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FROM CRAFT TO FLEXIBILITY

Linkages and Industrial
Governance Systems in the
Development of a Capital-
Goods Industry in Mendoza,
Argentina, 1895-1990

José Antonio Borello

CEUR

Centro de Estudios
Urbanos y Regionales

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DEL TRABAJO ARTESANAL A LA FLEXIBILIDAD

Encadenamientos productivos y sistemas de
gobierno industrial en el desarrollo de una
industria de bienes de capital, en Mendoza,
Argentina, 1895-1990.

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PREFACIO

Envidio a los poetas, a los grandes novelistas, a los cuentacuentos y a los pensadores. Envidio a aquéllos que pueden hablar de cosas realmente importantes. Los envidio porque el lienzo sobre el que pintan, las cosas que dicen, son interesantes para el gran público de hoy, de ayer y de siempre.

El texto que sigue tiene intenciones más modestas. Habla de cosas pequeñas, y hasta alguno dirá, insignificantes. De manera explícita y directa nada se dice aquí del amor, del tiempo, o de la distancia; aunque tanto la hechura del texto, como los objetos y procesos a los que ese texto se refiere, incluyan esas dimensiones centrales de la vida.

Lo que sigue es una visión, un invento, una interpretación. Claro, no se trata de una visión caprichosa, ya que se basa en una metodología que responde a ciertas convenciones, ciertos hábitos, ciertas técnicas, aceptadas por la tribu científica a la que pertenezco. Es a partir de esa metodología que construyo una interpretación de la historia y de la situación actual de la industria metalmecánica mendocina y, en especial, del segmento de fabricantes de máquinas y equipos.

Como siempre, detrás de cada texto hay una historia, un relato, una narración. En las páginas que siguen, sin embargo, fragmentos de esa narración han saltado de detrás del texto para formar parte de él, por lo que aquí no será necesario hacer la confesión habitual.

Para terminar, este volumen es el primero de lo que promete ser una trilogía metalmecánica mendocina. Tengo casi a punto un libro, en castellano, y dirigido al público en general, que cuenta una pequeña parte de la historia de esta industria. Un poco más atrás, en la línea de montaje, trabajo un texto que discute algunos aspectos de la competitividad de la metalmecánica mendocina. Espero completar la trilogía durante el noventa y cuatro.

J.A.B., Buenos Aires, enero de 1994.

DEL TRABAJO ARTESANAL A LA FLEXIBILIDAD

ENCADENAMIENTOS PRODUCTIVOS Y SISTEMAS DE GOBIERNO INDUSTRIAL EN EL DESARROLLO DE UNA INDUSTRIA DE BIENES DE CAPITAL EN MENDOZA, ARGENTINA, 1895-1990.

por José Antonio Borello,

Dr. Joseph L. Scarpaci, Director de Tesis

La tesis investiga el desarrollo de una industria de bienes de capital en Mendoza, Argentina, a través de un análisis de los encadenamientos productivos y de los sistemas de gobierno industrial. Los encadenamientos, o eslabonamientos, son los flujos de materiales, información y finanzas que conectan a las firmas entre sí. Los sistemas de gobierno industrial son las prácticas sociales que cementan a esos encadenamientos. Por lo tanto, los encadenamientos son entendidos como parte de lo social y no como transacciones de mercado gobernadas solamente por consideraciones de precios.

En este trabajo se plantean dos cuestiones. Primero, contrariamente a lo que dice la teoría convencional de localización industrial, las firmas no se localizan en función de la existencia de ciertos factores favorables, sino que los construyen a medida que crecen. Esta primera cuestión es indagada a partir de un examen del proceso de generación de encadenamientos en el tiempo. Para el período 1895-1990 se toman los siguientes ejemplos: mano de obra y subcontratistas, clientes, servicios y la aparición de grupos económicos.

Segundo, en este estudio se argumenta que la industria de bienes de capital de Mendoza está atravesando una sustancial (e inédita) etapa de transición. La transición es parte de un cambio mayor que está teniendo lugar a las escalas nacionales y mundiales. El análisis se concentra en el patrón histórico de encadenamientos y sistemas de gobierno industrial en la industria, y contrasta ese patrón con el de la última década.

Implícitos en los dos planteos anteriores hay dos dimensiones territoriales o espaciales. En primer lugar, coincidimos en que el desarrollo de "la industria produce regiones" (Storper y Walker 1989). Y en segundo lugar, al nivel intra-urbano, la evolución de la industria (y especialmente su estructura de encadenamientos y sistemas de gobierno) tiene una influencia directa sobre la dirección y naturaleza del crecimiento de la ciudad.

Los dos temas centrales de esta tesis se apoyan en información empírica recogida en la ciudad de Mendoza, una ciudad de casi un millón de habitantes, en el oeste de la Argentina. Más de 100 entrevistas realizadas en un período de más de diez meses revelan los orígenes, la evolución y la estructura de los encadenamientos en la industria de bienes de capital. Las entrevistas han sido complementadas con datos de diversas fuentes.

En el trabajo se llega a tres conclusiones centrales. Primero, que se puede obtener una gran riqueza y profundidad, en este tipo de estudios, a partir de un extenso trabajo de campo. Segundo, que resulta ventajoso concebir a la industrialización como un proceso que inician las mismas firmas y no como la localización de plantas a partir de ciertas condiciones favorables. Por último, esta tesis muestra que la industria de bienes de capital de Mendoza se encuentra en una fase de transición hacia nuevas formas de organización de la producción. La transición se expresa en nuevas estructuras de los encadenamientos, nuevos sistemas de gobierno industrial y en la aparición de nuevos tipos de firmas y nuevas formas institucionales.

Nota: El texto que sigue es una versión casi idéntica de la tesis de doctorado que defendí a comienzos de 1993 ante un comité conformado por los doctores: Joseph L. Scarpaci (director de tesis), John Browder, Paul Knox, Bob Dyck y Mark Wardell. La tesis era uno de los requisitos para la obtención del doctorado (Ph.D.) en Diseño del Medio Ambiente y Planificación, en el Programa de Diseño del Medio Ambiente y Planificación, de la Facultad de Arquitectura y Estudios Urbanos de la Universidad Técnica de Virginia, en Blacksburg, Virginia, EE.UU. (Environmental Design and Planning, College of Architecture and Urban Studies, Virginia Polytechnic Institute and State University).

La coordinación editorial es obra del manso empeño de César Poncela. A la mano oriental de Jorge Irrazábal corresponde el armado del libro.

FROM CRAFT TO FLEXIBILITY

LINKAGES AND INDUSTRIAL GOVERNANCE SYSTEMS IN THE DEVELOPMENT OF A CAPITAL-GOODS INDUSTRY IN MENDOZA, ARGENTINA, 1895-1990

by José Antonio Borello

Joseph L. Scarpaci, Chairman

(ABSTRACT)

This thesis examines the development of a capital-goods industry in Mendoza, Argentina through an analysis of linkages and industrial governance systems. Linkages are material, informational, and financial flows among firms. Industrial governance systems are the social practices that cement linkages. Hence, linkages are understood as socially embedded and not as market transactions governed solely by price considerations.

The study has two major arguments. First, it claims that contrary to conventional industrial location theory firms do not locate in view of the previous existence of certain favorable factors, but rather construct these factors as they grow. This argument is operationalized by asking how firms generate in time their own linkages. Examples taken from the 1895-1990 period include labor and subcontractors, clientele, services, and the emergence of economic groups. Second, this study argues that the capital-goods industry in Mendoza is undergoing a substantial (and unprecedented) transition in the way production is organized. The transition is part of the larger shift taking place at both the national and global scales. The analysis focuses on the historical pattern of linkages and governance systems in the industry, and contrasts that pattern with that of the recent decade.

Implicit in the previous two arguments are two territorial dimensions. First, the development of "industry produces regions" (Storper and Walker 1989). Second, at the intra-city level this means that the evolution of the industry (and specifically its linkage structure and governance systems) has a direct bearing on the direction and nature of the city's growth.

These two arguments are illustrated through empirical work in Mendoza, a city of close to a million people in western Argentina. Over 100 interviews gathered over ten months reveal the origins, evolution, and current form of linkages in the capital-goods industry. These interviews are complemented by data from a variety of sources.

The main conclusions of the study are three. First, the study illustrates the richness and depth that emerges from a project based on substantial fieldwork. Second, it shows the advantages of conceiving industrialization not as the location of plants in response to favorable conditions, but as a process initiated by the firms themselves. Third, the dissertation shows that the capital-goods industry of Mendoza is in a transitional phase towards new ways of organizing production. The transition is expressed in new linkage structures, new governance systems, and the emergence of new types of firms and institutional arrangements.

ACKNOWLEDGEMENTS

Although a dissertation is generally conceived to be mainly the result of one person's efforts I feel the following pages are better described as a collective effort. I am the scribe, the reporter, the narrator of that effort and thus I take responsibility for the words that follow. Yet this study would have never been completed without the money, the help, and the participation of many people and institutions.

First and foremost I would like to thank my thesis advisor and mentor, Dr. Joseph L. Scarpaci. I have no words to describe how grateful I am to his professional guidance and warm friendship. Without his dedication, enthusiasm, and help this project would have never been completed. I have been indeed very lucky to have met him some years ago back in Buenos Aires. Joe is not only widely versed in a number of areas, but he also has a profound understanding of the profession and knows how to transmit it.

I would also like to thank the rest of my thesis committee for the ideas, suggestions, and recommendations I have received from them at different steps in the development of this project and which have improved substantially this dissertation. I am grateful to Professors John Browder, Paul Knox, Bob Dyck, and Mark Wardell.

In a general way I would like to thank the Environmental Design and Planning Program at the College of Architecture and Urban Studies (CAUS) of the Virginia Polytechnic Institute and State University for providing the financial and institutional support to carry out a substantial portion of my Ph.D. studies. I was a research assistant for a semester and taught an undergraduate course during four terms. From CAUS I also received funds to present papers at four conferences while I was a student at the university. While in Blacksburg I have tried to take advantage of the outstanding resources available at the university. If there is something I regret it is not using them enough.

My field-work in Argentina was made possible by a grant from the National Science Foundation, Washington, and by a contract from the Economic Commission for Latin America and the Caribbean, United Nations, ECLAC. During part of my stay in Mendoza I lived in one of the apartments for visiting scholars owned by the Centro Regional de Investigaciones Científicas y Técnicas, CRICYT (a regional branch of the Consejo Nacional de Investigaciones Científicas y Técnicas). I thank Doctor Rodríguez Echandía, CRICYT's director for supporting my application.

I would also like to thank the warmth and support I always received in Mendoza from the Ponce family: Teri, Martín, and Tesa. Their generosity and love are beyond anything I might say. Also in Mendoza the help of many friends has been unmeasurable. Thanks to Simón and Susana Ponce, Luis and

Elcira Ponce, Oscar and María Inés Jaramillo, and to many other friends old and new. To "El Loco" Jaramillo I owe more than he will ever acknowledge. Alejandro Acevedo and I will always cherish our memories from the old times in Godoy Cruz. Alejandro Agüero, today a member of the directorate of EMSE (the provincial power company) and old friend from the times of rock and roll, was helpful in a number of ways.

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In Buenos Aires I was able to discuss my project and findings with Francisco Gatto, coordinator of Regional Studies at the Buenos Aires Office of ECLAC. Francisco has been a tremendous help all throughout this project. He has been an articulate discussant of many of the things said in this dissertation and indeed can rightly claim some ideas as his. He also invited me to participate as a consultant in a research program on small and medium-sized metal-mechanical enterprises. To him and to other people in his team I owe more than I can acknowledge here.

Bernardo Kosacoff, coordinator of the Area of Industrial Studies at ECLAC, Buenos Aires; and Luis A. Sotto-Krebs, then Director of the UNIDO office in Buenos Aires wrote substantial support letters which were instrumental in obtaining interviews in Mendoza.

More than three years have gone by since I first set a foot in Blacksburg. These have been at times years of financial and emotional difficulties in which I had to call for the help of family and friends. In both counts I owe much to Rodolfo and Alicia, Fito and Mariela, and to Jorge Taiana. César and Néida Ponce have always been there, close to the soul. This monograph has about Florencia María's age, a year and a half, and for her sake and her father's it must end right about here.

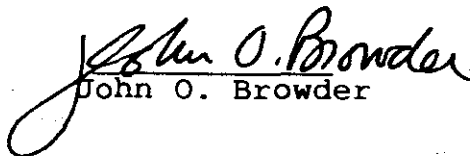
Although I will receive a Ph.D. in my name, at least the Ph. can be rightly claimed by Mercedes Taiana, my wife, who put aside her work and her friends to come with me to Virginia. I dedicate this effort to her.

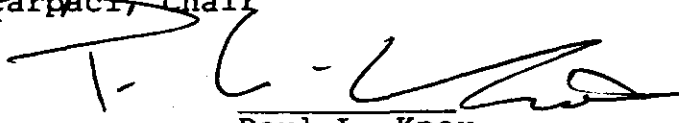
**FROM CRAFT TO FLEXIBILITY.
LINKAGES AND INDUSTRIAL GOVERNANCE SYSTEMS IN THE
DEVELOPMENT OF A CAPITAL-GOODS INDUSTRY IN
MENDOZA, ARGENTINA, 1895-1990**

by
José Antonio Borello


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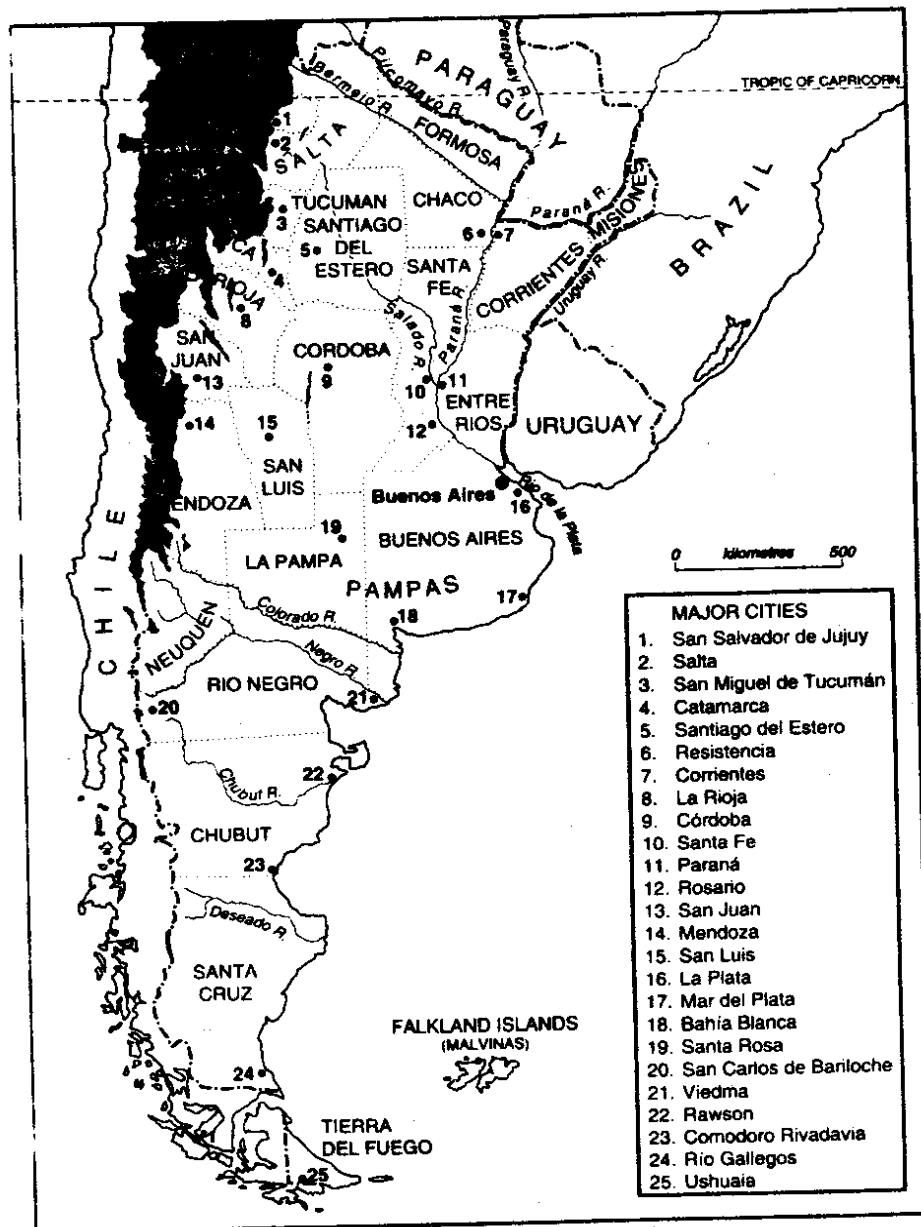
Blacksburg, Virginia

CHAPTER 1

INTRODUCTION

This chapter begins with a brief tale about the meandering process that led to the writing of this dissertation. The tale serves two purposes. Firstly, it shows the randomness and contingency of the research enterprise. Secondly, it presents the raw ideas that will be explored and developed in the rest of the text. In the second section of this chapter I discuss themes of audience and method. Sections third through seventh expand

on the ideas presented at the beginning. These sections include the usual fare in the dissertation menu: problem statement, research objectives and premises, information sources, and thesis organization. The chapter ends with a discussion on the significance of this dissertation in terms of six major research areas. This discussion fleshes out and places into a larger context the major arguments of the dissertation.



Map 1.1. Argentina, Contemporary Political Divisions and Main Cities

1.1) Background and Main Ideas Discussed in this Thesis

As a teenager in the early 1970s I used to play soccer on a dead-end street after school.¹ On one side of the street there was a long wall and a metal gate that separated a zinc-roofed shed from the street. Inside the shed, dozens of workers clad in blue shirts and pants would be welding, hammering, and machining iron and steel. Sometimes they would hang out in the street—smoking and talking—their hands darkened by soot and grime. Although no sign hung from the front gate, everyone in the neighborhood knew this was “Metalúrgica Pescarmona” (Pescarmona Steel) because the shop had been there for many years. Pescarmona had operated since the early decades of the century, although then it was located close to what is now downtown.

When I came back to the same street in the mid-1980s everything had changed. The Pescarmona Steel Corporation (“Industrias Metalúrgicas Pescarmona Sociedad Anónima”, or IMPSA) had engulfed two blocks of a once peaceful, middle-class neighborhood. The crashing sounds of huge machines and metal filled the neighborhood. Two miles away, on an enormous piece of land cut from a tapestry of vineyards and orchards, IMPSA had erected “Factory Number 2”. Besides the two mammoth steel yards, administration and research and development buildings, which housed more than one hundred engineers and technicians, rose from the dusty desert. The roof covering each steel yard stood 50 meters tall, dwarfing people who scurried about like tiny ants.

Since that impressionable visit I began toying with the idea of studying the capital-goods industry of Mendoza.² The idea had to wait several years, because of my work on industrial promotion in the northern province of La Rioja. The idea matured and became increasingly ambitious. From this vague but enthusiastic notion of studying the evolution of a single industry in a province, I gradually became interested in the broader question of industrial organization and regional growth. In the literature I identified the notion of linkage, a conceptual tool that seemed particularly apt for an analysis of industrial organization and regional growth.³ It took me some time to find out that linkages could not be understood in isolation, this led me to the notion of industrial governance systems. Governance systems are the social practices that give meaning to linkages.

Yet, I asked myself, what could be the purpose and significance of studying the development of the capital-goods industry of Mendoza by looking at linkages and governance systems? As the research unfolded I gradually moved from very specific issues I thought this project helped to illuminate—to more general problems. This was by no means an easy process, but slowly broader topics emerged.

At first, one major over-riding argument connected three fields of inquiry and policy. I wanted to show that the development of the capital-goods industry of Mendoza was not the result of the previous existence of certain favorable location factors, but rather that firms had, to a large extent, created these conditions themselves.⁴ This argument emerged from my parallel reading of the new industrial geography⁵, of development economics⁶, and of actual accounts of the industrialization process in Latin

America. In order to connect this statement to the data emerging from my case study I needed a translator; I needed to operationalize my argument. A way of doing that was by looking at the process of linkage generation and at the practices and conventions binding those linkages: governance systems.

I then had a major purpose. But what significance could that have in terms of related areas of inquiry? I identified five major fields of study and policy to which my research was to speak: linkages, spatial/territorial changes, capital-goods manufacturing, firm structure and the emergence of conglomerates, and theory generation in semi-industrialized countries (see point 1.8).

While in Argentina collecting data I saw that the contemporary part of my study could shed light on the transition in which the country was embarked. It seemed to me that some firms were experimenting with new ways of producing. At a broader social and economic scale, distinct changes were also taking place. Moreover, I was reading about what was happening in Europe, North America, and elsewhere and I was in contact with local researchers working in related areas. At some point it became clear to me that by looking at linkages and governance systems I could dissect very precisely part of this transition. For practical purposes I temporarily labelled the transition from Fordism to flexibility (more on point 1.8).

Only already back in Blacksburg and after several re-writes I began to bring to the surface⁷ and to knit into the text this second major purpose of my project. My exploration of linkages and governance systems in the context of the capital-goods industry of Mendoza could also illuminate the recent discussions about the shift in the way production is organized.

My readings on the debate about the transition led me back to some of the basic ideas behind linkages. One of those ideas was the division of labor. Upon my return to Blacksburg and in the fury previous to the defense I realized my study joined a long stream of writings concerned with the division of labor in society. All along I had known my dissertation spoke to that literature; what I did not know was the sheer mass of writings devoted to this topic. My project was significant in terms of the literature on the division of labor. My five areas of significance had turned into six.

Finally, there are the specific premises that provide the translation between my two broad arguments and the case study. I will enunciate them further on in connection with the problem statement, the techniques used, and the data sources. But before I want to make some remarks about three items: the “new regional geography”, audience, and method.

