que UD considera una fuente valiosa o importante de conocimiento, información y/o recursos para su firma o empleados

Nota: Por favor añadir las instituciones locales o nacionales no mencionadas en la lista.
Para cada una de las instituciones con las que se tiene este tipo de relación indicar:

1) El valor de la relación según la siguiente escala:

1= relación de valor limitado (Ej. que aporta poco a la empresa y suele ser ocasional)

2= relación bastante duradera y con algo de valor (que aporta algo de beneficios a las actividades de las empresas y es generalmente bastante frecuente en el tiempo)

3= relación duradera y altamente valiosa (que aporta muchos beneficios a las empresas y suele ser muy duradera)

2) Si esa relación ha permitido mejorar los procesos de innovación y adaptación de productos para los clientes que pertenecen a sub-sectores diferentes del sector de la empresa.

Marcar 1 si fue así, y dejar vacío en caso contrario.

D. INNOVACION, EMPRENDEDORISMO Y DESEMPEÑO

a) Con respecto al perfil innovador y estratégico de la empresa ¿Podría indicar el grado de acuerdo o desacuerdo con cada una de las siguientes descripciones de su empresa? Esas afirmaciones se consideran validas en la temporada 2008-2011	Marque el grado de acuerdo/desacuerdo según la escala 1-5: 1= totalmente en desacuerdo 5= totalmente de acuerdo
i. Nuestra tecnología está actualizada a los requerimientos y normas de calidad de los mercados internacionales	1-2-3-4-5
ii. El personal de mi empresa es alentado continuamente a innovar y probar nuevas y mejores formas de realizar el trabajo	1-2-3-4-5
iii. Nuestra empresa mejoró sustancialmente la comprensión de las causas de los defectos de los productos	1-2-3-4-5

iv. En esta empresa hay mujeres ocupando cargos gerenciales o con responsabilidades de gestión importantes	1-2-3-4-5
v. Nuestros productos podrían fácilmente competir con los de los grandes productores internacionales líderes en el sector	1-2-3-4-5
vi. Desarrollamos tecnologías de punta para el mercado internacional	1-2-3-4-5
vii. Nuestra empresa ha tomado medidas importantes para mejorar las habilidades de nuestra fuerza de trabajo	1-2-3-4-5
viii. Nuestros técnicos visitan regularmente otras empresas del sector en el exterior	1-2-3-4-5
ix. Nuestro gerente/propietario considera prioritaria la reducción de emisiones nocivas en el proceso productivo	1-2-3-4-5
x. Cuando hay nuevas oportunidades de mercado la empresa es muy proactiva en invertir para satisfacerlas	1-2-3-4-5
xi. La empresa es más dinámica en desarrollar nuevos productos y nuevas estrategias de mercadeo que las otras empresas del sector en la Ciudad de Córdoba	1-2-3-4-5
xii. La empresa tiene o ha participado de programas de responsabilidad social para mejorar las condiciones de la comunidad local	1-2-3-4-5
xiii. Cuando se requiere financiamiento, lo usual es resolverlo con financiamiento propio, sin recurrir al sistema financiero o a apoyos públicos	1-2-3-4-5
xiv. La empresa invirtió muchos recursos para reducir la cantidad de contaminantes del aire , agua y tierra que enviábamos al medioambiente	1-2-3-4-5
xv. La empresa ha incrementado la inversión para capacitar y retener al personal	1-2-3-4-5
xvi. Las mujeres que trabajan en esta empresa tiene las mismas condiciones de trabajo que los hombres	1-2-3-4-5
xvii. La empresa ha realizado cambios de gestión para adaptarse a nuevos mercados	1-2-3-4-5
xviii. La empresa ha desarrollado una clara y ambiciosa estrategia de largo plazo	1-2-3-4-5
xix. La empresa tiene importante clientes internacionales que son relevantes para el aprendizaje tecnológico y/o comercial de la empresa	1-2-3-4-5
xx. La empresa introdujo nuevas certificaciones internacionales (ISO) para favorecer la exportación y las relaciones con clientes internacionales	1-2-3-4-5

b) Por favor proporcione las siguientes cifras	2008	2009	2010	2011	Variación % 2008-2011
i. Monto total de ventas (en miles de Pesos)					
ii. Ganancias netas (en miles de Pesos después de impuestos)					
iii. Exportaciones (% sobre ventas totales (i))					
iv. Número de empleados totales (promedio anual (A.k))					
v. Inversión en I+D (en miles de Pesos)					
vi. % de ventas totales que correspondieron al (los) nuevo(s) producto(s) y/o servicio(s) desarrollado(s) por la empresa					