1.2) The “New Regional Geography”, Audience, and Method

This thesis also has other objectives at a broader level of generality. One of them is to contribute to the “new regional geography”, which in Sayer’s interpretation, means resolving the tension between narrative and analysis. Narrative is generally a way of contextualizing while analysis is connected to law-seeking approaches. For example, ethnography has tended to seek contextualizing explanations while political economy has sought to identify laws which are independent of context. The new

regional geography holds these two approaches in tension (Sayer 1989b, 257). However, narrative and analysis are not independent. Conducting an "accurate" analysis implies the implicit narrative (or local history) is correct and vice versa.⁸ There is a direct connection between the configurational (analysis) and episodic (historical narrative).

The tension between narrative and analysis can be seen in terms of the audience to which this thesis is directed. In this dissertation I speak to two audiences with very different expectations. First, this is pioneer work in industrial geography in the Argentinean and Latin American context. My central intention is to provide the basis for future studies on the industrial geography of Mendoza and other similar cities of Latin America. I first provide description, something that is very difficult to do, even though many dismiss it as less important than more "scientific" tasks such as explanation. In this regard, I am deeply convinced that most of the elementary groundwork needed to move into more refined theoretical questions has never been carried out in Latin America.⁹ This thesis also addresses the North American and European literature on industrial geography and industrial organization. Pleasing both audiences is difficult, yet bridging the two is essential.

On the question of method, this study ascribes to the philosophy of realism. Thus, instead of looking for regularities among events it tries to discover necessity. By determining the nature of structures it tries to identify the necessary consequences of that nature. Determining necessity, however, does not imply that consequences do or will take place. For that to occur causality has to be "activated" (Sayer 1989b, 258). In this respect, the realist view of causality "...is not about a relationship between separate things or events but about what an object is like and what it can do and only derivatively what it *will* do in any particular situation. Causal powers and liabilities may thus be attributed to objects independently of any particular pattern of events..." (Sayer 1984, 95-96). For our purposes, this choice of method means I must be concerned mainly with conceptualizing the objects being studied and not with discovering statistical relationships. In doing so, I rely on qualitative techniques of data collection (see point 1.5.C below).¹⁰

Identifying structures means speaking at certain levels of abstraction. The extreme abstraction is the identification of "durable pervasive structures", which are mostly independent of time and space. The structures of capital accumulation are examples of this kind of extreme abstraction. Yet, there are objects or structures such as cultural forms which are less durable and short-lived. In this case, the influence of specific "geohistorical contexts" may be too great to be left out of explanation.¹¹ In this regard, this dissertation analyzes in detail the practices and agreements generating and governing the linkages that bind firms in the capital-goods industry of Mendoza. This analysis is not only important in itself. Without it, it would be impossible to understand both the wider transition in which this industry is immersed and its historical development process.

1.3) Problem Statement

This thesis examines the development of a capital-goods in-

dustry in Mendoza, Argentina through an analysis of linkages and industrial governance systems. Linkages are material, informational, and financial flows among firms and local, national, and international economies. Industrial governance systems are the social practices that cement linkages. Hence, linkages are understood as socially embedded and not as market transactions governed solely by price considerations.

The study has two major arguments. First, it claims that contrary to conventional theory firms do not locate in view of the previous existence of certain favorable factors, but rather construct these factors as they grow. This argument is operationalized by asking how firms generate their own linkages. This is studied historically through an analysis of the changing pattern of linkages within the capital-goods industry of Mendoza from 1895 through 1990. Examples include labor and subcontractors, clientele, services, and the emergence of economic groups. Thus, this study departs from conventional approaches in economic geography in that it conceptualizes the emergence of a supportive production fabric¹² as the result of the development of firms and not as a prerequisite to the development of these firms.

Second, this study argues that the capital-goods industry in Mendoza is undergoing a substantial (and unprecedented) transition in the way production is organized. Furthermore, this transition is part of the larger shift taking place at both the national and global scales. This is analyzed by looking at the historical pattern of linkages and governance systems in the industry, and by contrasting that pattern with a close and detailed examination of the recent decade.

Implicit in the previous two arguments are two territorial dimensions. First, the development of the industry creates the necessary "factors" of production, or put it briefly, that "industries produce regions" (Storper and Walker 1989). Second, at the intra-city level the evolution of the industry (and specifically its linkage structure and governance systems) has a direct bearing on the direction and nature of the city's growth.

These two arguments are illustrated through empirical work in Mendoza, a city of close to a million people in western Argentina. Over 60 in-depth interviews gathered over six months with owners, managers, and chief executive officers (CEOs) of capital-goods firms reveal the origins, evolution, and current form of linkages (see details in section 1.5). These interviews are validated and complemented by data gathered from six other sources: (i) interviews with CEOs from other firms linked to the capital-goods enterprises in Mendoza province, (ii) interviews with public officials, consultants, and local researchers, (iii) published and unpublished written sources, including articles, books, manuscripts, commercial directories, newspaper articles, company brochures, balance statements, and transaction records, (iv) economic census data for several years, but especially for 1895, 1964, 1974, and 1985, (v) existing manufacturing surveys, and (vi) public and non-governmental industrial sector reports.¹³

1.4) Research Objectives and Premises

1.4.1. Objective One:

To examine the changing pattern of linkages of capital-goods firms in the city of Mendoza, Argentina from 1895 to 1990. Although the whole period will be covered, the 1980-1990 period will be analyzed in greater detail.

Premises for Objective One:

Premise₁: Capital-goods firms generate their own linkages as they grow. This is shown in a study of labor, subcontractors, clients, and services.

Premise₂: The degree of subcontracting (within the capital-goods industry and between the industry and other sectors) fluctuates over time even though vertical integration within those same firms remains high. In the long haul there is a tendency to increase the degree of subcontracting. Yet the kind (or kinds) of subcontracting prevalent at one time is not necessarily the same at others.

Premise₃: Capital-goods firms have not until very recently (involving only a group of firms) formed strong production linkages among themselves. They were never completely dispersed in a random fashion, yet their clustering has had more to do with being closer to clients and good access and not to each other. A number of economic and social structures have precluded stable and substantial linkage relationships among capital-goods firms.

Method for Objective One:

This entails a reconstruction of the history of the capital-goods industry of Mendoza, Argentina 1895-1990. Our account takes 1895 as the starting point because it corresponds to a census that falls around the time in which other sources indicate the first major shops were established in Mendoza.¹⁴ After analyzing existing secondary sources I carried out a first round of interviews with key individuals in the industry. A preliminary list of questions was drawn.

These questions were oriented to obtain information on a wide array of information including data on the historical pattern of backward and forward linkages of the capital-goods industry in Mendoza (see interview schedule in the Appendix). Linkages were operationalized to include materials (raw inputs and parts and finished products) and hence subcontractors, financing (short term, long term), and services. The first set of questions was pre-tested in a small number of interviews. After the pre-test and corrections, a larger and more refined list of questions was used to guide the rest of the interviews. Results from the interviews were triangulated (Marshall and Rossman 1989, 146) by referring back to secondary sources and by interviewing people in other organizations related to the capital-goods industry. The research strategy outlined corresponds to an intensive research design (Sayer 1984), in which qualitative techniques, such as unstructured interviews and observation are utilized to identify causality (see below).

1.4.2. Objective Two:

To examine the transition from Fordism to flexibility by analyzing linkage structures, governance systems, and the emergence

of new types of firms and agents in the capital-goods industry of Mendoza, Argentina.

Premises for Objective Two:

Premise₁: Linkage structures within the capital-goods industry are governed by a number of practices. Practices and structures are in a transitional phase since the early 1980s.

Premise₂: New linkage structures and governance systems co-exist, combine, and clash with old structures and governance systems.

Premise₃: The emergence of new linkage structures and governance systems depend on the emergence of new types of firms and new institutional arrangements.

Method for Objective Two:

Like the interviews discussed above, information was sought on discontinuities in production organization (P₁), on adoption of new linkage patterns and governance

systems (P₂), and on the emergence of new firms and institutions (P₃). These topics were explored also in the course of interviews directed to capital-goods firms and to organizations that connect to the target enterprises.

1.4.3. Intensive Research:

The choice taken for an intensive research design means that "...the primary questions concern how some causal process works out in a particular case or limited number of cases" (Sayer 1984, 221). Intensive research design involves the use of qualitative research methods. This includes

"structural and causal analysis, participant observation and/or informal and interactive interviews... Intensive research focuses mainly (though not exclusively) on groups whose members may be either similar or different but which actually relate to each other structurally or causally. Specific, identifiable individuals are of interest in terms of their properties and their mode of connection to others. Instead of relying upon the ambiguous evidence of aggregate formal relations among taxonomic classes, causality is analysed by examining actual connections" (Sayer 1984, 221).

In terms of our study, an extensive research design would involve a thorough study of the capital-goods industry or, at the most, of the metal-mechanical sector. Answers to the type of questions we are asking here would have to be posed by inference. An intensive research design refines its object of study through the progression of the research enterprise itself. That is why the original objectives and premises were modified at some points in the research enterprise.

For example, we have had to go beyond the capital-goods industry and even the metal-mechanical sector to answer with certainty the questions posed. Two major reasons have prompted us to pursue this avenue. First, we have found a large degree of heterogeneity within the capital-goods industry and also the

metal-mechanical sector. Second, causal and structural analysis showed we needed to include other firms, institutions, and individuals not necessarily classified under the label "capital-goods". The previous two points do not imply that we were to study everything in addition to the capital-goods firms and the metal-mechanical industry. In fact, the approach embraced made it possible to restrict the scope of the study while at the same time go further in depth.

"The greater level of detail in intensive studies need not be overwhelming because individuals who do not interact with the group of interest can be excluded even where, on taxonomic criteria, they would have to be included. Precisely because causal groups are selected, the 'logic of the situation' is often relatively easy to discover" (Sayer 1984, 225).

The use of an intensive research design has involved field-work and collecting primary data through interviews and observation. On page 12 of this chapter I identified the main sources of information on which this thesis draws, but before discussing in detail the significance of this study I will summarize here some of the methodological details presented in the Appendix.

1.5) Information Sources

This thesis draws on a wide array of written and verbal sources. Written sources include both printed and typed or manuscript materials and such things as company brochures, firms' balance statements, commercial directories, and transaction records in addition to more pedestrian materials. By the latter I mean published and unpublished census data, articles, books, magazines, and government reports. As for verbal sources this project has involved carrying out more than 100 interviews for a total of close to 200 hours of conversations. Setting up these interviews involved more than 300 telephone calls.

I first began working seriously in this project during December of 1989 when I spent one week in Mendoza probing the possibility of carrying out a study such as this one. The research proposal was based on material collected then and during several visits to the library of the University of California at Berkeley during July and August of 1990. The concepts of linkages and governance systems were explored in the context of a series of interviews with managers of two very different organizations in Southwest Virginia during February through May of 1991.

I spent thirteen months in Argentina collecting primary and secondary information in Mendoza and Buenos Aires, from July 1991 through August 1992. I visited several libraries and archives and interviewed a number of people in private and public organizations. A substantial portion of those interviews was directed at metal-mechanical firms in Mendoza. Those interviews include a survey of a sample of 43 metal-mechanical firms in the Mendoza Metropolitan Area.¹⁵ The sample contains over 50% of all the capital-goods producers in the city of Mendoza. When in the text we refer to the survey we are referring to this set of enterprises.

The survey of 43 metal-working firms collected information on the following topics: history of the firm, products, sales and

purchases, organization of production, technology, investments, labor force, and exports (see interview guide in the Appendix). The 43 firms for which information was actually collected result from an original sample of 65 firms which were contacted by phone. Refusal to give an interview was very low; only one firm declined explicitly to participate in the survey while six cases can be considered indirect refusals.¹⁶

1.6) Organization of this Thesis

This thesis has eight chapters, a bibliography, and a methodological appendix. The balance of Chapter One elaborates on the significance of the study. A literature review details the relevance of this dissertation within planning, industrial geography, and social theory. Six areas to which this study contributes directly are identified: industrial linkages and governance systems; the division of labor; the transition from Fordism to flexibility and spatial shifts; capital-goods; grupos económicos or conglomerates; and the generation of knowledge about industrial organization in semi-industrialized countries.

Chapter Two reviews in greater detail the concepts of linkages and governance systems from two perspectives: that of the literature and that of exploratory fieldwork I undertook in Southwest Virginia. In Chapter Three, I provide background information on the case study through a historical overview of the literature on the Argentine space-economy. Chapters Four through Seven form the heart of the study. Chapter Four introduces the case study by providing background information on the city and the region, the historical development of manufacturing in Mendoza, and the repair and maintenance shops of large public and private enterprises. Chapter Four ends with a sketch of the linkages connecting the capital-goods industry with the rest of the Mendoza economy.

In the fifth chapter I discuss the connected themes of linkages and governance systems from a historical perspective centered on the generation of linkages. Chapter Six looks at the period 1980-1990 through an analysis of the structure of linkages and the governance systems that give them cohesion. Linkages and governance systems are examined from the perspective provided by a typology of firms operating in the capital-goods and metal-working industries. In Chapter Seven I look at linkages and governance systems from two spatial perspectives. First, I explore the question of the division of labor and its relation to the intra-metropolitan location of firms in the city of Mendoza. Second, I examine the role of a capital-goods industry in the geographical industrialization of Mendoza.

In Chapter Eight I summarize the main findings of the study and advance some policy implications. Chapter Eight also charts some likely and fruitful avenues of future research. The dissertation ends with a bibliography and a methodological appendix. The appendix has three parts. The first part titled "On Research and Field Work" includes paragraphs on the story of the project and its difficulties, information sources, writing, and the researcher as a linkage. The second part titled "On Interviews, Samples, and Interview Guides" provides information on structured and semi-structured interviews, sample and sample frame, details on the fieldwork in Mendoza, and a discussion on the advantages of the interview as a technique of data col-

lection. The appendix is not a sort of catchall folder where we find all those things I could not fit elsewhere. Much on the contrary, the appendix provides the account needed to judge the validity and reliability of this whole research project.

1.7) Significance and Overview

This study seeks to enhance our understanding of the relationship between industrial organization and regional growth. The dissertation examines two aspects of this relationship: the historical process that is behind the emergence of an industry in a region; and one point in that history in which that same industrial organization is being transformed. In other words, the dissertation looks at the historical development of the links between an industry and its territorial base and at one discontinuity in that historical development.

Thus posed, this exercise would help us improve our knowledge of the origins and forms of linkages and governance systems in semi-industrialized countries. This would better our understanding of firm structure, firm classification, and the division of labor in these countries. The emphasis on theorizing the transition in the way of organizing production should also give us some insight on broader economic and social developments of immediate spatial consequences.

Because it focuses on a secondary urban center, this research contributes to the debate on polarization reversal and related discussions on decentralization and intermediate-sized cities. The concern with the capital-goods industry and with Economic Groups (large conglomerates) joins ongoing discussions in Latin America and elsewhere in the Third World. Lastly, this study contributes to the broader theme of the generation of knowledge and cultural identity in Latin America. We now turn to a more detailed discussion of each of the broad areas to which this dissertation makes a contribution.

1.7.1) Industrial Linkages in the Space-economy, and the Division of Labor

This study argues, in line with recent studies about industrialized countries, that firms create their own requirements and linkages as they grow (Storper and Walker 1989). A well known example is the informatics industry in the U.S. sunbelt. Before the 1970s, few inputs or skilled labor could be secured within the region. Over time, however, well developed production systems were created by the firms themselves. Scattered historical evidence for the major cities of Latin America points to a similar pattern, albeit in industries other than informatics (Cochran and Reina 1962; Dean 1971; Weaver 1980, 88-89; Gwynne 1986, 154-155; Gutiérrez and Korol 1988). A verification or rejection of the process of industrial linkages has important theoretical and policy implications. Theoretically, it would direct attention to firm formation as a social product and not mainly as a response to factors of production (Scott 1986, 226). Contributions to industrial policy and regional development theory include understanding the limited success of growth-pole strategies to promote firm formation and local growth despite massive investments in infrastructure (Aeroe 1991). Indeed, conventional accounts of growth centers are silent on "the central and critical issues of the division of labor, the vertical disintegration of production, and

the structure of inter-establishment transactional activity" (Scott and Storper 1986a, 303).

The concept of linkages has a long tradition in studies related to industry, planning, and economic development. Conventionally, linkages are conceived primarily as the expression of market transactions and not as ways of coordinating labor processes, making commodities available to firms, and directing critical information to enterprises (Fredriksson and Lindmark 1979; Scott 1983 1986; Storper and Walker 1989).

From a broader perspective, linkages and governance systems are conceptual tools to dissect the division of labor in society. Simply put the division of labor is work specialization. It takes place within a workplace where different tasks are carried out by different individuals to achieve some common objective. That workplace may be a shop, factory, or household. There is also a division of labor among industries and branches of industries (Littler 1982, 6-7; Sayer and Walker 1992, 15). Conventionally, three major divisions of labor are identified: technical, social, and spatial. The first two terms refer to work specialization within and among firms while the third points to a division of tasks among places (Massey 1984). Analytically it is possible to separate the three; however, a number of processes bind them together. In this thesis we will mainly be concerned with the social division of labor. The idea of the division of labor can be traced back to such classic writers as Adam Smith and Karl Marx.¹⁷ Even French sociologist Emile Durkheim dedicated a whole book to this topic: De la Division du Travail Social. Etude sur l'Organisation des Sociétés Supérieures (1893). The basic idea of the division of labor and work specialization can be traced back to classical Greece, to the writings of Plato and Xenophon. Yet the interest on the division of labor died out during the first part of this century and has only been revived in the last fifteen years. Adam Smith's classic, An Inquiry into the Nature and Causes of the Wealth of Nations, written in the late 1700s, devotes several chapters to this issue. Indeed, it was perhaps Smith, more than any other writer, who put the division of labor at the forefront of the explanation of economic growth. He believed the division of labor was a major explanatory factor for the wealth of nations. The division of labor was at the base of growth through its influence on productivity. To Smith is credited the idea of the division of labor being limited by the extent of the market. Smith also saw the human consequences of an extensive division of labor, a concern he shared with a number of other classical writers such as Marx and later Durkheim. To Marx is attributed the distinction between the technical and the social division of labor. Although the concept of the spatial division of labor was latent in many previous analyses, it really gained prominence in recent decades through Froebel, Heinrichs, and Kreye's The New International Division of Labor (1977, English ed. 1980), and Doreen Massey's Spatial Divisions of Labor (1984). "The importance of the division of labor for economics is finally underlined by the fact that the greatest economic minds of the past invariably included it in their treatises on the subject" (Groenewegen 1987, 905). Linkages and governance systems make possible the division of tasks among different workplaces.

Linkages are the more visible expression of industrial governance systems. Industrial governance systems are designed to

overcome market failures and to reduce uncertainty (Storper and Walker 1989, 134-35). Markets in the developing world are more unstable than in the advanced industrial nations. Governance systems mediate between the market and the firm. Significantly, benefits from that mediation are not equally reaped by all firms. For example, in the case of subcontracting, relations among the terminal firm and the subcontractor are rarely symmetrical. In many cases the terminal firm extracts value from the subcontracting enterprise (Taylor and Thrift 1982; Rofman 1984; Coraggio 1987a). An exploration of the concept of governance systems would also improve our understanding of the larger question of firm structure.

Firm structure includes the existence of a number of firms of different sizes and different characteristics operating in different markets. The study of firm structure is closely related to different attempts at classifying firms. This is an important exercise that has improved our view of manufacturing (Walker 1985; Taylor and Thrift 1982; Storper and Scott 1986, 12). Firm classification is derived from a larger effort to identify meaningful units of analysis in industrial studies beyond the traditional (and misleading) concern with individual firms and plants. Some such efforts have dealt with "commodity chains" (Hopkins and Wallerstein 1986; Gereffi and Korzeniewicz 1990), "filières" (Truel 1983), or sectoral blocks (Lifschitz 1978 1986). Other writers have placed these inter-linked production systems in space into territorial production complexes (Smith 1981; Storper and Walker 1989). A few writers have even incorporated the sphere of consumption into "spatial subsystems and circuits of regional accumulation" (Rofman 1984) and "territorial complexes in the context of subsystems of production and circulation" (Coraggio 1987a).

The study of the origins of linkages and of the governance systems in which these linkages acquire meaning and form cannot be attempted without taking into account the characteristics of locale. Thus, this project avoids the weaknesses of reductionism by integrating industrial location, urbanization, and regional growth as closely related fields of enquire that take a meso-level of analysis bridging the macro forces (and concepts) with the local (Storper and Scott 1986, 14; Storper and Walker 1989).

1.7.2) The Shift from Fordism to Flexibility and its Territorial Dimensions: Polarization Reversal, Deconcentration, and Intermediate-sized Cities

As argued in the previous point, firms create their requirements and linkages as they grow. Yet, the resulting linkage structures and governance systems evolve in time. This evolution is gradual, but at some points in history linkage structures are substantially transformed. This is the second main argument of this dissertation: the capital-goods industry of Mendoza is undergoing a substantial (and unprecedented) transition in the way production is organized. The transition at the level of production is part of a larger shift in the economy and society.

As Harvey argues, "theorizing the transition" is not an easy endeavor. The only point, writes Harvey (1989, 173), where commentators of most theoretical persuasions agree is "that something significant has changed in the way capitalism has been working since 1970". Moreover, capitalism has not only

changed at the core, but it has also done so at the periphery. This is a topic I will explore in the dissertation.

This is not the place to review the different theories which attempt to explain the transition (see, for example, Castells 1987; Harvey 1989; Lash and Urry 1987). Nor is it the place to describe the transition as it is taking place in Argentina (I do that at the end of Chapter Three). Rather I propose to describe the theoretical tools that I will use to interpret the shift in production organization. I am couching the explanation of this transition in the language of the French regulation school. This school has several strands. Here I will work along the theoretical lines set forth by the group of writers gathered around CEPREMAP.¹⁸ Thus defined the regulation school works on theorizing the restructuring of capitalism along a broad Marxist political economy.

Regulationists depart from two key theoretical blocks: the regime of accumulation and the mode of regulation (Lipietz 1986; Lipietz and Leborgne 1990; Dunford 1990; Tickell and Peck 1992). A regime of accumulation is a phase of capitalist development in which there is a convergence (and stabilization) in production and consumption. A mode of regulation is the series of social and political norms and practices that provide cohesion and stability to the regime of accumulation. One is not determined by the other and regulationists insist that the mode of regulation does not follow from the needs of the regime of accumulation (Lipietz 1986). Thus, for example, similar regimes of accumulation may be governed by different modes of regulation. The US and Germany are both capitalist and highly industrialized countries. Yet their state and social regulatory institutions are substantially different.

Regimes of accumulation are relatively long and stable phases of capitalist development, but their stability is checked by different types of crises. The mode of regulation "serves to accommodate, mediate and normalize" these crises" (Tickell and Peck 1992, 193). Crises may be micro, conjunctural, or structural according to their severity. Microcrises are highly localized and affect individual firms or fractions of an industry. Conjunctural crises have a broader impact but are confined to the downturn of a business cycle or to an industry or region. Structural crises have a much wider reach and threaten the continuance of the regime of accumulation.

The ensuing restructuring process thus leads not only to a new regime of accumulation but also to a new mode of regulation. The switch from one regime to the next takes several years and hence there is a transition phase. For example, between the two regimes of accumulation normally identified in this century—the extensive and the intensive or Fordist—more than two decades went by. Up to 1914 observers speak of an extensive regime of accumulation. This regime was followed by a transition phase which lasted up to World War II. Only after the mid-1940s we see the clear emergence of the new, intensive, Fordist regime (Lipietz and Leborgne 1990; Tickell and Peck 1992). The Fordist regime of accumulation entered a period of crisis in the early 1970s. The signs of the crisis were a slowdown of productivity, stagnant wages, and market saturation in the core countries (but also in the periphery, for details see Chapter Three).

A heated debate has ensued on what comes after Fordism. Two major camps of commentators may be identified (Jessop 1992). On the one hand there are those who speak of post-Fordism. For them we are still in a phase of crisis of unpredictable outcomes. "In this sense the temporal prefix in the term 'post-Fordism' serves as a useful remainder that the exact nature of the emerging economic order is not pre-ordained" (Jessop 1992, 28). (Yet some writers in this camp are already speaking of the emergence of a new regime called flexible accumulation.) Those in this first camp generally ascribe to a regulationist approach. On the other hand, in the second camp, observers argue that the successor is already here and is called flexible specialization. While Fordism is equated with mass production, flexible specialization is compared with craft production.¹⁹

In much of the literature on both camps (as defined above) a pivotal contrast has been that of rigidity/ flexibility to compare Fordism with its successor. The rigidity/ flexibility contrast is then used to examine different parts of the accumulation regime or its associated regulatory institutions. Areas of interest are labor markets, production processes, consumer markets, and firm structures (Tickell and Peck 1992, 196).

In this thesis I will concentrate on the production process and within it on the social division of labor.²⁰ The post-Fordist production process "can be defined as a flexible production process that is based on flexible machines or systems and an appropriately flexible workforce" (Jessop 1992, 29). According to Storper (1990, 431) flexible production entails "organizational fragmentation of the production process (horizontal and vertical disintegration) creating a deep social division of labor among" firms. Although much has been written on this topic with respect to industrialized countries (Tickell and Peck 1992, 203), very little has been said about semi-industrialized countries such as Argentina.²¹ Yet enunciating this topic in the Argentinean context poses some specific challenges.

The case study we are to analyze in this dissertation presents a number of difficulties and problems we need to pose at this time. As it will become apparent in the substantial portion of the text, the case study also offers some unique opportunities of exploring a number of issues. First, the most obvious difficulty is the transplant of regulation theory to the edge of the Andes. As it is explained further below and in Chapter Three, at least at a macro and general level the language of the regulation school does find a reasonable application to a reality that initially it did not intend to describe. I have added the suffix criollo (creole) to the term Fordism to denote that we are in the presence of a different regime of accumulation.

The second problem is the application of the term Fordism to an industry (such as the capital-goods of Mendoza) that is not organized along Fordist lines. That is, except for a few of the large firms, goods are not produced in long series and plants are not organized along the assembly line. Most firms can be better described as craft shops. Craft shops are little specialized in terms of tasks and produce a wide range of products and models in small batches with little reliance on outside subcontractors. Yet this does not stop us from analyzing the shift from this way of organizing production to a new one where firms specialize more and become part of larger networks of firms.

Moreover, neither post-Fordist writers nor flexible specialists claim that "Fordism as a specific way of organising the labour process.... was ever universal in its reach" (Jessop 1992, 26).²² We are not, however, in the presence of an industry that already before the 1970s had characteristics similar to the flexible specialized industrial districts of Italy. Rather, I believe that from a craft organization the industry is moving to flexible forms of organization.

These changes at the level of production do not take place in isolation, but are part of a larger societal shift that involves other parts of the regime of accumulation, the mode of regulation, and the territorial base which is both the expression and the foundation of this shift. Since the 1970s the semi-industrialized countries of Latin America have been moving away from a regime of accumulation we may call fordismo criollo (creole Fordism, what Lipietz calls peripheral Fordism). Fordismo criollo was built after World War II on growing mass production and mass consumption coupled with a mode of regulation characterized by limited (but expanding) state welfare, and some degree of state-mediated discussion between labor and capital.

In countries such as Argentina the transition means abandoning a broad development path built around import-substitution industrialization (ISI). Thus the past emphasis on automobiles and consumer durables geared to the internal market gives way to the production of commodities for export (steel, aluminum, edible oils) (Bisang 1989; Gutman and Feldman 1989; Katz and Kosacoff 1989). The transition takes the form of a restructuring process. This process means, for example, the reduction of plant size by layoffs, automation, and the fragmentation of industrial processes. The restructuring of manufacturing and of the economy in general is also part of a larger process of societal change that also involves the state and consumption (Scarpaci 1990).

The transition in regime type and its concomitant mode of regulation has a spatial expression. That is, if the Fordist regime of accumulation had a particular geography, so does the emerging regime. It is in this context that we may interpret in a different light writings on polarization reversal, spatial deconcentration, and the growth of intermediate-sized cities in semi-industrialized countries. The crisis of the Fordist regime in these countries led to a two-step restructuring process. In the first step, firms responded through sectoral and spatial capital switches that attempted to re-create previous conditions. It is in this first step when firms set up at a grand scale branch plants in peripheral areas and make investments geared to export markets. Production facilities for export are also generally concentrated in areas away from the major metropolitan areas. Only in a second step do firms begin experimenting with more "flexible" forms of production.

It is certainly debatable that the previous argument is applicable to all semi-industrialized countries. Yet, it can be argued that the restructuring process as a response to the structural crisis in the regime of accumulation is a reasonable hypothesis to explore. Thus, in the case of the semi-industrialized countries of Latin America, deconcentration is in part the spatial expression of the on-going restructuring of the manufacturing base after the mid-1970s (Beccaria and Yoguel 1988; Gatto et al.

1988; Gatica 1989; Portes 1989; Borello 1990; Scarpaci 1990).²³ In Argentina, industrial restructuring marks a clear shift in the spatial orientation of investments away from the main metropolitan areas and into peripheral suburbs and secondary cities (Borello 1990).

This dissertation also underlines the fact that the new geography emerging should not only be seen as the result of investments made by firms based in the major metropolitan areas, but also as processes emerging from local forces. In Latin America, urban historians have long argued that national historical interpretations will continue to be incomplete as long as we lack regional studies (Fleming 1986; Scobie 1988; Vellinga 1989). Although the growth of intermediate-sized cities is a widespread phenomenon in Latin America (Portes 1989) and elsewhere in the developing world, the origins of this process are varied (Hardoy and Satterthwaite 1986). In some cases, the impetus for growth lies in the expansion of locally-based firms producing knowledge-intensive goods (Borello 1992c). Capital-goods firms form part of this growth process in Mendoza, but also in some small cities of Southern Brazil (Storper 1990 1992). On the same vein, the debate on polarization reversal and decentralization (Richardson 1980; Storper 1984; Townroe and Keen 1984; Brown and Lawson 1990; De Mattos 1989; Rogerson 1986; Rondinelli, McCullough, and Johnson 1990; Slater 1990)²⁴ could benefit greatly with specific examples that stress decentralization not so much from the point of view of what happens in the main cities, but rather from the events taking place in secondary cities and towns. Put another way, polarization reversal and the growth of intermediate-sized cities should not only be seen as a result of decentralization from a few metropolitan areas, but also as a result of processes taking place among second-order cities in the interior of most Latin American countries in the last decades (Borello 1992a, ch. 3). This research aims to do that.

In semi-industrialized countries such as Argentina the crisis of Fordism has not only led to territorial changes, but also (as in the core countries) to changes in the mode of regulation. In turn changes in the mode of regulation have had consequences on both regional process and in the regime of accumulation.

Thus, the crisis of *fordismo criollo* had consequences in the mode of regulation which in turn had spatially differentiated effects. The switch from broad policies of ISI which depended greatly on internal consumption gives way to export promotion policies (Bisang 1989; Gutman and Feldman 1989; Kosacoff and Azpiazu 1989). What has been called in Argentina the crisis of the regional economies (Rofman 1985) is the crisis of those areas producing for the domestic market. Such areas are, for example, the Argentine provinces of Mendoza and San Juan (wine), the province of Tucumán (sugar), or the provinces of Corrientes and Misiones (mate and tea) (Manzanal and Rofman 1989; Gatto and Quintar 1985).

Investors in Argentina that were tied to the shrinking domestic middle class had few options in the 1980s. In general, investment opportunities were sought in foreign markets or in the ever more sophisticated consumption tastes of the upper classes. This helps to explain the rapid transformation of many areas of the interior of the country around the production and process-

ing of primary commodities for export: soybeans, beans and vegetable oils, juice concentrate, fish and seafood, among others (Borello 1988; Gutman 1989). In Mendoza, the crisis has meant a devaluation of a landscape geared to the production of table wine and canned fruits and vegetables for the domestic market. Significantly, this industrial restructuring requires that local elites search for new areas of investment. The production of capital-goods for export markets is one such area.

1.7.3) Capital-goods Industries

Capital-goods industries are a key component in the industrialization process (Rosenberg 1976; Rothwell and Zegveld 1985; Edquist and Jacobsson 1988). They challenge the import-substitution process in Latin America and elsewhere in the Third World by providing a basis for indigenous industrialization (Tavares 1964; Chudnovsky and Nagao 1983; Fajnzylber 1983; Kay 1989). Because of the rapid technological change taking place in Latin America in the last decade, capital-goods firms have become vital in the transmission of new techniques throughout the production system (Katz 1986 1987b; Leff 1968; Chudnovsky 1986 1988). However, the capital-goods sector in Latin America has not been studied from a regional and urban perspective. The emergence and expansion of capital-goods firms is related to local conditions. These attributes of locale include the existence of an entrepreneurial class and potential forward linkages to agriculture, some degree of protectionism, subsidies from the local and national state institutions, and several decades of a long "learning period," or what Katz (1986 1987b) calls "maturation path".

1.7.4) The Emergence of *Grupos Económicos* in Latin America

Governance systems are an appropriate point of entry to a central topic in developing nations: the emergence of large, national firms organized as conglomerates, or groups. Leff observes:

"The group pattern of industrial organization is readily understood as a microeconomic response to well-known conditions of market failure in the less developed countries... The group can be conceptualized as an organizational structure for appropriating quasi rents which accrue from access to scarce and imperfectly marketed inputs... The institution of the group is thus an intra-firm mechanism for dealing with deficiencies in the markets for primary factors, risk, and intermediate products in the developing countries" (1978, 666-667).

Conglomerates, known in Latin America as Grupos Económicos, are becoming the major economic, social, and political player in the region and elsewhere in the developing world (Leff 1978; Azpiazu, Basualdo, and Kavishe 1986; Dahse 1979; Stolovich, Rodríguez and Bertola 1987). State capitalism of the 1940s and 1950s and the flood of foreign investment of 1960s and early 1970s have now been superseded by the expansion of private and domestically-owned enterprises in the countries of Latin America (see Chapter Three). Studies of the Grupos Económicos have concentrated on national firms with headquarters in the major cities. What has not been recognized explicitly is the existence of regionally-based conglomerates in the interior of many Latin American countries (cf. Gutman 1989;

Caravedo Molinari and Vellinga 1989; Cerutti 1989; and Koonings and Vellinga 1989); a gap in the research this dissertation aims to fill. As Chudnovsky (1989, 128) notes, the heterogeneous nature of these economic groups calls for a detailed examination of specific characteristics and dynamics. Within the group of firms studied in this research are large conglomerates. Knowing more about the dynamics of these regional conglomerates will assist planning and policy as Argentina enters the twenty-first century.

1.7.5) Industrial Organization in Semi-industrialized

Countries and the Generation of Knowledge

This study contributes to a larger effort which seeks to describe the Latin American reality in its own terms.²⁵ This is an effort undertaken mainly (but not solely) by Latin American researchers in a number of disciplines. It can also be seen within the even broader context of the search for cultural identity (Zum Felde 1943; Zea 1986; Borello 1992d). It does not necessarily mean the rejection of theories and ideas developed to describe the reality of Europe and North America, though it certainly means a change in the meaning of those concepts in the Latin American context. On the question of industrial organization, for example, the large research project directed by Jorge Katz (1986 1987a) shows the need to take into account the specificities of firms, markets, and institutions if we are to gain a better understanding of industrial organization. Katz's studies of the

pharmaceutical and mechanical industries highlight the need for separating semi-industrialized countries as a meaningful unit of analysis from other Third World countries. In Argentina, for example, there is a strong group of national pharmaceutical producers which is literally driving out foreign subsidiaries. The strength of these Argentine producers rests not with tariff protection but rather with their ability to adapt imported technology to local manufacturing.

Summing up, the theoretical tools derived from the industrial North Atlantic nations may not be useful when applied categorically to the entire Third World. There can be no substitute for a careful grounding of the study of industrial linkages in the local setting. Admittedly, it is not easy to navigate such a fine line between cultural autarchy (and parochialism), on the one hand, and contributing to nomothetic²⁶ research, on the other hand (Browder and Borello 1992). However, researchers who have contributed to the schools of dependency theory and Latin American structuralism have proven this approach to be a fruitful avenue in understanding economic development (Kay 1989; Cardoso and Faletto 1979).

The discussion on the metal-mechanical industry and on the capital-goods producers of Mendoza only begins in Chapter Four. The next two chapters provide a larger conceptual and empirical frame of reference to the historical overview of Chapter Four and to the arguments developed in chapters Five through Seven.

NOTES

CHAPTER 1

¹ It will be quickly apparent to the reader that I have tried to keep in the dissertation the process through which I constructed this monograph. I side with Michael Burawoy (1991, 8) in "regarding discovery and justification as part of a single process"; despite the long held view that "In the social sciences the lore of objectivity relies on the separation of the intellectual product from its process of production" (ibid.).

² The capital-goods industry is made up of producers of machinery and equipment for other industries. For example, capital-goods producers make machine-tools, agricultural machinery, textile machinery, food-processing equipment, and turbines for hydroelectric generation. The capital-goods industry is one part of the metal-working or metal-mechanical industry.

³ Very basically a linkage is a flow of materials, finance, or information between two firms. See further for a more complete definition.

⁴ Obviously this contrasts squarely with much of traditional industrial location theory (see Smith 1981).

⁵ For example, writers such as M. Storper, A. Scott, and R. Walker in the US; and D. Massey, A. Sayer, A. Amin, and others on the other side of the Atlantic.

⁶ Mainly A. Hirschman.

⁷ Certainly this was not only the product of my thinking, but rather of the many suggestions and ideas I received from my committee.

⁸ "...when applied to concrete examples, the explanations offered through analysis are only as good as the implicit local histories which they generate." (Sayer 1989b, 265).

⁹ One of the very few writings that addresses squarely these issues is a book-chapter written by a North American biologist who works on Latin American mammals. Mares writes: "Without basic data on systematics, distribution, and ecology, research that is judged exciting by current standards often cannot be formulated" (Mares 1992, 62).

¹⁰ Sayer's (1984, 183) words are pertinent in this regard: "The preoccupation with statistical significance, sample sizes and response rates stands in bizarre contrast to the lack of concern with the adequacy of the frequently 'chaotic' conceptions whose interrelationships, or rather 'correlations', the statistical analyses are supposed to uncover".

¹¹ "Contextualising and law-seeking approaches should therefore be seen not as competing but as extremes of a continuum ranging across different kinds of objects" (original emphasis, Sayer 1989b, 259).

¹² In industrial geography a supportive production fabric refers to the labor, services, specialized firms, and infrastructure, among others, available at a given location.

¹³ What I have briefly described corresponds to a large extent to the way in which Nathaniel Leff (1968, 4-7) gathered information for his classic study The Brazilian Capital-goods Industry, 1929-1964, Cambridge, Mass. Harvard University Press.

¹⁴ Much more detail on how the research was carried out can be found in the next section, and in the Appendix, at the end of this monograph.

¹⁵ Leff's classic study of the Brazilian capital-goods industry relied on interviews in a group of 20 firms. The total number of in-depth interviews was 44 (Leff 1968, 6).

¹⁶ Contrast my results to Scott's in the Los Angeles women's dress industry. "...135 plants...were contacted by mail and telephone...41 plants agreed to participate, though...only 12 of them...returned questionnaires...there are...18 plants in the final sample used here" (Scott 1984, 5).

¹⁷ This brief overview on the idea of the division of labor draws mainly on the thick synthesis of Groenewegen (1987)

¹⁸ CEPREMAP is the Centre D'Etudes Prospectives D'Economie Mathématique Appliquées à la Planification and has its headquarters in Paris. In it converge such writers as Aglietta, Boyer, Coriat, and Lipietz.

¹⁹ The idea of flexible specialization emerges initially from Piore and Sabel's influential The Second Industrial Divide: Possibilities for Prosperity, published in 1984. Flexible specialization has then been used to inform a number of studies on complexes of vertically and horizontally disintegrated firms in a number of industries and countries.

²⁰ The choice is in line with, for example, Jessop's argument (1992, 28). He says that it is "sensible to confine the use of "post-Fordism" to accounts of the labor process and/or certain aspects of the mode of regulation".

²¹ The exceptions are the works of Sabel (1986), Storper (1990 1992), and Lipietz (1986).

²² Furthermore, as it is argued in Chapter Three, one characteristic of the Argentinean version of Fordism (even in the automobile and durable industries) is the high vertical integration and wide product mix.

²³ Yet, at least in the case of Argentina, decentralization and the growth of intermediate-sized cities is a process that can be traced further back in time (Vapnarsky and Gorojoski 1992; Borello 1992a).

²⁴ The idea of polarization reversal was first discussed at length by Richardson (1980) to refer to a widespread process of deconcentration of production and population from the main metropolitan areas to the interior of many countries. Subsequently, it has also been used to describe dispersion around primate cities. To analyze the Brazilian case Azzoni (1990) uses both senses.

²⁵ Fortunately I am not alone in this enterprise. Some researchers working in industrialized nations even see this project as one that also contributes to a broader understanding of those nations and societies (Slater 1992). "The analytical and reflective contribution of non-Western intellectuals, working in both the North and the South needs to be taken far more seriously within the domain of critical geography" (Slater 1992, 324).

²⁶ Nomothetic research means research that generalizes from the particular (or idiographic).

CHAPTER 2

LINKAGES AND GOVERNANCE SYSTEMS

This chapter discusses the related ideas of linkages and governance systems by drawing from the literature and from preliminary field-work undertaken in Southwest Virginia. The argument here is that the richness of a concept must be explored not only from the viewpoint of the literature, but also from direct contact with the field. Thus, the field is not only a repository of data, but also of concepts and dimensions of understanding.¹

The chapter has three sections. The first explores the linkage idea from the perspective gained through preliminary field-work in Southwest Virginia. Tasks carried out in Virginia involved both a series of loosely structured interviews and some participant observation in two organizations: a branch plant and a food cooperative. The second section looks at linkages from the viewpoint of the literature beginning with Albert O. Hirschman's original formulation of the concept. The third section discusses explicitly the governance systems concept.

The architecture of the thesis is built on the confluence of the connected ideas of linkages and governance systems. Thus, in this chapter, when I conceptualize linkages I implicitly refer to governance systems. In turn, defining more precisely governance systems means clarifying what is meant by linkages. The way these ideas are conceptualized makes them interdependent. Simply put: linkages refer to the connections, while industrial governance systems describe the tone of the connections.² Governance systems are the mortar that sustains linkages. To think of linkages as governed by some kind of logic pushes forward the idea that linkages are *not* given. That is, linkages result from a historical and social process which does not necessarily repeat itself across countries, epochs, or industries.

2.1) What are Linkages?

The word linkage is used in development economics and economic geography to refer to connections among firms.³ Although other disciplines deal with many of the themes and concerns attached to linkages they use other language to refer to connections and flows among firms. Economists, for instance, may see linkages as an input-output table, and the sum of certain linkages as a market.⁴ Sociologists talk about networks, where networks are made up of linkages.⁵

Linkages are flows of materials, information, or finances connecting a firm to its external environment. Linkages may be classified in terms of their direction (backward or forward), nature (materials, information, finance), time-span (short-term, long term, occasional, permanent), and content. In terms of content, linkages may take the form of market transactions, quasi-market transactions, subcontracting (of different kinds), licenses, contracts through bids or tenders, or a mixture of some of these forms.

Forward linkages connect a firm downstream with its market while backward linkages link a firm with its suppliers. Suppliers may provide inputs (materials, parts), services (productive, administrative, consulting), or intangibles (information, finance). More likely, suppliers provide a mixture of inputs, services, and intangibles.^{6 7} Markets are not necessarily consumer markets, but may include other firms. Thus, one firm's forward linkages may be another's backward linkages. Forward linkages provide a channel for the goods produced, but they may also be a very important source of information and finance.

Linkages are generally conceived as connecting different firms. Yet, we may think of linkages as the connections between different shops or areas within a plant, or as the flows between different plants belonging to the same firm. We may also imagine linkages within and between industries, as in, for example, automobile manufacturing and the steel industry. As noted below, a series of linkages in a succession from raw materials to final markets constitute a commodity chain or a sectoral block. While concentrated in space, chains constitute territorial production complexes.