E. PREGUNTAS ABIERTAS

5. ¿Considera que en los últimos años las empresas del sector han aprendido a manejar las relaciones de cooperación o interacción con las otras empresas del sector en la Ciudad de Córdoba de una forma diferente al pasado?
6. ¿Por qué cree que esto es así? (tanto si la respuesta fue positiva como negativa)
7. ¿Considera que se ha generado un nuevo “modelo de gestión” para gestionar relaciones? ¿Puede describirlo?
8. ¿Considera que se han reducido comportamientos oportunistas, asimetrías informativas y desconfianza entre las empresas?
9. En caso de que se desarrollaran políticas que fomentaran la cooperación entre las empresas del sector ¿Que recomendación haría para que sea provechosa para su empresa y su sector?

3) Questions addressed in the Focus Group

A partir de los resultados presentados ¿Uds esperaban que ésta fuera la estructura de la red?

¿Consideran que se trata de una decisión de los empresarios o piensan que más allá de esto puede relacionarse con características de las firmas?

¿Consideran que se trata de una estructura óptima o beneficiosa en algún aspecto? ¿Por qué?

Mirándolo desde otro lugar, este núcleo podría haber desaparecido después del programa. ¿Qué hizo que se mantuviera ese centro?. ¿Qué actividades los mantuvieron? ¿Qué beneficio les trajo mantener la red funcionando?

¿Si el CSMT no hubiera existido piensan que esta red hubiera sido menos densa aún?

¿Creen que la razón de esta mayor densidad en el núcleo central se debe a relaciones personales previas entre los empresarios o había otras bases?

Y en ese sentido y teniendo en cuenta las trayectorias de los empresarios de Córdoba y del núcleo que fundó la CIIECA ¿eso significa que tienen que existir esas relaciones antes o eso se crea?

¿Y no se puede ver como falencia del Programa no haber promovido más relaciones, más estables y más densas? ¿quizás que no hizo suficientes actividades o las que hizo no fueron convocantes?

¿Cuáles fueron los factores que Uds consideran que fueron exitosos en el programa y especialmente para mejorar la red de relaciones?

¿Cuáles fueron aquellos aspectos que pudieron haberse hecho mejor o no funcionaron según lo esperado?

¿Qué otros aspectos podrían haber tenido buenos resultados?

¿Qué aprendizajes favoreció el Programa en lo referido a la gestión de redes de relaciones?

¿Que cosas ayudaron por ejemplo a generar más confianza? ¿O a resolver conflictos?

Si tuvieran que replicar una política en otro contexto ¿Qué se podría mejorar?

¿Puede ser que el programa sea útil para una primera etapa pero se agote y que ahora se requiera de otros?

Appendix II

Endorsement letter



BANCO INTERAMERICANO DE DESARROLLO
FONDO MULTILATERAL DE INVERSIONES

Washington, DC, 23 de Enero de 20112

Señor

Ingeniero Erardo Bozzano

Presidente de la Cámara de Industrias Informáticas, Electrónicas y de Comunicaciones del

Centro de Argentina (CIECCA)

Argentina

Estimado Ingeniero Bozzano,

Por la presente, nos es grato comunicarle que el Fondo Multilateral de Inversiones (FOMIN), administrado por el Banco Interamericano de Desarrollo (BID), ha seleccionado al sector industrial que su Cámara representa en la ciudad de Córdoba como parte de un estudio destinado a elaborar herramientas para evaluar el impacto de Programas de Desarrollo de Clusters, una de las iniciativas que lidera el BID en la región. Para este estudio se han seleccionado diferentes casos analizando en cada uno de ellos el potencial de uso de la metodología de *Análisis de Redes Sociales* para la evolución de impacto en desarrollo de clusters.

En particular, el estudio intentará explorar los efectos del Programa de Desarrollo de Cadenas Productivas financiado por ADEC y el FOMIN y se enfocará en analizar las relaciones de cooperación entre las firmas y entidades participantes del programa. El aprendizaje que surja de este estudio reforzará la metodología para la evaluación de impacto de Programas de Desarrollo de Clusters, y la calidad de futuras intervenciones similares.

La elección de las empresas del "complejo electrónico" de Córdoba obedece en primer lugar a que las empresas que componen la CIECCA participaron entre los años 2003 y 2007 del Programa de Desarrollo de Cadenas Productivas, uno de los pocos Programas en los que se utilizó la metodología de *Análisis de Redes Sociales* previamente. Esto nos permite contar con una "línea de base" que posibilitará extraer mejores resultados y conclusiones. En segundo lugar, consideramos que la institución que usted preside ha demostrado siempre una gran disposición al aprendizaje continuo y ha cooperado siempre de manera activa en todas las iniciativas que se han propuesto en este sentido.