At present the literature on linkages is so voluminous (see section 2.2) and the term has been used so much that, at least for those immersed in the discussion, linkages seem to exist and have a physical existence of their own, just like a cat, a chair, or computer. However, I argue that linkages as physical entities only exist in the imaginations of researchers. We know this because the people interviewed in this study never used the word linkage nor did they seem to identify such a thing (even under a different name) as having an independent existence. Yet, by assuming linkages necessarily have a quasi-physical existence researchers have tended to concentrate on the properties, strength, and spatial expression of linkages as opposed to their origins.⁸

This operationalization of linkages may be related to some deeply held conventions in economic theory such as the "natural" character of markets and firms, and indeed of economic activity.⁹ If markets and firms are in themselves non-problematic, then linkages may be taken as given. An enormous amount of research has been undertaken on the physical qualities of linkages, but very few studies have tried to look at how linkages are generated. This study takes the opposite approach by showing that linkages are neither un-problematic nor given and that they are created and re-created socially by people.

2.1.1) The Social Construction of Linkages

For linkages to materialize there has to be a core of shared meanings between participants. A core of shared meanings

encompasses not only strictly productive premises but also dimensions of status, prestige, image, and unequal power. Forster (1989, 147), for example, identifies four criteria of mutual understanding: comprehensibility, sincerity, legitimacy, and truth. Linkages take place when some kind of solution has been found for these criteria.

Linkages are a paradox for any organization. This is so because linkages are needed to solve all kinds of problems within the organization, yet linkages, themselves, are a source of problems and costs. Linkages are the points of entry and exit of an organization and hence they constitute the bridges between an organization and its external environment.

The existence of a linkage suggests the possible choice of contracting out or integrating a process, part, service, or operation. Integration may be of two kinds: horizontal or vertical. Vertical may be upstream (backwards to inputs) or downstream (forward to markets), but always within the same general commodity chain or system. Horizontal integration means making part of the enterprise, production facilities manufacturing the same products. It may also be sideways, to services, information, or finances.

Organizations need linkages in order to function, and, generally speaking, as organization size and complexity increase, so does the need for linkages. Yet, more linkages of greater volume and of greater complexity also mean greater costs. Then, linkages pose a dilemma which is confronted by the organization through a regulation of linkages with the outside world. First, only a limited number of individuals in one organization are in charge of the construction of linkages. Second, these individuals are not randomly selected. Third, those in charge of building linkages are not allowed to construct them any way they want. Instead, linkage construction is regulated by the organization through the use of an array of "cultural pyrotechnics": the image of the organization, the way access is determined, and the permeability of boundaries separating an organization from the outside world. The image of an organization is reflected in the buildings that house it, in its name, in its logos, and in the brochures and materials it publishes. The way access is regulated can be observed in terms of, for example, physical and telephone access. The permeability of boundaries is reflected in what it takes to become a member and in who is and who is not a member.

The problems raised by the social construction of linkages will be illustrated in the next two sections with examples related to production and marketing. Examples have been taken from interviews carried out in Southwest Virginia.

2.1.2) Production Linkages

We may speak of variation not only in the characteristics of linkages, but also in the way these linkages are constructed. This variation is a function of a series of dimensions including characteristics of the product, status, technical expertise, and image of the organization. Thus, for example, the less standardized the product, (such as a custom-made slip ring) the more interaction that will take place between customer and designers and engineers.

Linkage issues are different from linkage to linkage, as we can see in the following example taken from interviews at a plant which makes slip rings. The two main production processes undertaken in this firm are machining and assembling. Key inputs are bearings, lead wire, and connectors. Assembling needs are normally dealt inside the plant and, when needed, people are hired from the outside to cover peaks in demand. Machining is a more difficult matter that determines a very different approach. First, machining is divided into three shifts. Second, peaks of demand are levelled off through "farming out" to local machine shops. Third, the relationship with these shops is highly idiosyncratic and personal, going far beyond any kind of contract or formal relationship. Finally, a premium is placed on the idea that "nobody understands our business as well as we do," and hence there is an attempt to minimize linkages.

2.1.3) Marketing Linkages

Marketing involves a number of activities. It means the actual sales, obviously, but that is only the last step of a long and complex process. Indeed, to equate sales with marketing will surely infuriate any person in marketing as I discovered—the hard way—in one interview. Marketing includes advertising, pricing, product development, the writing of technical brochures and notes, and image building. All of these things (and more) are present in any sale, but the meaning and the importance of these terms vary by market type. This is certainly clear in the contrast between different organizations, but it is even true for different products made by the same firm.

For example, the firm in the example above sells some products through exclusive representatives ("reps") paid by the organization, while other products are sold through salespeople, who carry a number of similar products and who are paid commissions on the sales made. In the first case, sales are made from the firm's internal pool of people, while in the second case a linkage to the outside is created by hiring the services of a sales specialist. Advertising also involves a number of tasks that may be internalized or contracted out.

Concepts can be explored by going out into the field, talking to people, and observing. Traditionally, however, the approach to this problem has been to consult the literature. Yet, to consult the literature is also to connect indirectly to the field, for the insights other researchers may have on our topics of interest do not spring from a vacuum.

2.2) The Study of Linkages

2.2.1) Hirschman's Formulation of the Concept

Linkage is a term originally coined by Albert Hirschman (1958) in his classic work, The Strategy of Economic Development. Initially used to describe material flows linking a firm with its suppliers and buyers, its usage has spread to include other flows such as information and capital. The inputs of raw materials, services and parts are called backward linkages. The outputs of final products are forward linkages. It is interesting to note that to a large extent the conventional understanding of linkage in economic geography is not that conceived by

Hirschman. In fact, the original meaning was stripped and replaced by another. Hirschman devised the linkage concept in the context of Latin American development and in opposition to conventional thinking grounded on neo-classical economics.

"The concept arose from a perspective contesting the conventional representation of an economy where natural resources, factors of production, and entrepreneurship are all available in given amounts and need only be efficiently allocated to various activities for best results" (emphasis mine; Hirschman 1987, 206).

Hirschman (1958) conceived the idea of linkage as a tool for understanding the reality of industrialization in Latin America in the 1950s and 1960s. It was also to serve as a guiding concept for policy making. Curiously, the linkage concept embodied political and institutional questions that were left out in later formulations. For example, Hirschman (1958) identified the likely support or lack thereof for the development of backward and forward linkages from local entrepreneurs and state institutions. In later contributions, Hirschman (1968 1984 1987) showed the centrality of his concept of backward linkage in the description of the ISI process and in the emergence of economic groups. Other writers have used and expanded the idea of linkages. In economic geography, the concept of linkages has been widely used in a number of contexts although not in line with some of the characteristics of the original formulation. Indeed, some recent reviews of the literature on linkages in economic geography make no reference to Hirschman (see, Hoare 1985).

"If a popularity contest were held for the various propositions I advanced in Strategy, the idea of favoring industries with strong backwards and forward linkages would surely receive first prize. The linkage concept has achieved the ultimate success: it is by now so much part of the language of development economics that its procreator is most commonly no longer mentioned when it is being invoked" (Hirschman, 1984:96).

However, the central problem with respect to linkages in economic geography is not one of proper acknowledgment. Rather, it involves the loss of Hirschman's original conceptualization of the linkage concept.

Although the literature on linkages in economic geography is voluminous (Scott 1983 1986; Holmes 1986), most studies have defined linkages in an un-problematic manner such as a simple expression (in the market) of transactions among firms. In these studies the conceptualization of markets and firms has relied heavily on neo-classical propositions. There is a tendency to reify the spatial dimensions of linkages and to seek purely spatial explanations (Holmes 1986, 82). Only recently have writers been concerned with placing firms within the network of interdependence in which they operate (Fredriksson and Lindmark 1979; Scott 1983 1986; among others). It is also only recently that the concept of linkages has been recast to include asymmetrical relations among firms (Taylor and Thrift 1982). Linkages, then, can be seen as channels through which certain firms may exercise power over other firms in the same or related industries.

If we envisage an industry (or industrial sector) as a system

of firms of different sizes organized around "governance systems" and producing a certain value, it is possible for certain firms in the system to extract value from their own plants as well as from other firms. A typical situation in semi-industrialized countries such as Argentina is found among small and medium-sized enterprises selling to a limited number of terminal firms and buying from a very small number of suppliers of raw materials (Encuesta a la Pequeña Empresa 1988; Borello 1989b). Typically, the markets for such intermediate inputs as glass, steel, aluminum, cloth, or basic plastics are highly concentrated and protected from outside competition. A similar situation can be observed in the case of transport equipment, automobiles, household durables, and electronics (Jenkins 1987, 119-139). Smaller firms are effectively squeezed from one or both ends.

2.2.2) Industrial Organization and Urban and Regional Growth

An examination of the way linkages have developed provides insights of the past and the reasons for the emergence of capital-goods firms. A study of linkages tells us how these firms organize production and offers clues about the possibilities of expansion. Except in studies of branch plant locations, very little is known about the way in which modern firms in Latin America organize production outside major cities. A few studies have examined the development of linkages between large firms and smaller subcontractors and have argued that, in general, Latin American firms tend to internalize a larger portion of the production than firms in industrialized nations (Chudnovsky and Nagao 1983; Katz 1986 1987b). This means that firms in Latin America are more vertically integrated than in Europe or in North America. To date, no one has studied this problem from a spatial perspective. We know branch plants in peripheral areas have very little material linkages with the local economies (BND 1983; Boneo 1985; Borello 1989c). We also know that small and medium-sized firms of local origin generally have strong linkages with the local economies (backwards to agriculture or forward to construction) (Borello 1989c).

Conventional neoclassical theory asserts that firms locate at a point of lowest transport costs and where they can profit from agglomeration economies (Gwynne 1986, 86-93). The existence of other firms at a major city provides a new firm on the scene with raw materials, needed services, or an outlet for its production. The historical record of manufacturing not only in Latin America, but also in North America (Storper and Walker 1989, 70-98), suggests a different process.

First, in Latin America, most firms have not "chosen" their location, at least not in the manner suggested by conventional theory. Early manufacturing activities were closely associated to export activities that were concentrated in specific regions and key break-in-bulk points such as port cities. Incipient industrialization built around export activities, light manufacturing, and a few consumer goods could only flourish in major cities. During the big industrial push associated with ISI most firms were not free to choose their location. The only exceptions to this locational exercise were major industrial complexes in intermediate industries, generally under direct state supervision and ownership (steel, petroleum products, chemicals). In the major cities thousands of small and medium manufacturers

paralleled the expansion of the ISI process and provided labor with limited social mobility. In this regard, the existing evidence points to the 1940s, 1950s, and 1960s as the "golden age" of the small and medium-sized manufacturers (Durand 1985; Borello 1989a). These firms did not "choose" their location. It is only in the last fifteen years or so, that some firms are able in some activities to choose from a number of—still limited—locations (Borello 1989c).

Second, in Latin America most empirical studies show that firms try to generate, as they grow, their own inputs such as labor, services, and infrastructure. The history of some pioneer firms producing consumer goods at the beginning of the century shows this very clearly (e.g., Mattarazzo in Brazil (Gwynne 1986, 154-155); SIAM Di Tella and Alpagatas in Argentina (Cochran and Reina 1962; Gutiérrez and Korol 1988)). The extraction and processing of agricultural or mineral raw materials in areas located away from major cities led to the integration within the enterprise not only of all the direct production requirements, but also of the private lives of workers, foremen, and technicians. That was the case of the textile and sugar districts of the Northeast of Brazil until at least the late 1950s (Andrade 1980; Stein 1957; Hutchinson 1957). It is also the case of the sugar mills, the sawmills and the tannin-extraction facilities in northern Argentina, particularly in the early part of this century. Company towns also sprung up around the production of cement in the center of the province of Buenos Aires, close to Olavarría (Neiburg 1988) and deep inside Patagonia, in Río Turbio, around the extraction of coal. More recently, the exploitation of iron ore in northern Patagonia has led to the mining town at Sierra Grande, in the wind-swept Patagonian plateau.

The ISI process proved that firms could begin production before all the necessary production factors envisioned in conventional theory were readily available (Hirschman 1968). Case studies such as Cochran and Reina's (1962) detailed historical account of SIAM Di Tella in Argentina demonstrate this phenomenon. They describe a manufacturing sector that is markedly different from that of industrial countries. In terms of linkages, Latin American firms continue to be more integrated than firms in advanced industrial countries, simply because the network of firms is less dense and less complex than in industrialized nations (Katz 1986 1987b). What services or goods that are available in the local production system may not meet some firms' requirements in terms of quality or price. To fill this services and goods gap, many firms encourage the development of subcontractors which allows them to control indirectly the production process (Katz 1987b).

The search for a producer points the large firm to an area of potential (monopolistic) profits and to a market niche not yet exploited by any manufacturer. This seems to be the basis to explain the emergence of economic groups in Latin America as noted above. The low level of subcontracting points to a lack of middle-income sectors from where entrepreneurs and small and medium-sized firms emerge (Katz 1987b, 29). As Scott (1986a, 226) puts it:

"...there are also significant impediments that limit the amount of vertical disintegration... One is the relatively underdeveloped entrepreneurial energies of many parts of the periphery, and especially of the Third World" (emphasis mine).

2.2.3) The Debate on Linkages and Beyond

In 1979, Burrell and Morgan wrote that what was needed in the field of industrial organization was to move beyond the functionalist paradigm into other frames of understanding. These authors argued that little research had taken place in the context of radical structuralism and radical humanism and that the field was wide open for interpretative approaches. In the last ten years it seems that the pendulum is moving away from traditional approaches and into those areas identified as little tilled by Burrell and Morgan. The field of linkages might be one good example of this.

Framed in Latin America by Albert Hirschman, the concept was used to describe the process of import substitution industrialization (ISI). As defined by Hirschman the concept embodied a number of social, political, and historical considerations that were later left out of the idea of linkages. The original meaning was stripped and replaced by an orthodoxy based mainly on neo-classical economics.

Thus, linkages became the expression of market transactions between independent and free participants. Yet, participants are not always free-willing and markets do not always exist (at least not in the manner envisioned by this kind of theory). A number of writers disputed these ideas by showing that there can be unequal relations between firms and that markets are seldom the open arena where supply and demand meet to set up prices that are not controlled by individual players (Block 1990). This discussion moved writing and research closer to considerations of culture and embeddedness (Granovetter 1985).

Recent research on themes of industrial organization related to linkages has focused increasingly on context, culture, and interpretation (Storper and Harrison 1991). The trek of the linkage idea from development economics, through neo-classical economics, with a small dip in neo-Marxism, seems now headed into the realm of culture. This study joins this new trend and argues that its attendant new landscape, the new vistas provide a better understanding of the issues involved in the point of contact between organizations. The trend is directed to highlight the practices and agreements governing linkages, a point to which we now turn.

2.3) What are Industrial Governance Systems?

The concept of industrial governance systems is less developed than linkages. It is at the cutting edge of scholarship in industrial geography and planning (Michael Storper, personal communication, April 1991). The fact that the concept is new makes it less robust and less explored. In a recent contribution titled "The Expanding Horizons of Industrial Organization", Richard Walker writes echoing an article by Powell (1990):

"Inter-firm cooperation, alliances, and networks are now the rage in industrial organization theory. They represent a second tier of modes of integration for complex production systems. Yet the literature is still in a rather chaotic state... there is no standard terminology as yet, only a jostling of concepts..." (Sayer and Walker 1992).

One of the contributions of this dissertation is precisely to refine the concept of governance systems and to show how it

may be used to interpret empirical information. The idea of governance systems makes explicit a dimension of the linkage concept that is implicit in Hirschman's (and others) rendering. Governance systems form an umbrella term that encompasses different forms of coordination within a specific industry. The term may be used in different ways as, for instance, to refer to the regimen inside an establishment, as interactionist sociologist Herbert Blumer (1990, 44) does in the following quote:

"A manufacturing system necessarily requires and introduces some kind of internal government in the industrial establishments. An overall scheme must arise to regulate the relations between owners, managers, supervisors, and different categories of workers... A scheme of governance exists at every point in the manufacturing system. Hence, every participant in the manufacturing system comes under the sway of an industrial regime" (Blumer 1990, 44).

Different forms of industry governance systems exist and they should be envisioned as complementary. For example, Storper and Walker (1989, 135) mention "subcontracting, strategic alliances, trade organizations, state planning agencies, or informal relations of trust between firms in a business community." All of these, however, imply a certain organizational and technological development not necessarily present in all places and at all times.

As it was argued before, based on a number of studies in different Latin American countries and industries, subcontracting only became important in scattered industries and regions of Latin America after the 1950s. The emergence of subcontracting (and this sounds banal) demands the prior or simultaneous emergence of subcontractors. For subcontractors to appear, we need small entrepreneurs. Their appearance is more closely related to questions of income distribution than to some cultural drive to make money, as students of the achievement school believed. In addition, for a division of labor to occur there has to be a process of market expansion; as Adam Smith long ago recognized "the division of labor is limited by the size of the market".

Strategic alliances also seem to be possible only when firms have a certain sophistication in technological and managerial

terms. Strategic alliances also imply the existence of sizable markets and mature state institutions. The latter should be able to guarantee some stability (social, economic, and political) and be capable of having a dialogue on an equal footing with private firms. These conditions are not always present in semi-industrialized countries.

Trade organizations are perhaps one of the simplest forms of governance. A number of trade organizations exist in Mendoza. The oldest and largest trade organization is the Unión Comercial e Industrial de Mendoza, UCIM, which harbors about 80% of the commercial and service enterprises of the province and 20% of the manufacturing enterprises. Founded in 1943, ASINMET, Asociación de Industriales Metalúrgicos de Mendoza, includes not only other manufacturing businesses besides metal-mechanical, but also commercial undertakings. ASINMET groups about 80% of the manufacturing firms in the province and only 20% of the commercial enterprises. These organizations provide a number of services to their associates.

In addition, trade associations pursue a number of other non-stated courses of action (Storper and Walker 1989). One is lobbying the public sector to obtain advantages in terms of public policies and legislation. Another is the discussion of agreements and alliances among other trade associations, political parties, and unions. Additionally, trade associations attempt to influence local politics to their advantage. They do so through direct participation of their key members on electoral campaigns, regulatory boards, and commissions. Other forms of governance systems include the creation of extra-governmental bodies that influence public opinion.

In this thesis we will be mainly concerned with the governance systems regulating linkages within the capital-goods industry of Mendoza and between the industry and the rest of the provincial economy. Thus we will be looking mainly at subcontracting and at formal and informal practices and agreements governing transactions. As it is known, in opposition to a completely hierarchical organization of production, (as inside a firm) the division of labor among firms means a number of transaction costs. These costs thrive on opportunism, uncertainty, and ambiguity as we will see in Chapter Six (Ottati n.d.).

NOTES

CHAPTER 2

¹ This assertion does not necessarily imply that data are in themselves un-problematic. What a researcher sees in the field is an extension of what he knows and believes.

² Looking at how the two interact appears as a useful way of examining problems of production and territorial development. After receiving funding from NSF to carry out this project I received from Professor Michael Storper (UCLA) a copy of a working paper drafted with B. Harrison titled: "Flexibility, Hierarchy, and Regional Development: The Changing Structure of Industrial Production Systems and their Forms of Governance in the 1990s". This paper has now been published in Research Policy, Vol. 20, 1991.

³ The father of the term is Albert O. Hirschman (1958), see below.

⁴ The application of Leontief's input-output ideas to regional development and regional planning was the work of Walter Isard. See his studies of Puerto Rico and Pittsburgh (Isard, Schooler, and Vietorisz 1959), and the systematization of these ideas in the classic text based on these ideas (Isard et al. 1960).

⁵ The idea of networks has wide application in sociology, in a number of topics. For a general discussion see Boissevain (1984). For an account more strictly related to industrial organization see, for example, Burrell and Morgan (1979). More re-

cently, European geographers and other regional scientists have expanded on "innovation networks" as a useful concept to understand the milieu in which small and medium-sized enterprises function (Aerøe 1990; and the vol. edited by Roberto Camagni 1991a).

⁶ See the very interesting and candid account of a small businessman in the printing industry and his relationships with suppliers and clients (Washington Post 1991).

⁷ Intangibles are investments in other areas besides fixed capital (buildings and machinery) and include information, R & D, labor training, and marketing, among others.

⁸ Since linkages are flows which connect organizations, the origin and end of these flows can be identified and mapped; the volume of the flows can be measured and tabulated. Exercises of the first kind are common in economic geography and regional planning. The strength of linkages is called the multiplier. There are different kinds of multipliers. Employment multipliers measure the number of jobs to be created by the establishment of an industry in a region. Output multipliers measure the value of production generated by the location of an industry in a region.

⁹ See, for example, the discussion in the overview by Fred Block (1990, 46-74).

CHAPTER 3

MANUFACTURING AND THE ARGENTINE SPACE-ECONOMY, FROM COLONIAL TIMES THROUGH 1990

This chapter presents an overview of the organization of manufacturing production in Argentina from a historical and spatial perspective. The chapter situates the rest of the study in the larger Argentinean context by pulling together a number of otherwise scattered materials. At present there is no comprehensive text on the historical development of the industrial geography of Argentina. In the following paragraphs, emphasis is put on the units of production, the organization of production (within and among enterprises), and the technology used.

Following a number of writings by economists and economic historians, the periodization includes: the colonial period (1500-1809), independence and the 1800s (1810-1880), export-led industrialization (1881-1930), import-substitution industrialization (1931-1976), and restructuring and the end of import-substitution (1977-1991). Import-substitution is subdivided into three phases: export-led industrialization with import-substitution (1881-1930), import-substitution by the state (1930-55), and import-substitution by transnational corporations (1955-76).

3.1) The Colonial Period

Although manufacturing as we conceive it today only began this century, different sorts of craft production and even a proto-industrial period can be identified in the centuries of colonialism in what would become Argentina. To a large extent, these forms of production declined drastically in the early years of the 1800s as a result of the disruption of commercial flows that accompanied independence and civil wars. Independence also opened up the ports to British products, particularly of textiles, which were generally cheaper and of better quality than local products. Yet, in the northern interior provinces, handwoven textile production survived until the end of the last century and provided employment to thousands of people. Even today forms of craft production remain in some rural areas and small towns of Northwest Argentina (Hermitte and Segre 1984). The major market is now tourism, but even thirty years ago the use of traditional ponchos was widespread in the provinces of the northwest.

Whereas European industrialization has its bases in the late Middle Ages, Latin American industrialization is a recent product. Although historically the first forms of industrialization were undertaken by the Indians and later on by Spanish encomenderos who subjugated Indians in the obrajes,¹ most authors see a discontinuity between the obrajes and the domestic production of the colonial and early independence period, and the industry of the early years of this century (Dorfman

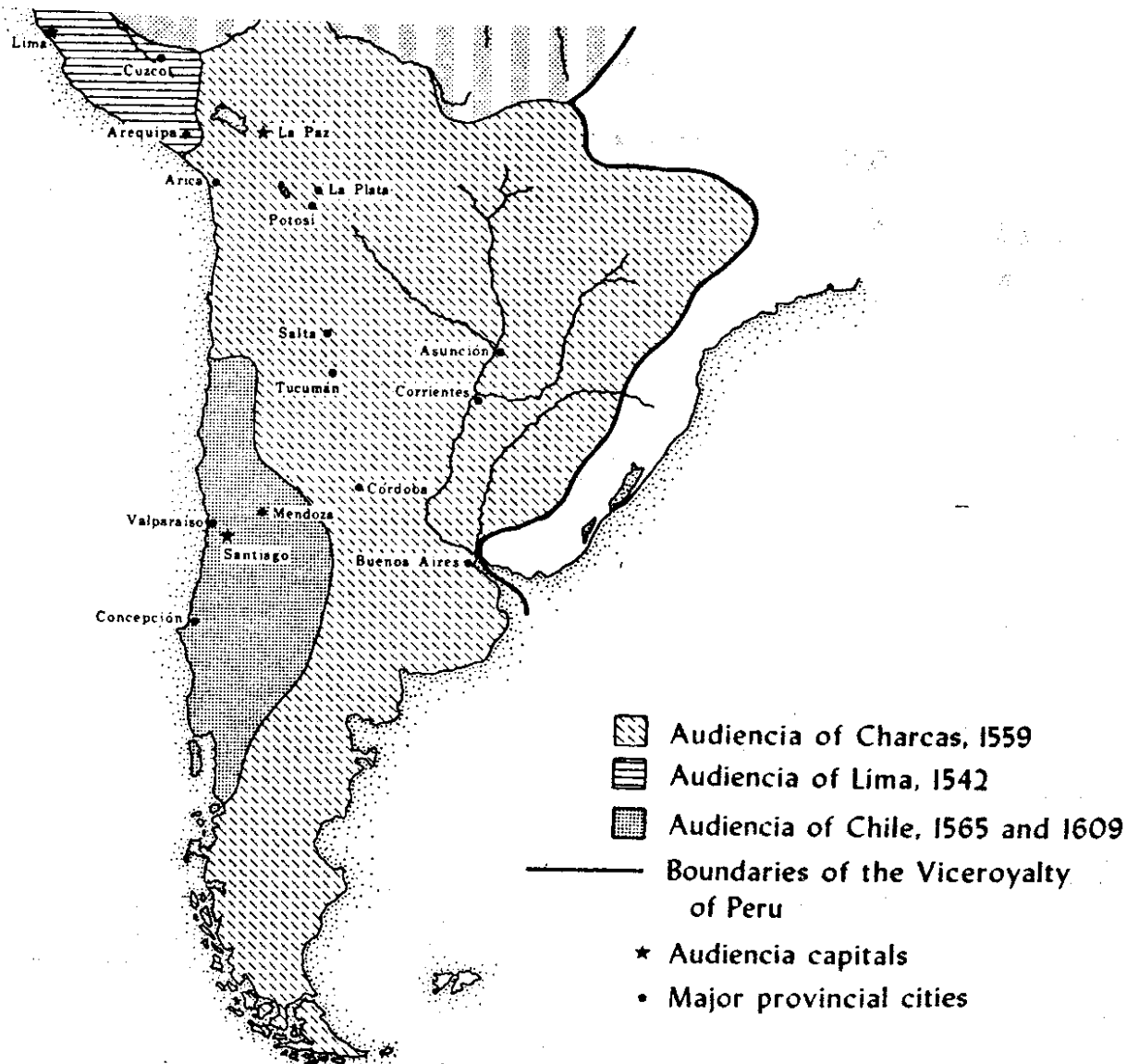
1970, 13-14). This discontinuity is expressed in the whole debate on the origin, role, and outlook of the Latin American bourgeoisie, particularly in terms of the differences, similarities, and historical role of bourgeoisies in Latin America vis-a-vis Europe.²

The crumbling of feudalism in Europe and the triumph of the bourgeoisie gave way to the progressive forces of the industrial revolution. In Latin America, this did not happen. Pre-capitalist forms of production based on quasi-feudal relations were to crumble under the competition of European production. Yet the fall of these forms of production was not accompanied by the surfacing of a new bourgeoisie (Dorfman 1970, 46-47).³ What took place in Latin America was not only the result of European actions.

Traditionally, the history of Latin America during the colonial period has been seen as a mere reflection of the actions of the colonial powers. Yet that vision has to incorporate the changes taking place in the interior of these regions, changes that are not necessarily tied to what Spain or Portugal did. In this view, one important element is the appearance of internal markets as a result of the new continental order (Assadourian 1982). In the case for example of the Southern Cone, Spain connected a number of very different ethnic and cultural areas under the Viceroyalty of Lima. The Viceroyalty of Lima included initially a vast region of most of what is now Peru, Chile, Argentina, Bolivia, and Uruguay. Despite the difficult land communications, the integration of a number of different spaces led very rapidly to regional specialization, though many regions and towns remained self-sufficient. Thus, the regions of Córdoba and Tucumán (in what is now northern Argentina and southern Bolivia) became producers of cloth, covers, and ponchos, and bred mules for the mines of Potosí (southern Bolivia). Mendoza grew wheat and fattened cattle for the markets of Central Chile (see Chapter Four).

Despite the break from the Indian past, the areas where the conquistadors settled were, naturally, those areas of greater Indian concentration: the mountains and valleys of Northern Argentina (Scobie 1971; Dorfman 1970). The riches of these regions were not the gold and the silver of Potosí, México, or Minas Gerais, but the land tilled by the Indians and the labor they could provide. Once the early Indian resistance was put down, land and its inhabitants became the property of the Spanish (Assadourian 1982; Scobie 1971).

Textile production was organized in so called obrajes, small shops with a master to direct production and a limited number



Map 3.1. The Southern Cone During Colonial Times

of tools and machinery brought from Europe. In part, the obrajes exploited communal forms of work from the pre-Columbian era (Dorfman 1970, 28). The obrajes resembled primitive forms of the organization of production in England, France, Holland and other European countries. The market for the coarse cloth of local origin was comprised by the mestizos, Indians, and black slaves which constituted a sizable part of the population at the time.

Indians were forced to work in these obrajes under a system called encomienda. In the encomienda system Indians were assigned to an encomendero by a higher Spanish authority. The encomendero had rights, but also responsibilities, such as taking care of the health and the well being of the Indians assigned to him.⁴ Most encomenderos had previously financed expeditions and explorations and the encomienda was the way the Crown paid them back. Obrajes and encomiendas could be found in most of what is now western, northwestern, and central Argentina, but they were concentrated in today's provinces of Córdoba, Tucumán, Salta, and Jujuy.

The master in charge of production was a key figure in the obraje. Although the encomendero was responsible for the provision of the means of production, the master would normally keep around 25% of the profits from the obraje. Cotton and wool, the main production inputs, came from Córdoba, the region which by the end of the 1500s was a major cotton-producing area in the New World (Assadourian 1982).

The obrajes were the main form of organizing production in the sixteenth century. The fate of the obrajes was tied to the encomienda and to the size of the Indian population. The Indian population was reduced substantially as a result of disease, war, and direct and indirect disruption of the existing social order (Assadourian, Beato, and Chiaramonte 1986). The decline in the Indian population and the progressive reduction of the importance of the encomienda led to the progressive disappearance of the obrajes. But for many decades, obrajes and domestic production coexisted side by side.

The owners of the obrajes switched to raising sheep and mules for the mines in Potosí. By the early 1600s most obrajes had ceased to exist. Those that remained in production began to use slaves brought from Africa. Black slaves replaced, to some extent, the dwindling Indian population used as servants and laborers in the fields and the obrajes. Textile production moved to other areas where labor was more abundant, such as Asunción (Paraguay), La Rioja, Catamarca, and the highlands of Perú (Assadourian 1982; Bazán 1979; Dorfman 1970).

Besides the Northern regions of Córdoba and Tucumán, the Jesuit Missions of Mesopotamia⁵ were another important region of local cloth production. The Missions were also the main producers of yerba mate (mate tea) in the whole of the Americas. It is estimated that almost 200,000 Indians lived under Jesuit rule and protection, in a quasi-autarchic state (Dorfman 1970, 29).⁶

Recent studies show that another important region of cloth production was the Indian territory. Until the Campaña del Desierto, a major military expedition headed by General Roca in the years 1878-79, at least half of what is now Argentina was held by

different Indian tribes. Most of Patagonia and the dry part of the Pampas, to the South of an East-West corridor linking Buenos Aires with Mendoza, was held by tribes loosely organized in federations and capable of striking (on horseback) the white man settlements with the speed of lightning.⁷ The Northern part of the country, the Chaco region, was also sparsely settled and out of the control of the central government. Yet, trading between the region controlled by the white man and the Indian territory was more frequent and of greater volume than what has traditionally been argued (Palermo 1989).

Until the early 1800s, the obraje constituted the only example of a fairly complex workplace. Even when it was targeted to markets beyond the local village, domestic production of household wares never entailed more than family labor and very little division of labor. Most urban centers had their share of artisans who could repair carriages and mend household goods, but artisans worked mostly alone and there was nothing resembling a factory (see Chapter Four).

3.2) Independence and the 1800s

3.2.1) The Putting-out System

By the early 1800s, the encomienda had been replaced by a "putting-out" or "verlag-system" (Assadourian 1982, 253). Production was no longer organized in shops or obrajes under a mode of production that resembled in many ways feudalism, but under mercantile forms of production. A merchant, usually based in a town or city, would advance the cotton or wool necessary for production to domestic units. In many cases, wool and dyes were also provided by the weavers while the merchant would take care of commercialization. Debt was the favorite mechanism to keep people in the system. Weavers were advanced payment by merchants. Payment was usually in kind, and ironically, many times in the form of European textiles. As in the obraje system the means of production were quite simple (Assadourian 1982).

3.2.2) Early Industrialization

By the mid-1800s, a number of foreigners had established the first factories, mostly in the city of Buenos Aires, but also in some cities of the interior (Dorfman 1970). The emergence of modern factories, with machinery, foremen, workers, and an organization of production accompanied the decline of the domestic production of textiles in the interior. Kritz argues that by the 1850s Argentina was still the sum of regional sub-economies with precarious connections among them.⁸ In large areas of the interior there "persisted backward modes of production and social organization..." (Kritz 1985, 57). The modernization process which swept the country in the later part of the 1800s definitively incorporated all regions of the country to the world economy and did away with most of the domestic textile production in the interior. It also ended production in the areas still held by the Indians in Patagonia (Dorfman 1970; Assadourian, Beato, and Chiaramonte 1986; Palermo 1989).

Domestic production was concentrated mostly in the North-

west and was undertaken almost exclusively by women working in household production units (Kritz 1985, 58-63). Because women could not find other occupations to replace those lost in domestic production, their participation in the work force fell in the period 1869-1914. The modern industry was to be the realm of foreign industrialists and foreign workers established themselves mostly in Buenos Aires and Rosario, and in lesser numbers in other areas of the interior such as Mendoza.

3.3) Export-led Industrialization

At the turn of the century the units of production to be found in Argentina were four: (i) the domestic undertaking still alive in the rural areas of the interior and particularly in the Northwestern provinces; (ii) the pre-capitalist shop where craftsmen and owner(s) worked side by side and where craftsmen owned the tools of production and pay was by piece-rate; (iii) the large private firm, which was more prevalent in activities where economies of scale mandated large undertakings: meat-packing, flour mills, sugar mills, alcoholic beverages, chemicals, alcohol distilling, and railroad-repair shops. Other large undertakings were those associated with construction works directed by the state and funded by foreign—mostly British—investment: ports, docks, railroads, and public buildings (see, Oszlak 1985). Finally, (iv) there were the urban household workers, mostly women and children working out of dingy rooms in crowded tenements of Buenos Aires. Taylorist principles of work organization were used only in the large undertakings oriented to foreign markets, such as meatpacking (Johns 1992a-b). Even in the bodegas (wine-making plants) of Mendoza coopers worked in semi-independent gangs led by contractors (Bialet-Massé 1904) (see Chapter Four).

The urban explosion of the turn of the century was accompanied by an expansion of a myriad of small shops and factories. Most of the times, the setup of these shops was precarious. Buildings were little more than sheds to protect the machinery. Most industrial activities were still carried out in small shops with little use of machinery or electric power. "With a few exceptions [the units of production] were insignificant shops barely deserving the name of industrial" (Dorfman 1970, 210). Security and working conditions were often appalling. Trained workers were scarce (Falcón 1986, 25). Knowledge about the proper set up of plants and machinery was not widespread. Because social mobility was high, workers did not usually stay long in their jobs, and personnel rotation was high. Despite all of these shortcomings, industrialization was indeed taking place in Argentina, although it was mostly confined to the cities of Buenos Aires and Rosario. Some processing activities took place in integrated works and mills in the interior of the country: sugar (Tucumán), tannin extraction (Chaco), wine and alcohols (Mendoza). However, only in the case of Mendoza, the processing of primary products and the local linkages associated to them would lead to the emergence of middle-income sectors as early as the 1910s (Balán 1979). The direct involvement of the state in industrialization after the 1930s would mean both a further industrial expansion in the cities of Buenos Aires and Rosario, and the opening up of new industrial spaces in other areas of the country.

3.4) Import-substitution Industrialization

3.4.1) Export-led Industrialization with Import-substitution

The big industrialization push took place in Argentina after the 1940s, yet already by the first two or three decades of this century, a number of firms of modern characteristics had already emerged, even in areas not directly tied to the export of primary products. Before the 1930s the economy was relatively open to outside competition. Explicit protectionist policies were implemented in the following decades. Yet already before the 1930s local manufacturers of textiles, clothing, food, light equipment and machinery, pharmaceuticals, and chemical products were active in the national scene. Some of these firms were even expanding into the markets of neighboring countries and setting up subsidiaries and offices in Europe and North America (Katz and Kosacoff 1989, 48; Cochran and Reina 1962; Gutiérrez and Korol 1988; Johns 1992a-b; Nofal 1989).

Naturally, most of these firms emerged in the large cities of Buenos Aires and Rosario. Yet, for example, the processing of primary products in a number of areas of the interior of the country would lead to the foundation of enterprises dedicated to the maintenance and repair of equipment and machinery in Tucumán, southern Santa Fe and Córdoba, and Mendoza (CFI 1973; Pérez Romagnoli 1987; Kantis and Delgobbo 1991; Worcel and Azcúa 1991; Borello 1992a).

3.4.2) Import-substitution by the State, 1930-55

The state imposed several measures of protectionism. In spite of changes in political regime, these measures—which meant a closing of the economy to foreign competition—were in place until the military takeover of 1976. From the processing and export of primary products, industrialization expanded into the production of intermediate goods (steel, petrochemicals, artificial fibers, paper and chemicals) mostly under direct state investment; into the production of capital goods (textile and agricultural machinery and machine tools); and into durable consumer products such as household durables (Katz and Kosacoff 1989, 48-49).

According to Katz (1986 1987), six elements characterize the industrialization of the 1930-43 period: 1) the products manufactured were often outdated copies of European and North American products, 2) the machinery was used or self-made, 3) plant layout was very primitive and the product of chance versus careful planning, 4) vertical integration of production was very high in light of the scarcity of subcontractors, 5) extra economic criteria prevailed in the search and hiring of qualified personnel, or in the acquisition of machinery; 6) the lack of an organized capital market led to auto-financing by enterprises.

In the following decades the state fostered industrialization through a number of direct and indirect means. In 1944, the Banco de Crédito Industrial was created to finance medium and long term ventures of manufacturing development (Fernández Pardo 1986). Also in 1944, the first major legislation of industrial promotion was approved which centered on a number of

key activities. In 1946, the state created an agency to control directly foreign trade. This control enabled the state to capture part of the private benefits accruing to the exporters of agricultural products and to re-direct these funds, through diverse means, into manufacturing. Direct state intervention was derived from the creation of the Dirección Nacional de Fabricaciones Militares (1941), the controlling arm of SOMISA (steel, 1947), ATANOR (chemicals, 1946), and DINIE (a variety of plants confiscated from the Axis countries, 1947). Manufacturing was the major area of job generation in the economy in this period (Katz and Kosacoff 1989, 50). The war, protectionist measures, and state intervention combined with real salary increases, fostered the appearance of a myriad of small and medium-sized firms in light manufacturing.⁹ It also seems plausible that some of these small and medium-sized firms were nurtured by the large firms themselves, as scattered evidence suggests.

Again, in absolute terms, industrialization was largely confined to the major metropolitan areas of Buenos Aires and Rosario. However, in part because some of the provincial governments also became involved in orienting the industrialization process, manufacturing activities (eventually) emerged in different areas of the interior of the country. We will look in detail at the case of Mendoza in Chapter Four.

These decades signaled a number of new trends in the locational pattern of manufacturing in the country. First, industrial activities began to move away from the old industrial districts close to the heart of the cities and into suburban areas. Second, new production spaces opened up in the interior. A special case was the city of Córdoba, in the center of Argentina, a city which became the major producer of automobiles and transportation equipment in the country (Nofal 1989). Since the late 1920s, the state had made major investments in the development of defense-related industries in Córdoba (Angueira and Tonini 1986). Some large and medium-sized enterprises took advantage of industrial promotion schemes and set up branch plants in Patagonia and in some small cities and towns of the north of the country (BND 1983). Manufacturers of clothing and textiles, faced with increasing wages and workers' demands began moving into small cities and towns within 200 miles of the cities of Buenos Aires and Rosario (Borello 1992a). Third, the state began making investments in intermediate industries largely undeveloped in the country, such as steel and chemicals. Most of these plants were located outside of the major metropolitan areas.

3.4.3) Import-substitution by Transnational Corporations, 1956-76

The end of the 1950s witnessed a curtailment of direct state intervention and the beginning of the largest inflow of foreign capital in manufacturing in Argentina. In the period 1958-63 about 500 million dollars (of the time) came from US firms to set up manufacturing plants in Argentina. The influx of foreign investment "...[had] a profound effect on the morphology and performance of the different manufacturing markets and on the prevailing organization and division of labor both at the level of industries and individual plants" (Katz and Kosacoff 1989, 52). The preferred areas of investment were the automobile industry and the area of consumer durables (Nofal 1989).

The subsidiaries of European and North American firms could not produce in the same manner they did in their countries of origin.¹⁰ The big profits to be had from a closed market with substantial potential unsatisfied demand could not be instantly realized. Market size limited plant size to 10% or 15% of a typical plant in a developed country. Production technologies had to be much less automated and much more discontinuous—the mix of products elaborated in a production line is quite wide. Peripheral processes and tasks often had to be integrated in the plant because local subcontractors could not be found. In many cases, terminals went out and "developed" their own subcontractors through a slow and difficult process. This process entailed the enforcement of quality controls and strict deadline schedules on smaller producers with little experience, precarious machinery, and little qualified personnel. "All of this in the end diffused in the local metal-mechanical environment new technological practices and quality standards....In other words: the automobile industry affected deeply the dominant metal-mechanical state of the art in the local society" (Katz and Kosacoff 1989, 54).

The fledgling manufacturing sector Argentina had by the early 1960s expanded significantly in the period 1964-74, a period many authors identify as "the most successful stage in the industrialization process" (Katz and Kosacoff 1989, 57). In this decade, employment, salaries, and manufacturing exports expanded, while manufacturing productivity improved at a rate of 6% annually. Slowly, many producers touched a ceiling in terms of local markets, but some foreign markets were secured in a number of non-traditional exports. The engineering departments of large and medium local and foreign firms expanded and developed significantly.

It was the culmination of a long maturation process that reached beyond the strict limits of the major firms to encompass the local technological capacity, understood broadly to include labor qualifications and training, quality controls, standardization of parts and components, and development of reliable subcontractors. Katz (1986 1987b) identified three major indicators of the qualitative change operated in the Argentinean manufacturing sector as a result of this maturation process: the impressive expansion of non-traditional manufacturing exports, the export of technology (turnkey plants, licenses, technical assistance), and direct foreign investment by Argentinean firms on other countries (see also, Katz and Kosacoff 1989, 59; Ablin et al. 1985; Katz and Kosacoff 1984).

As in other Latin American countries, the big manufacturing expansion of the 1950s and 1960s took place mostly in a few metropolitan areas, although some branch plants began to locate in the periphery of Argentina (De Mattos 1990; Gatto 1990; Borello 1992a). In addition, some areas outside the main metropolitan areas began to develop an endogenous manufacturing base as a by-product of demands generated in agriculture and in the processing of mineral resources. Yet, most of the provinces with the exception of Buenos Aires, Córdoba, and Santa Fe, and to a lesser extent, Mendoza and the provinces of Patagonia, were left behind the industrialization process. Thousands of migrants from the provinces of the northern and central regions of the country became the new workers in the developing enterprises of the major metropolitan areas (Lattes

1992; Vapnarsky and Gorojovsky 1992). This was one of the costs of the import-substitution process.