Nos complace informarle que el estudio sería coordinado por la Dra. Elisa Giuliani, de la Universidad de Pisa (Italia) y por el Lic. Andrés Matta de la Universidad Nacional de Córdoba, quien estuvo a cargo en 2005 y 2006 de aplicar la mencionada metodología de manera experimental. Según la planificación que se nos ha facilitado, los consultores esperan realizar su trabajo de campo mediante entrevistas personales con los propietarios/gerentes generales de las firmas durante el mes de febrero del corriente año.

Desde ya agradecemos a usted y a la Comisión Directiva de la Cámara por su colaboración en difundir esta actividad con las empresas del sector, brindar información de contacto de las firmas de su Cámara para la confección de la agenda de entrevistas, y apoyar la tarea de los consultores para que la puedan cumplir esta tarea con el éxito esperado.

Por nuestra parte, y tal como se lo ha adelantado el Lic. Matta, nos comprometemos a mantenerle informados de los avances del estudio y a su finalización, presentarles sus resultados.

Atentamente,

Sandra Darville

Jefe, Unidad de Efectividad para el Desarrollo del FOMIN

Appendix III

Performance Indicators: t-tests and correlations

TABLE i: DIFFERENCES IN THE AVERAGE REVENUES OF TREATED AND UNTREATED FIRMS (T-TESTS)

		N	Average value	Sig. (2-tail)
Revenues 2008 (Arg. Pesos)	Treated	13	3,426,903.23	0.706
	Untreated	7	5,042,285.71	
Revenues 2009 (Arg. Pesos)	Treated	11	3,750,601.82	0.935
	Untreated	8	3,984,625.00	
Revenues 2010 (Arg. Pesos)	Treated	10	3,731,972.10	0.620
	Untreated	8	5,669,750.00	
Revenues 2011 (Arg. Pesos)	Treated	17	8,439,106.53	0.317
	Untreated	9	8,484,333.33	
Var % 2008-2011	Treated	18	0.5517	0.109
	Untreated	13	1.4254	

TABLE ii: DIFFERENCES IN THE AVERAGE PROFITS OF TREATED AND UNTREATED FIRMS (T-TESTS)

		N	Average value	Sig. (2-tail)
Profits 2008 (Arg. Pesos)	Treated	9	201,697.67	0.474
	Untreated	2	226,250.00	
Profits 2009 (Arg. Pesos)	Treated	6	181,144.50	0.166
	Untreated	3	103,750.00	
Profits 2010 (Arg. Pesos)	Treated	6	327,703.17	0.520
	Untreated	3	304,833.33	
Profits 2011 (Arg. Pesos)	Treated	10	500,768.40	0.191
	Untreated	3	469,666.67	
Var % 2008-2011	Treated	15	0.2740	0.144
	Untreated	5	1.3120	

TABLE iii PEARSON CORRELATIONS BETWEEN PERFORMANCE INDICATORS AND DEGREE CENTRALITY INDICATORS

	Out Degree centrality IN	IN Degree centrality IN	Degree centrality CN
Revenues 2008	0.075	0.053	0.100
Revenues 2009	0.171	0.149	0.214
Revenues 2010	-0.008	-0.024	0.078
Revenues 2011	-0.038	-0.063	-0.009
Var % Revenues 2008/2011	-0.231	-0.284	-0.252
Profits 2008	-0.468	-0.452	-0.207
Profits 2009	0.666*	0.683**	0.572
Profits 2010	0.391	0.379	0.221
Profits 2011	0.135	-0.058	0.206
Var % Profits 2008/2011	-0.324	-0.340	-0.294
Note: *<.10; **<0.05 and ***<0.01			

TABLE iv DIFFERENCES IN THE AVERAGE PROFITS OF DOMINANT PLAYERS VS THE REST OF THE FIRMS (T-TESTS)

		N	Average value	Sig. (2-tail)
Profits 2008 (Arg. Pesos)	Dominant Players	2	-112360,50	,569
	Other firms	9	276944,44	
Profits 2009 (Arg. Pesos)	Dominant Players	2	343433,50	,016
	Other firms	7	101607,14	
Profits 2010 (Arg. Pesos)	Dominant Players	2	718109,50	,476
	Other firms	7	206357,14	
Profits 2011 (Arg. Pesos)	Dominant Players	3	612561,33	,766
	Other firms	10	457900,00	
Var % 2008-2011	Dominant Players	4	-,3500	,301
	Other firms	16	14,5525	

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