Argentine import-substitution had other costs. The development of manufacturing was financed by a transfer of resources from the primary sector, and society in general due to high tariff protection. Preferential loans and industrial promotion legislation were also another form of subsidizing manufacturing development (Katz and Kosacoff 1989, 60). Organized labor, large and medium manufacturing firms, and the state were the major players in this model. The military government that took power by force in 1976 would aim to break the tacit agreement between unions, industry, and state.

3.5) Restructuring and the End of Import-substitution? 1976-1991

The developments taking place in Argentina at the beginning of the 1970s should not be seen in isolation either with respect to the rest of Latin America or to the world at large. For many Latin American countries the end of the 1960s and the beginning of the 1970s are the time of coups d'état and mounting foreign debt. It is also a breaking point from a previous process of increasing national self-reliance and the construction of more egalitarian societies centered around incipient welfare states. To what extent can we relate the events taking place in Argentina and in other Latin American societies at this time to the rest of the world and particularly to the central countries, is a subject that seems yet far from being clearly understood. Some things are clear, though.

At the time the ISI model began to run into a number of difficulties in Argentina, the central economies were also in crisis. Growth rates had declined significantly compared to the previous decade, as had the rates of investment. Whole industries were in a process of corporate restructuring, leading to further market concentration. Manufacturing centered on Fordist production methods was encountering a number of difficulties. In contrast, financial capital expanded and siphoned huge portions of capital from central and peripheral economies. The economies that had developed under Fordist regimes of accumulation on the shadow of expanding welfare states were in crisis. Skyrocketing energy prices, accelerating inflation, and mounting state deficits were behind the crisis, but equally as important was the need for the hegemonic sectors to control labor (Gatto, Gutman, and Yoguel 1988, 6-7; see also, Harvey 1989).

Argentine industrial restructuring responded to an exhaustion of the import-substitution industrialization (ISI) model that had been the pivot of growth for the previous twenty of thirty years (see Katz and Kosacoff 1989).¹¹ Under the ISI model demand was the ceiling of expansion for Argentinean industry. For many products, markets had become saturated, particularly because the income distribution—despite important gains in the late 1960s and early 1970s—continued to be rigidly skewed. Income distribution worsened during the immediate years following the 1976 coup d'état.

Foreign markets were unreachable for many firms. Under the umbrella of decades of high tariff protection, many manufacturers had continued producing inefficiently and could not en-

ter external markets (without at least some adjustment). For many firms which had managed to secure some external markets, especially in Latin America, prospects of greater sales in those markets were checked by several problems. One problem was that many Latin American markets were also shrinking. Other obstacles were unstable and abruptly changing exchange rates and trade policies at home and abroad that made it difficult, particularly for small and medium-sized firms, to rely heavily on external buyers.

Another bottleneck of the ISI model was its influence on cyclical balance of payments problems (Tavares 1964; Fajnzylber 1983). Because import-substitution was an imperfect process that left out a number of industrial sectors such as some basic inputs and capital goods and machinery, each time demand, and consequently industrial output, increased the country faced a balance of payments problem. This was severe in those years when foreign exchange derived from agricultural exports dropped.¹²

Industrial restructuring can also be seen as the corporate response to the break in the model of *fordismo criollo* prevailing in the previous decades. Restructuring reflects changes in the dominant fraction of capital at the command of the accumulation process. *Fordismo criollo*, a regime of accumulation which Perón began constructing in the fifties, had started to crack and with it the whole fabric of society.¹³ Whereas in the previous period the new actors on the scene were foreign subsidiaries, the military period is the time of the emergence of local conglomerates known as *grupos económicos* (Azpiazu, Basualdo, and Kavissee 1986).

The restructuring of Argentina's industry involves sectoral and spatial switches of capital but also changes at the establishment level (Gatto et al. 1988; Borello 1990). At a sectoral level, automobiles, consumer durables, and machine tools, the leading industries in the previous decade, decline and go through a profound restructuring process. The expansion takes place in intermediate industries linked to natural resources: petrochemicals, pulp and paper, steel, cement, and aluminum. Plants in these intermediate industries are heavily subsidized through industrial promotion schemes (Basualdo and Azpiazu 1989). Concomitantly, the previous development of large engineering teams in the areas of design or in the organization of production—a key element in metal-mechanical production—give way to the standard production of commodities or quasi-commodities with little local value added (Katz and Kosacoff 1989, 63).

Industrial investment is being directed to regions outside of the old industrial core.¹⁴ In the traditional industrial regions, industry is moving to suburban areas. There is also a general trend to locate plants in small towns and in rural areas. Almost all of this investment outside the old industrial core is being subsidized by the taxpayers through direct and indirect fiscal and financial incentives. Still, investment in old industrial areas continues although at a much slower rate. A large proportion of the employment losses in traditional industrial areas are the result of closures and employment contraction in steel and basic metals and automobile production. Another portion is jobs in labor intensive and "mature" industries such as textiles, apparel, assembly of electronic and household products, and footwear. These jobs losses are in part offset by plant openings in

Tierra del Fuego and Patagonia (electronics and artificial textiles), in the Northwestern region (textiles, apparel, electronics, footwear), and in the Northeast (pulp and paper, textiles, food processing) (BND 1983; Boneo 1985; Borello 1989c 1990; Ciccolella 1986; Gutman et al. 1988; Kürzinger et al. 1985; Roitter 1987). Many jobs have also been created in plants processing mineral and agricultural raw materials in the interior (pulp and paper, food processing, petrochemicals, iron ore).¹⁵

To many authors the period 1976-83 would lead to a "complex phenomenon of techno-economic involution" in Argentine manufacturing (Nochteff 1984). Other authors spoke of a de-industrialization process. More recent interpretations see the recent changes in Argentinean manufacturing as a complex restructuring process that has left a host of diverging situations (Beccaria and Yoguel 1988; Gatto, Gutman, and Yoguel 1988). On the one hand, many firms did not survive a decade of crisis. On the other, a group of firms went through profound transformations to become what many writers see as a "pole of modernity" within manufacturing (Katz 1989; Katz and Kosacoff 1989). In between the two extremes a host of situations may be identified. Clearly, the dynamics of the period have not yet been fully explored.

The restructuring process continues. Yet, as I pointed out in section 1.7, the first step of this process, which can be characterized as a neo-Fordist response to the crisis (Gatto 1990), is giving way to a second step. In this second moment of the restructuring process, firms are searching for forms of production that may be characterized as flexible. For example, two industrial surveys undertaken recently—most of the results have yet to come to light—show that Argentinean industry is clearly in a profound wave of technological and organizational change.¹⁶ The firms which survived the shock of the last 15 years are rapidly modifying the layout of their plants, incorporating computers in diverse areas of the firms, and acquiring technological and organizational innovations. Such innovations include numerically-controlled tools, sensors, PLC's, CAD/CAM, and managerial techniques imported from Western Europe and Japan—organizational novelties unthought of years ago. The meaning of these developments is still unexplained.

It seems likely that the implementation of forms of production taken from the shelves of the flexibility model is now a feasible strategy because important changes have taken place at the level of the mode of regulation. The traditional militancy of Argentinean labor is now very much a thing of the past. Labor

laws have been substantially modified, in many cases to make transparent a series of de-facto practices in labor markets. With an increasing dependency of local firms in foreign markets, production and local consumption do not need to be matched anymore. Firms do not have—as they did during the ISI period—a collective interest in maintaining and increasing internal demand.

Yet, it is difficult to pinpoint what the future holds. It remains unclear whether fordismo criollo, as a way of organizing production, will turn into flexible production. There are at least three reasons for moving cautiously as we aim to understand this change. First, fordismo criollo itself remains a big mystery, with the exception of some aspects which have been studied by local researchers. As Sayer (1989a) would argue, how can we speak of the demise of Fordism if we cannot even agree on what it was and what it is. Second, the end of fordismo criollo as a mode of regulation marks perhaps the end of social mobility in countries such as Argentina. Indeed, poverty and hunger have worsened significantly in the last 15 years as a result of lower salaries and higher underemployment (see, INDEC 1984 1989 1990). Fordism as a regime of accumulation might have been brutal and costly in Argentina, but what we see of the emerging regime is not necessarily a pretty face. The end of fordismo criollo is the end of incipient forms of a welfare state. Hence, it remains difficult to applaud wholeheartedly what looks like the road to a more skewed income distribution and a lower real participation in the system for everyone. Third, if we are to learn something from the discussion on Fordism, then we know that a flexible production system cannot be transported and implanted in any country without acquiring a new and different face. In other words, if indeed in countries like Argentina flexible production will become the hegemonic form of organizing production (but also the heart of the emerging accumulation regime and of regulating society's conflicts), then fordismo criollo will give way not to flexibility, but to producción flexible a la criolla (flexible creole production).

What we have just said is speculation. Only the study of particular cases will give us a firmer grip on these problems. The capital-goods industry of Mendoza is a case whose study can give us insights not only on the transition from Fordism to flexible production, but also on a number of other areas: industrial organization, regional change, and firm structure, among others (see Chapter One). Before we begin with the direct analysis of the case study we need to place the city and the industry in their larger historical and economic framework.

NOTES

CHAPTER 3

¹ Obrajes were work-places directed by a master where Indians were forced to work under a system called encomienda. The head of the encomienda was the encomendero (see below).

² On a related line of inquiry, rivers of ink, scholarship, and disagreement have gone into the discussion of the modes of production in Latin America. Thus, there has been a long discussion on whether Latin America ever went through a feudal period, or whether, from the beginning of the colonial period the continent has been tied into the world mercantilist system. Also, a controversy remains on the interpretation—within the idea of mode of production—of forms of production that are not capitalist, but yet form part of a system in which capitalism is dominant.

³ Dorfman, and other authors, blame the revolutionaries of 1810 and the governments that followed, for failing to protect incipient forms of industrialization in different parts of the national territory. "...the annihilation of the national industry, semi-domestic, backwards, pre-capitalist, but industry in the end, should have been stopped. That was one of the greatest faults of the revolutionaries [of May 1810]" (Dorfman 1970:).

⁴ The latter, of course, did not always occur.

⁵ Mesopotamia is the region between the rivers Paraná and Uruguay. It comprises the Argentinean provinces of Entre Ríos, Corrientes, and Misiones.

⁶ The Mission, a recent motion picture filmed on location in Northern Argentina and Brazil, in and around the Iguazú Falls, gives a reasonable flavor of the life in the Jesuit Missions. Excellent photography, music, and the presence of Robert De Niro make up for the deficiencies of this Hollywood-made film.

⁷ The bibliography on the long and complex conflict between Indians and the developing new Argentinean nation is voluminous, although much remains to be researched. See, for example, Zeballos; Hasbrouck 1935).

⁸ In other Latin American countries, the integration of all regions into a national market would only become a reality well into this century, as was the case of even the more dynamic and powerful countries. Brazil, for example, integrated the vast and heavily populated Northeastern region only after the 1950s, and Amazonia only after the 1970s. Some countries still have not effectively integrated all the regions of their territories in a national market, as is the case of the Bluefields region of Nicaragua, on the Caribbean coast (on a non-academic, but powerful piece see Salman Rushdie's (1990) account of his visit to Nicaragua).

⁹ Small and medium-sized firms have been the subject of much discussion in Argentina (as in other countries). Yet, as in the discussions in other countries, most of what is said or done is

driven by purely ideological considerations: little is in fact known about this group of enterprises. A recent major study in which I participated shows a significant variation in the rate of firm creation over time. Those results support the idea that entrepreneurship in this size of enterprises is a historically situated event directly connected to social mobility and an increase in real earnings (Borello 1989a).

¹⁰ Michael Storper asserts —wrongly I believe— exactly the opposite: "Fordist mass production, was technologically of a nature such that it could, in large part, be picked up and implanted in new locations with little loss in efficiency, provided that a certain minimal scale of operations was met" (Storper 1990, 426).

¹¹ Restructuring refers to changes in the circuits of capital which reflect modifications in the conditions of capital accumulation. Accumulation refers to the employment of surplus value as capital (Harvey 1986). (For a more detailed analysis of the Argentinean case see, among others, Gatto et al. 1988, Borello 1990).

¹² This problem has been solved in recent years after a number of plants began producing intermediate raw materials such as steel, paper, petrochemicals, and aluminum (see, Kosacoff and Azpiazu, 1989).

¹³ Although many explanations have been advanced to account for the change in the path of Argentinean society we will not discuss them here. The interested reader may consult, among others, Jozami, Paz, and Villareal, 1985; Katz, 1989; Katz and Kosacoff, 1989.

¹⁴ Although it has generally been argued otherwise, in Argentina, the change in the spatial direction of capital investments is not a new phenomenon. The process can be identified even in the 1964 economic census (see Lindenboim, 1982; Borello 1992a).

¹⁵ In Argentina, as in other countries, textiles, leather products and apparel are primary foot-loose industries specially for multiplant enterprises. The same can be said of large portions of a so-called high-tech industry like electronics, where a large part of the production involves very low-skilled activities of assembly.

¹⁶ Encuesta a la Pequeña y Mediana Industria, Convenio de Cooperación CFI/CEPAL/Provincia de Buenos Aires, 1988. Encuesta sobre Inversiones en la Industria, Convenio Instituto de Estadísticas y Censos/CEPAL, 1989. Still being undertaken and corrected is the Encuesta sobre Cambio Tecnológico y Desarrollo Industrial 1974-1987, Convenio Instituto de Estadísticas y Censos/CONICET, 1988-89.

CHAPTER 4

THE ECONOMY OF MENDOZA AND THE CAPITAL-GOODS INDUSTRY: HISTORICAL OVERVIEW

The present and past of the capital-goods industry is closely connected to the rest of the local economy in two major ways. First, the local economy is and has been a learning place for local capital-goods enterprises (see section 5.2.2). It is in the local economy where firms have made (especially in the past) most of their sales, but more importantly, where they have acquired the knowledge that has enabled them to begin selling in extra-regional and foreign markets. Second, the repair and maintenance shops of private and public enterprises in Mendoza have been the main point of contact between capital-goods producers and their local clientele. Moreover, in many cases the emergence of new capital-goods firms was the result of the disintegration of repair activities previously carried out in larger private and public enterprises. Disintegration can be seen as an instance of the social division of labor. This chapter provides a general historical overview of the economy of Mendoza and the emergence of these industries.¹ The chapter is organized as follows. First, I describe the city and the region. Second, because the history of the capital-goods industry of Mendoza is closely related to the rest of the provincial economy, I provide some background information on the development of wine-making, fruit-canning, petroleum and petrochemicals, beverages, mineral-processing, and other industries. Third, I also advance information on the repair and maintenance shops of these industries and of public enterprises. Finally, I sketch a map of the linkages between capital-goods production and the different economic activities in the province.

4.1) The City and the Region

Mendoza is the main city of the Cuyo region in Western Argentina. The region includes the provinces of Mendoza and San Juan in the eastern piedmont of the Andes.² Rainfall is very scarce, between three and eight inches annually. Human settlement concentrates along the few rivers that tap the snowfields of the Andes. Thus, the rivers are the starting point for the organization of space through irrigation. Population clusters in the three major oases of the region: San Juan, Mendoza, and San Rafael. San Juan is the capital of the province of the same name and is located about 200 kilometers north of Mendoza. San Rafael is the capital of the department of the same name in Mendoza province and is due southeast of the provincial capital about 250 kilometers.³

Sitting on the edge of the Andes, a thousand kilometers east of Buenos Aires, lies Mendoza. It is a vibrant city of the interior

of Argentina. The border with Chile is only two hundred kilometers to the west. It is reached by a paved road running along the valleys which cut the Andes chain. The city's hinterland includes the whole province of Mendoza, half of San Luis, and most of San Juan (Ackerman 1972).

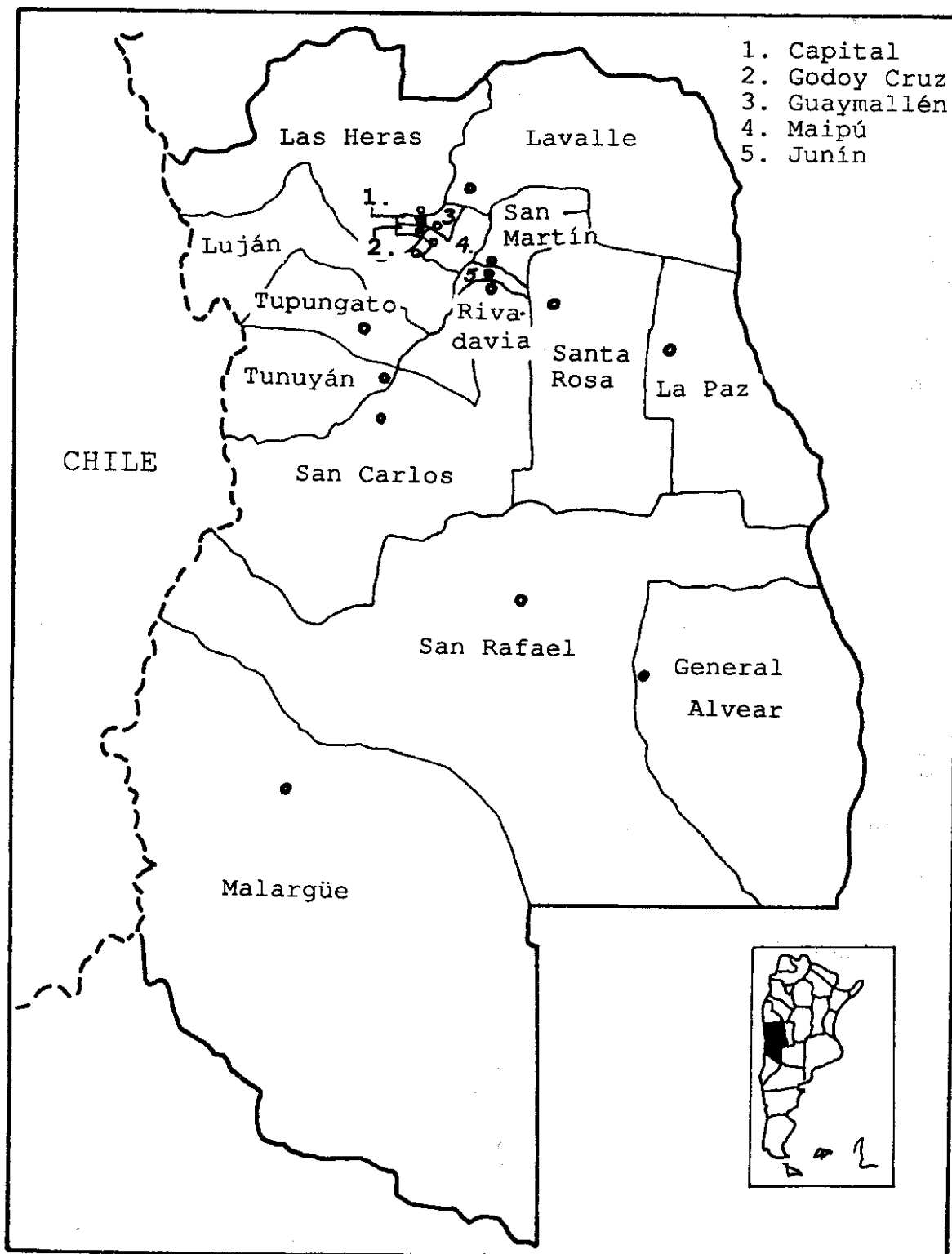
Mendoza is the fourth largest city of Argentina. With almost one million people, only Buenos Aires, Córdoba, and Rosario surpass Mendoza's population.⁴ Most of the population of seven departments make up the Mendoza Metropolitan Area. This includes, the city proper, the department Capital, and the capitals (of the same name) of three other departments which have traditionally been included in the Metropolitan Area: Godoy Cruz, Guaymallén, and Las Heras. Improved public transportation and a new system of highways have de facto been engulfed within the conurbation the towns of Luján de Cuyo, Maipú to the south, and San Martín to the east.

James Scobie (1988, 103) has provided an excellent contemporary description of the city.

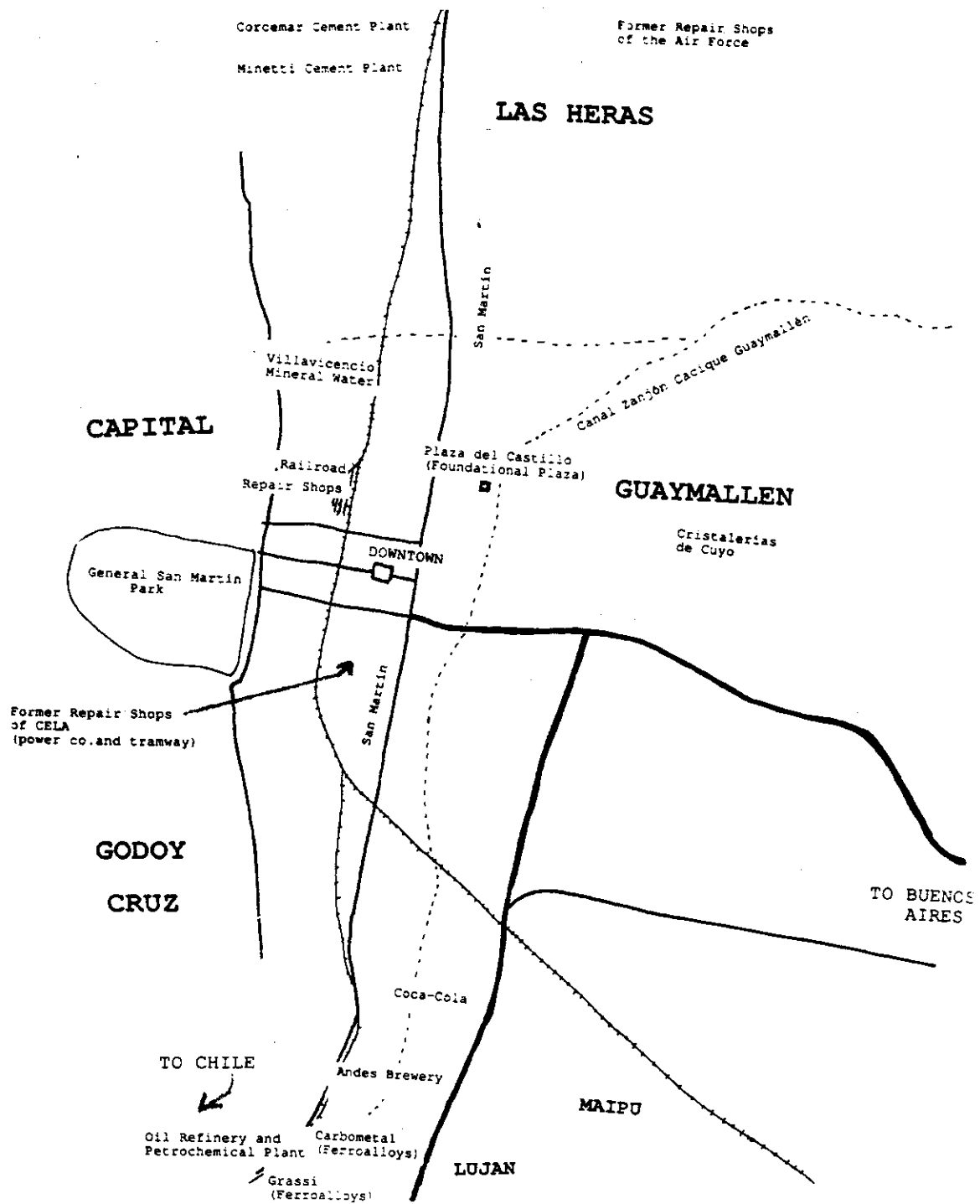
"In the 1980's, the urban area of Mendoza, more correctly referred to as Greater Mendoza, stretches out ten miles to its most distant suburbs and claims a population of over half a million. Set on a semiarid plain at the foot of the Andean Mountains, surrounded by irrigated orchards and vineyards, with growing industrial capabilities and a homogeneous population, Mendoza exudes prosperity and development. Broad avenues and modern buildings immediately strike the visitor's eye. Notable are the activities on the streets, the movement of cars and people, the bright lights and decorated shop windows. Even the hot, arid summer does little to diminish the energies of these people. They walk and talk with determination and decision.

Pleasant tranquillity exists alongside the drive and movement of this city. Beneath the shady cover of poplars and acacias that line the downtown streets, water flows steadily through the acequias, or irrigation ditches, that form refreshing borders for sidewalks and pavement. Attractively arranged plazas with walks, gardens, and trees enhance further the sense of openness and light afforded by the wide streets. Once out of the downtown area, which stretches along the principal north-south Avenida San Martín, one encounters peaceful, shaded streets with modest, comfortable one- and two-story stucco or brick residences".

Yet, the relative and absolute importance of Mendoza in the



Map 4.1. Mendoza, Contemporary Political Divisions and Main Cities



Map 4.2. Mendoza Metropolitan Area, Major Transportation Axes and Location of Industries Mentioned in the Text

Argentinean urban hierarchy owes much to the rapid growth which took place at the turn of the century. Until then Mendoza had had a population similar to other provincial capitals which are today situated further down the urban hierarchy (Scobie 1988). Initially, the transformation of the province would hinge on the large scale production of wine for national markets.

4.2) Manufacturing in Mendoza

4.2.1) The Wine Industry

"Dentro del vino sangra la vida" (Luis Alberto Spinetta)

"...porque en medio del vino la vida se recobra agitando el latido de tierra y del aire" (Armando Tejada Gómez)⁵

Viti-culture, Irrigation, and Government Policies

Called by Mendocinos la industria madre (the mother industry), the landscape, the economy, and the culture of the province has revolved for decades around the wine industry. The motto of the province is La provincia del sol y del buen vino: (The Province of Sunshine and Good Wine). In the name of wine many things have taken place in Mendoza: songs were sung, blood was shed, and people traded their old lands in Europe for a piece of land in this promising region by the Andes. Mendoza cannot be understood without an understanding of the wine industry.⁶

The primacy of wine in the economic and social affairs of the province, however, did not materialize until the last decades of the 1800s. In 1860, the main economic activities of the province were the export of cattle to Chile, the raising of alfalfa to feed those cattle, the making of flour from wheat grown locally, and the cultivation and drying of fruits (Martin 1981, 11). At the time of the Gold Rush, some of the flour was sent to California via the port of Valparaíso on the Pacific coast.

The transformation of Mendoza into the principal wine-making region of the country and one of the most important in the world was a complex process. It involved the local landed oligarchy and the state institutions it controlled, massive investments in infrastructure, the development of new institutional and social arrangements, and European immigration.⁷

In 1873, vines occupied only 10% of the total cultivated area of Mendoza; the rest was taken by wheat (10%), maize (4.5%), and alfalfa (75%). By 1910, vines occupied 45% of the total cultivated area of the province. This tremendous relative growth took place at the same time that all the other crops also expanded. In fact, the cultivated area of the province multiplied nine-fold in the same period through the incorporation of thousands of virgin hectares (Figure 4.1). Naturally, the number of hectoliters of wine elaborated with the grapes produced by these vines also increased, as did the number of bodegas (wine-making plants) (Figures 4.2 and 4.3).⁸ Yet the aggregated figures for the number of bodegas include many which were very small. Figure 4.4 shows that most of the 61 largest wine-making es-

tablishments existing in 1910 were created roughly between 1891 and 1905.

Because of the dry climate, the planting of vines meant important investments in dams, canals, and other irrigation works. At the time of the conquest, the Huarpe Indians had tapped the waters of the Mendoza river using three major irrigation canals. It is believed two of them had been built by the Huarpes themselves with the help of Inca engineers sent from Cuzco.⁹ The Spanish improved upon the existing irrigation system, but no major changes were made until the turn of the century. It was not until then that, based on a major land survey, the whole irrigation system of the Mendoza river was substantially improved by rectifying existing canals, building new ones, and ameliorating the dams from where water was tapped (Ponte 1987).¹⁰

Public agencies were created to regulate the use of water and the drafting of appropriate legislation. In 1871, new water rights were suspended on the Mendoza and Tunuyán rivers' watersheds until a Water Law (Ley de Aguas) could be designed and approved. The law was promulgated in 1884; the following year, a provincial institution was created to regulate the use of water, the Departamento General de Agua (Martin 1981, 29).

The provincial government would also promote technical improvements in wine-making with the help of the national government (Martin 1981, 29). In 1872 an experimental farm and technical school of agriculture were set up on the outskirts of the city, the Quinta Normal y Escuela Práctica de Agricultura. In 1884 an expert arrives to head the newly created National School of Agriculture and to improve wine-making and viticulture. In 1886 the provincial legislature creates the Provincial Chemistry Office (Oficina Química Provincial) to regulate and control the quality of the wines made in the province (La provincia de Mendoza... 1885, 27; Martin 1981, 29; Tacchini n.d., 38-54). Until that time the quality of the wines made in the province had been very poor; they could not compete with those brought from Italy, Spain, and France. In a few decades the bulk of the wines imported from Europe would be replaced by local vintages.

The Railroad

For wine production to attain such a massive scale there had to be a way of reaching with ease the national markets, especially those of the major cities on the east of the country: Córdoba, Rosario, and Buenos Aires. On May 1885 the railroad reached the city of Mendoza. In the five following years wine production tripled (Martin 1981, 27).

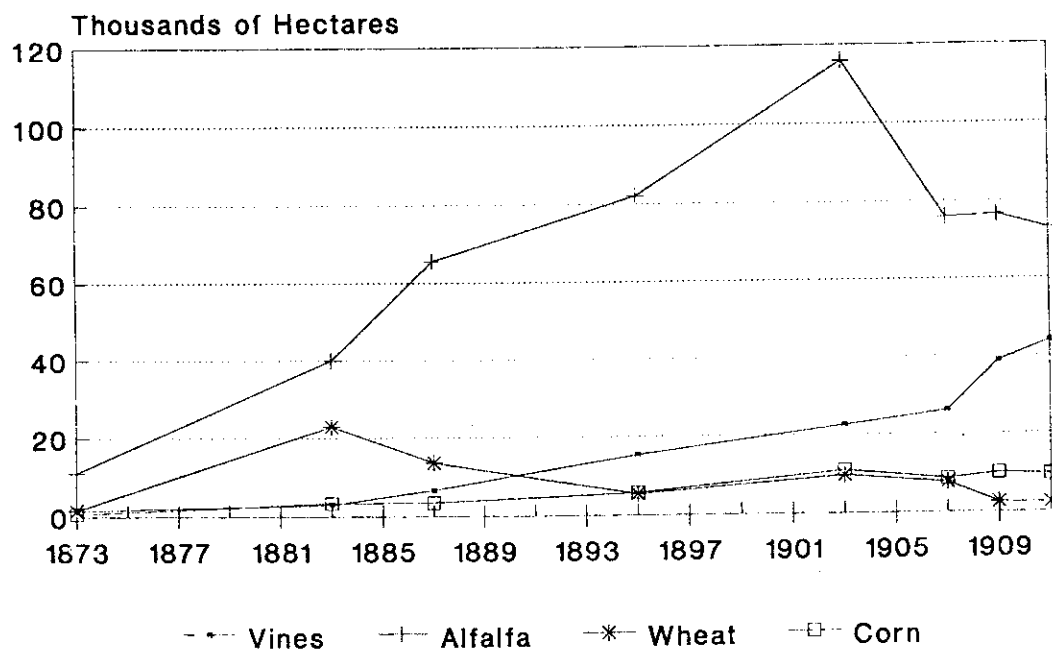
All observers agree that after the arrival of the railroad, important technical changes took place in the wine industry. Substantial investments were made in the bodegas.

"As the making of wine and its commercialization became more sophisticated, the cost of building and maintaining large bodegas increased" (Fleming 1986, 49).

"The mendocinos studied new techniques in grape cultivation and wine-making, installed modern machinery in their bodegas, experimented with a wide variety of vines, and above all, repeatedly reinvested their profits in the industry to promote its development" (Fleming 1986, 53).

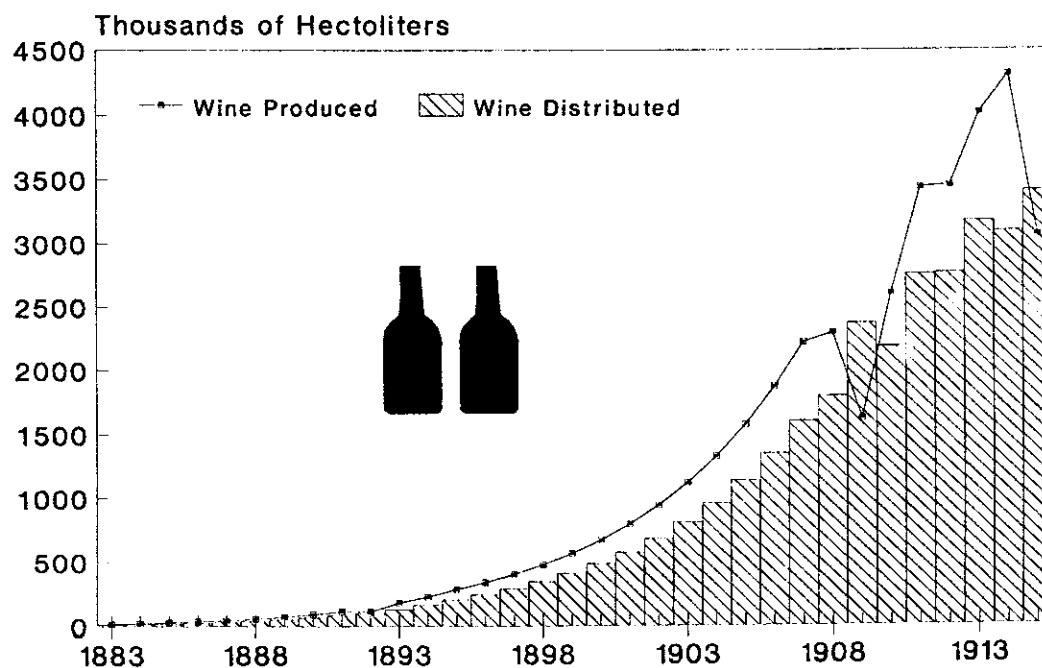
"...the arrival of the railroad to Mendoza in 1885 opened new

Fig. 4.1. Mendoza, Land Planted with Different Crops, 1873-1911



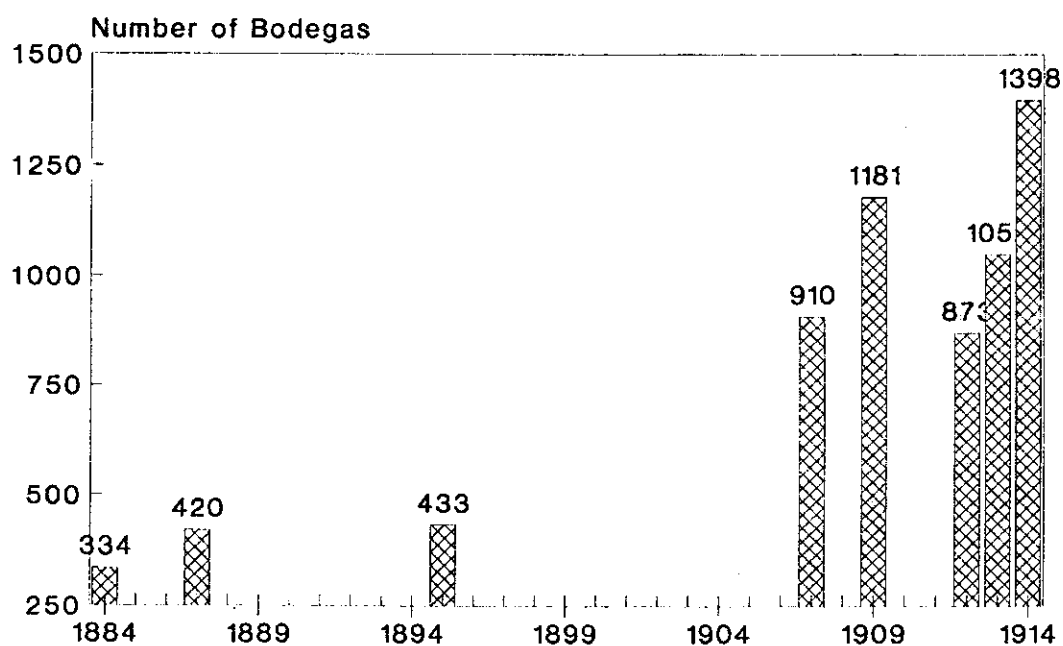
Source: Martin 1981, 180.

Fig. 4.2. Mendoza, Wine Produced and Distributed, 1883-1915



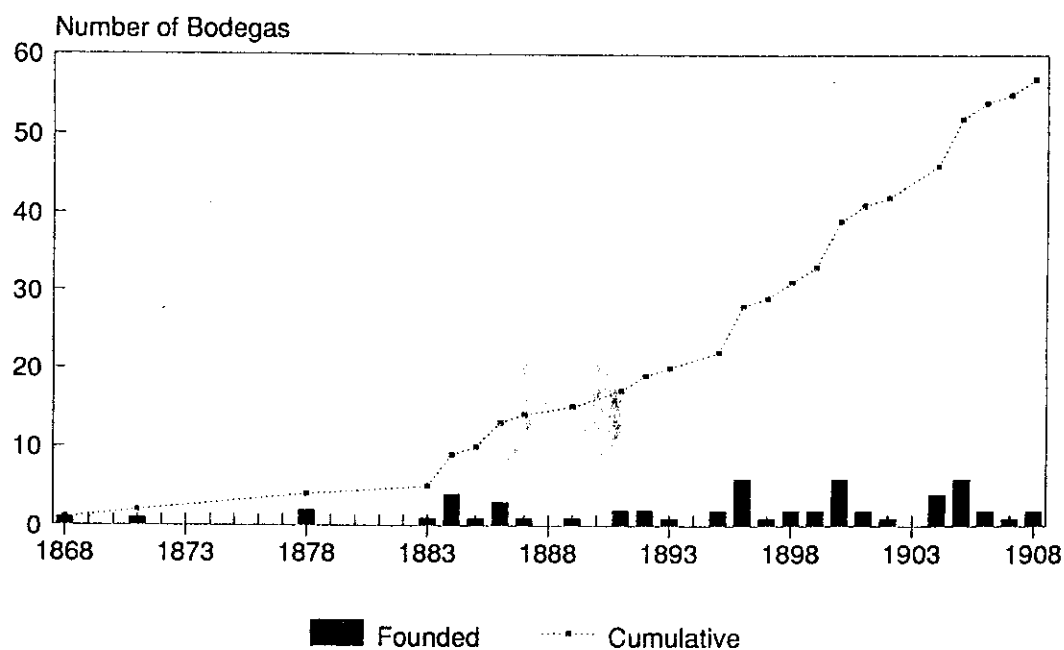
Source: Martin 1981, 191-92.

Fig. 4.3. Mendoza, Total Number of Existing Bodegas, 1884-1914



Source: Martin 1981, 193. Note data are missing for some years.

Fig. 4.4. Mendoza, Dates of Foundation of the Largest Bodegas, 1868-1908



Source: Elaborated from Martin 1981, 226

markets....for its wines and stimulated the growth of the number, size, and mechanization of the bodegas" (Salvatore 1986, 241; emphasis added).

The railroad was also the vehicle to facilitate the arrival of European immigrants who entered the country through the ports of Buenos Aires and Rosario. Until then a large proportion of the commercial traffic had been carried out with Chile. Previously, it took between 35 and 45 days to reach Rosario or Buenos Aires by oxcart (Martin 1981, 26). The railroad continued to be very important well into this century for the quality of the roads outside the major towns was very poor (Gufa 1925; Gufa 1941). It was only in the 1930s that the road network was substantially improved (Lacoste 1991, 16-17, 20-24).

Immigration

The entrepreneurs who directed and led these tasks were mostly immigrants from Southern Europe, mainly from Italy. Many of the workers were also Europeans. In fact, foreigners were over-represented in most of the activities linked to wine-making. In 1895, when the largest immigration wave had not yet arrived to Mendoza, and foreigners constituted about 14% of the total

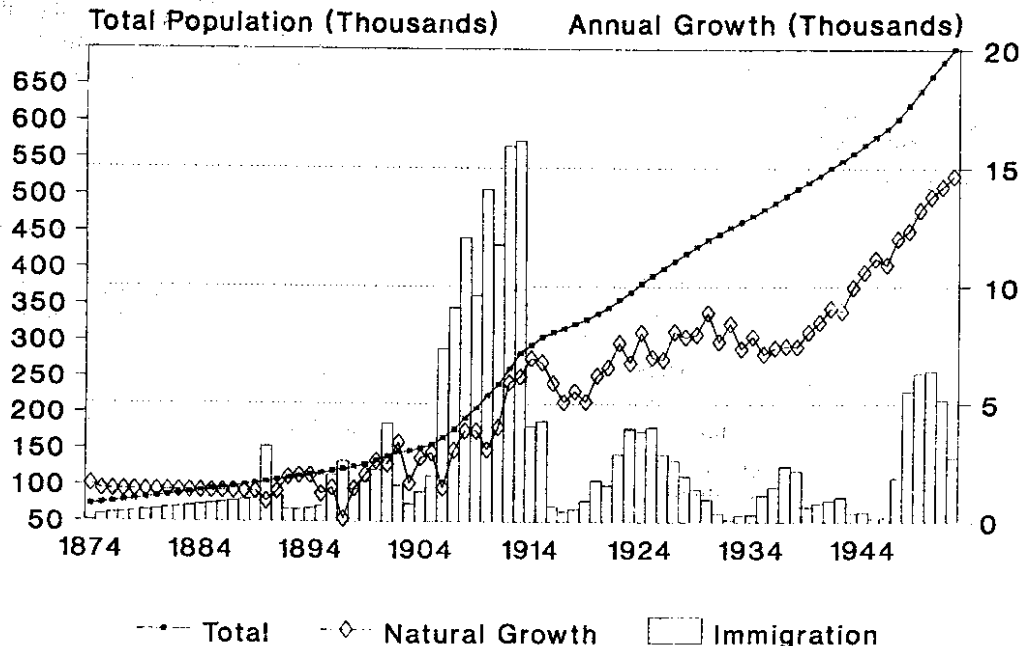
population of the province, foreigners already made up 29% of those employed in the vineyards, 83% of the wine-makers, and 60% of the owners of metalworking shops (Martin 1981, 24; Census 1895; Cueto 1990) (Figure 4.5).¹¹

Foreigners continued to be a very large proportion of those in many of the activities that demanded technical or mechanical skills. Commenting on Biale-Massé account of 1904, Salvatore (1986, 236) says that "...the majority of the workers who were in charge of operating and repairing machinery in the bodegas were foreign as were the majority of the coopers".¹² Well into this century Europeans, but specially Italians, will make up an important proportion of the skilled workers, technicians, and major associates, not only in wine-making, but also in the host of agro-industrial activities that would expand tremendously in the 1940s and 1950s. In 1940, for example, Italians made up 48% of those working in metallurgy and mineral processing, 49% of those in wine-making, and 42% of those in machine shops (Cueto 1990, 69, with information extracted from different sources).

Labor and the Contratista System

In the vineyards, specific forms of labor organization such as the contratista emerged. Under the contratista system, a family

Fig. 4.5. Mendoza, Immigration and Population Growth, 1874-1952



Source: Martin 1981, 182-85.

would be contracted to take care year-round of the vineyards in a property in exchange for a participation in the annual cosecha (harvest). This participation would amount to about 18% of the harvest (CEPA 1984). Contratistas would also receive modest housing and normally the right to cultivate a small plot of land for family consumption (Salvatore 1986). Although at the turn of the century most contratistas were Europeans, contratistas have generally been local folks. The occasional labor needed at harvest time came from the northern provinces and from Bolivia (Cabezas 1976; Sabalain and Reboratti 1980; Whiteford 1975).

Salvatore (1986) argues that the contratista system may be interpreted in two contrasting ways. First, it was a way of introducing new agricultural techniques while at the same time spreading risk between landowners and contratistas. Second, the contratista system assured a much needed (and initially scarce) labor force while it simultaneously provided a vehicle to control and discipline the creole labor force.

In the bodegas, work was organized in different fashions. First there were a number of permanent workers and technicians: laborers in charge of the daily menial tasks, mechanics and skilled workers taking care of the equipment and machinery, and enologists looking after quality and taste. Second, there were substantial numbers of skilled and unskilled workers which were contracted at the time of the harvest and during the months that follow and precede it. Grapes had to be collected and transported rapidly from the fields into the bodega, but there was also a seasonal need for additional skilled workers such as coopers. Coopers and the gangs of workers needed for the harvest were often directed, organized, and hired by contractors, who in turn worked for the wine-makers (Salvatore 1986).

Problems in the Wine Industry

Things did not always go smoothly. Already by the early decades of this century serious problems of over-production emerged in the wine industry. In part, a solution was found by limiting imports from abroad and by prohibiting the production of lower quality wines. In addition, the state intervened directly through the creation of a regulatory board and through its participation in production and marketing. By the early decades of this century it was clear that wine-making was profitable, but profits could not be reinvested in the same activity forever. New opportunities for investment were sought and thus a diversification of the province's economy was needed (Martin 1981). This cry for economic diversification would be repeated many more times throughout this century (Molina Cabrera n.d.; Zapata and Merino 1983; CEPA 1984).

As a result of the crisis of the 1930s, in 1936 and 1937 the provincial government would also dictate a number of laws and decrees oriented to diversify the local economy into other activities and to streamline the wine-industry. Thus, for example, tax exemptions were given to firms setting up new activities in the province. In some cases these exemptions were for 20 years and under their shade several factories were installed in the province: two cement plants and a num-

ber of fruit canning operations, among others. As for the wine industry, the legislation was designed to diversify viticultural products, to promote the participation of wine-making cooperatives into fruit production, and to enhance the role of cooperatives of small and medium-sized producers in the consumer market for wine (Martin 1981, 130). The first substantial move towards a diversification of the economy was in the production and processing of fruits and vegetables: canning and food processing, olive oil, and apple cider.

4.2.2) Agricultural Industries: Fruit Canning, Olive Oil, and Apple Cider

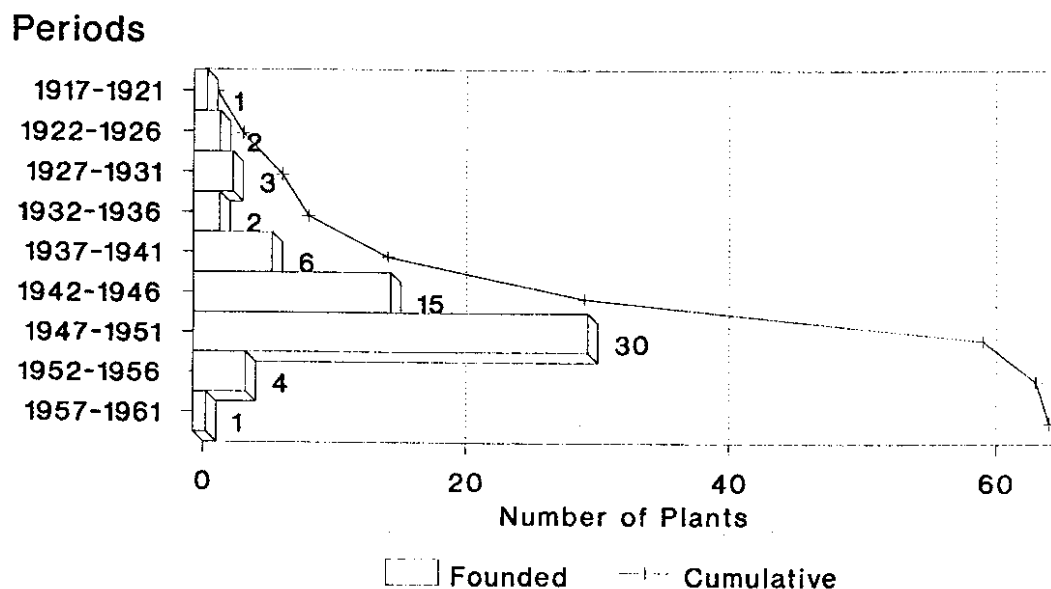
*"En Mendoza, la tierra pa' fruta y la gente pa' bruta"*¹³
(Popular saying)

Even before the age of wine, Mendoza had been a producer of dried fruits. In 1860, 24% of the province's sales were dried fruits (Martin 1981, 124). The establishment of the wine industry in Mendoza at the turn of the century did not displace fruit cultivation though it may have hidden its importance. Vineyards left room for the planting of fruit trees (peaches, pears, prunes) and olive plants and hence from the start many wine makers did produce some olive oil and process fruits.¹⁴ As early as the first decade of this century, there were also a few specialized producers who had gone beyond the widespread family tradition of canning and preserving; these traditions were brought from the semi-rural areas from where most of the immigrants came. In 1904 Biale-Massé visits one of the few establishments where peaches were processed and packed in jars (Biale-Massé 1904 [1985, vol.3, 351]). A 1910 publication also makes reference to the same establishment owned by Juan Serú where peaches were processed industrially (CVN 1910).

However, the big expansion of agricultural and agro-industrial activities outside of wine-making would be one of the results of the crisis of the 1930s. In the 1940s and 1950s these agro-industries will expand significantly: apple cider, olive oil, fruit and vegetable preserves, and canned goods, especially tomatoes (Figures 4.6, 4.7, 4.8, and 4.9). At the same time that the number of processing plants grew so did the extension planted with apples, olive trees, and fruits and vegetables. Thus, for example, between 1924 and 1937 the number of hectares planted with fruit trees in Mendoza tripled, while the extension planted with tomatoes doubled between 1933 and 1942 (Martin 1981, 131).

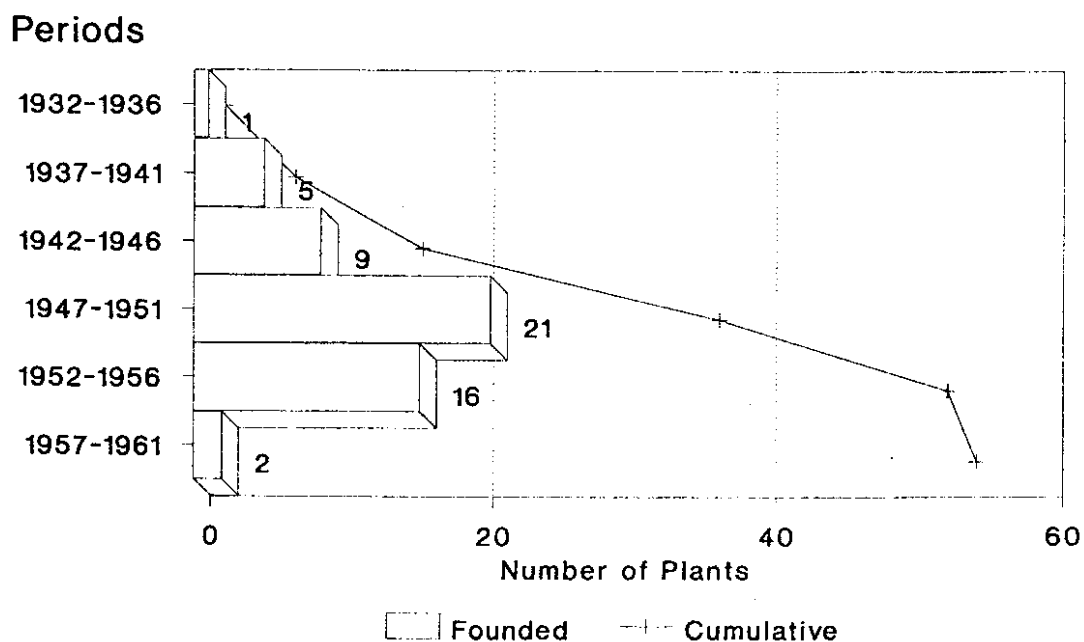
Despite the ups and downs of the wine industry, the extension planted with vines continued to expand, mirroring the expansion of the internal market for wine (Figure 4.10). The market expanded as a result of an increase in population, real wages, and per capita consumption.¹⁵ The new agro-industrial activities also meant the planting of new areas, and the expansion of the agricultural frontier. New dams were built for the provision of water for irrigation and human consumption and for the generation of electricity.

Fig. 4.6. Mendoza, Number of Fruit and Vegetable Canning and Processing Plants, 1917-1961



Source: Martin 1981, 132.

Fig. 4.7. Mendoza, Number of Olive Oil Processing Plants, 1932-1961



Source: Martin 1981, 135

Fig. 4.8. Mendoza, Number of Apple Cider Processing Plants, 1932-1961

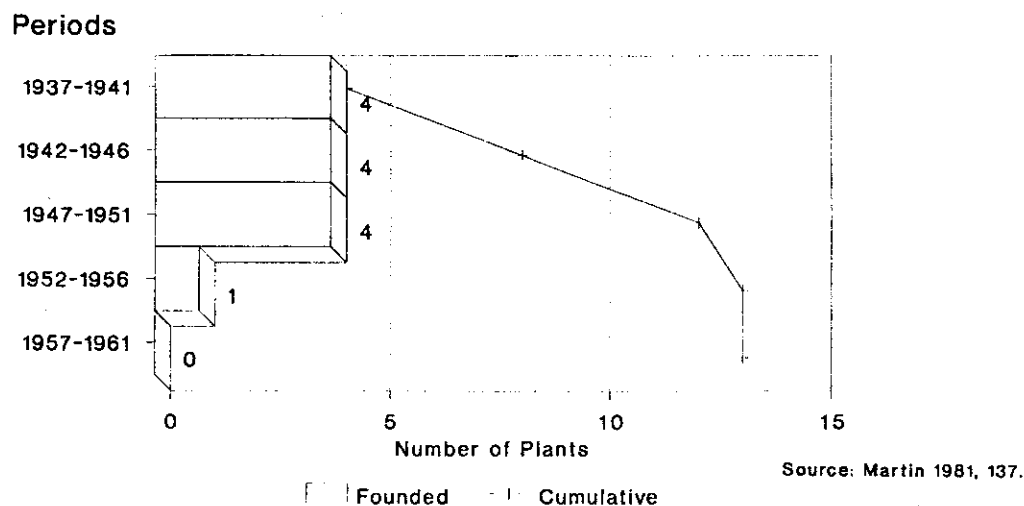


Fig. 4.9. Mendoza, Production of Canned Tomatoes, Olive Oil and Cider, 1938-1961

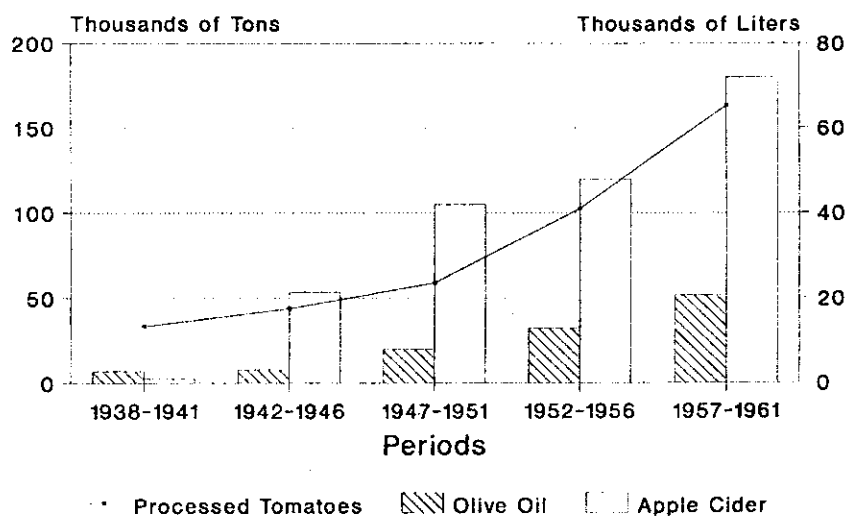
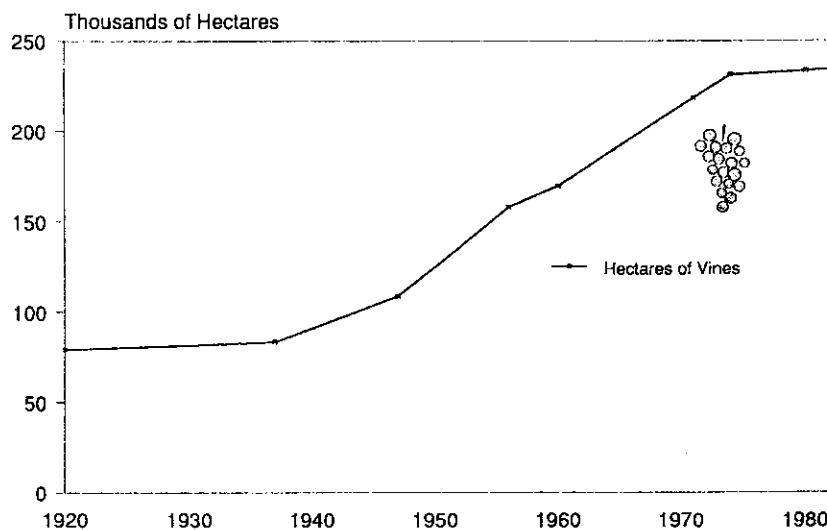


Fig. 4.10. Mendoza, Evolution of the Surface Planted with Vines, 1920-1982



4.2.3) The Mastery of Water: Irrigation, Hydroelectricity, and Groundwater

As pointed out above, because of the dry climate, vineyards and orchards had to be irrigated artificially. Dams and canals were built to tap the little water flowing from the snowfields in the Andes. Since the time of the colony streams were used to generate the power that would move equipment and machinery. For example, along the Canal Zanjón¹⁶ and other irrigation canals, flour mills ground wheat with the help of water wheels that moved with the water flow (Ponte 1987). By the turn of the century, more sophisticated forms of tapping the kinetic energy of moving water were used. The hydraulic turbine had been discovered by Francis in 1849, in the US, and its use quickly reached South America and Mendoza. For example, the machine-tools of the metal-mechanical shop of Carlos Berri operated using 60 HP generated by a turbine on the Canal Tajamar (Album Argentino 1910). In 1904, Biale-Massé reported the use of turbines on the Canal Zanjón to generate electricity for street lighting and household and commercial consumption, and for grinding wheat (Biale-Massé 1904 [1985, Vol.3, 367-369).

In 1910, after several years of efforts that involved the dynamiting of hills and the construction of several kilometers of roads, the German-born engineer and entrepreneur Fernando Fader, set up the first major hydroelectric facility on the Mendoza River, a few miles west of the city. Although Fader's efforts were not met by long-term success¹⁷, others in the province were already working in similar endeavors. In 1903, the Empresa de Luz y Fuerza (Light and Power Company) began providing street lights and in 1912 electric tramways began connecting different parts of the city (Santos Martínez 1979, 162 166; Los Andes 1982).¹⁸

During this century, and especially following World War II, major dams and hydroelectric power stations were built in the province. Although much of the initial works were undertaken by extra-regional companies, local firms acquired experience through time in hydromechanics (turbines), large engineering works, and electricity. The El Nihuil project had been initiated in 1942. By 1947, the first major dam was collecting water. The first hydroelectric power plant only began functioning in 1957. Yet only in 1965, with the completion of a second dam at Valle Grande, did the Nihuil complex begin working in full. That year another dam was completed on the Diamante River at Agua del Toro.

In many areas where water rights could not be secured or where new crops demanded more water than that allocated through irrigation canals, groundwater was pumped into circular metal tanks raised over the level of individual properties. Most of the wells to extract groundwater were drilled in the 1960s and early 1970s. Between 1960 and 1974 the number of wells increased more than three-fold: from 4,190 to 15,536 (CEPA 1984, 12).

4.2.4) Petroleum Extraction and Petrochemicals

The underground of Mendoza not only held water. Petroleum was first commercially exploited in 1885, though there were previous reports of its existence.¹⁹ That year, Carlos Fader, to-

gether with local entrepreneurs, founded the Compañía Mendocina Exploradora de Petróleo to exploit superficial petroleum deposits at Cacheuta (Santos Martínez 1979, 145). Fader was also at the head of two other related projects: the Compañía Mendocina de Gas (street lighting) and a hydroelectric power generation station at Cacheuta (see above). The Compañía extracted 8 million liters of petroleum by 1891. Yet a number of difficulties forced the paralyzation of activities by 1893. After decades of legal difficulties, in 1930, the Compañía transferred its exploitation rights to Yacimientos Petrolíferos Fiscales, YPF (the national oil company created in 1922) (Santos Martínez 1979).

In 1932, the province gave YPF the exploitation of other petroleum-producing areas in exchange for royalties on the volume extracted. Rapidly, new deposits were discovered in several areas of the province.²⁰ In 1937, an oil refinery was built by YPF in the department of Godoy Cruz (Santos Martínez 1979, 199). Five hundred workers and technicians were employed at the refinery in 1939 (Guía 1939, 52). In 1940, a new and larger refinery was completed in Luján de Cuyo, about 20 kilometers south of Mendoza. By 1960, Mendoza had become one of the largest oil-producing provinces in the country (Santos Martínez 1979, 219). The oil refinery set up in Luján by YPF was complemented by a petrochemical complex.

4.2.5) The Beverage Industry: Mineral Water, Soft Drinks, and Beer

Since the early decades of this century, mineral water brought by aqueduct from the hills of Villavicencio was bottled by a private company which had its plant on the outskirts of the city, by the railroad tracks. A 1936 description of the plant depicted the large size of the operation:

"...the mineral waters of 'Villavicencio' [are exploited] on a large scale in the large establishment owned by a private company in the capital of the Province, where water is purified, carbonated, and bottled, under hard to match conditions. The plant is set up with the most perfect elements, a circumstance which enables it to compete with the best in the world, in that specialty" (Sabella 1936, 307).

The plant occupied (and still does) three hectares and even included facilities to make bottles and glass containers (Sabella 1936, 308).

Since the late 1800s, soft drinks and beer were also made in the province under very precarious conditions. In 1921, Cervecería Andes was founded and rapidly became the major brewery in the province. For several decades Andes had an almost complete monopoly on local and regional markets. Andes fused with Cervecerías del Norte in Tucumán in recent years.

4.2.6) Mineral Processing: Cement, Calcium Carburum and Ferroalloys

As a result of industrial promotion laws dictated in the 1930s which provided a number of incentives to firms manufacturing new products in the province, two large cement plants were set up in Mendoza. In 1935, the Compañía Sudamericana Cemento

Portland J. Minetti e Hijos SA Ltda. began production in Panquehua district, Las Heras department, in the northwest part of the city. The ore was taken from quarries five kilometers away by a suspended cablecar to the processing plant. In 1939, more than 250 people worked at Minetti (Guía 1939, 51-52). In 1936, the Corporación Cementera Argentina SA (CORCEMAR) began production close by, in the Capdevilla district, also in Las Heras. In 1939, around 150 employees and workers labored at the plant. Investments made at these plants amounted to 8,000,000 pesos. The total combined production was about 850 tons of cement per day (Guía 1939, 51-52).

There are two major producers of ferroalloys: Industrias Siderúrgicas Grassi and Carbometal. The latter belongs to the Grupo Casale (see section 5.3) and began operating in 1950 (Martin 1981, 175). Carbometal's plant is located in Luján, just south of Mendoza city. Grassi has three plants: Fray Luis Beltrán (founded 1965, also in Luján), General San Martín (1952, in Malargüe), and El Nihuil (1956, in San Rafael). The production of ferroalloys is, like aluminum, an electro-intensive industry. Thus, the location and timing of these plants has been close to the major power stations and has accompanied their development (Chiozza 1979).

4.2.7) Other Industries: Chemicals, Glass, and Tins

Also as a result of policies developed in the 1930s to diversify the economy, a Free Zone for the Elaboration of Alcohol was established in Maipú. In 1936 a number of distilleries set up new plants in the Zone. Some firms also began producing chemicals as a by-product of wine-making. In turn, wine-making and vineyards require a number of chemical products. These chemicals also began being manufactured in the province (Martin 1981, 137-138). For example, vineyards are sprayed several times a year to prevent diseases; wine is stabilized with the addition of certain chemicals. In 1964, Mendoza was one of the major producers of chemical products in the interior (Lindenboim 1982).

The major glass-producing enterprise was established in Mendoza by a number of large wine-makers at the end of the 1940s. The firm, Cristalerías de Cuyo, became practically the monopolistic producer of bottles and damajuanas (five, ten, and 20 liter glass carafes).²¹

In 1949, the firm Centenera (part of the Bunge y Born Group) began producing tin containers for fruit and vegetable canning. Until its recent shut-down, Centenera was, by far, the major producer of tin cans in Mendoza and also held most of the local and regional market (Martin 1981). Yet, a substantial portion of the tin containers for canning was produced by the fruit and vegetable canners themselves (Economic Census 1974 and 1985; Chiozza 1979). Canners sought to integrate such a very different line of production within the enterprise so as to avoid unfair pricing practices from the few firms producing tin cans in the country.

4.3) The Repair and Maintenance Shops of Continuous-Process Industries and Public Enterprises²²

Each one of the industries described in the previous section

involves at every factory or public enterprise a shop and a team (however small) of repairmen and technicians. In addition, we have the shops belonging to large enterprises in public utilities and transportation. Most of these enterprises were private before the 1940s and were subsequently nationalized.²³ Ironically, some of them are now being sold back to the private sector. This group of enterprises includes the railroad, the power company (which originally also held hydroelectric generation stations and the tramway company), the national road service, the Air Force, the provincial irrigation department, the tramway company, and the major bus company.²⁴ Each one of these enterprises had large repair shops.

According to one first-hand observer, in the late 1950s the repair shops of the power company had about 75 people working in several sections: foundry, smithery, carpentry, painting, lathery, welding, and thermal treatments. The shops still had a large proportion of foreign workers (Spanish, Germans, Italians), and were capable of undertaking all kinds of repairs. This ranged from the frequent maintenance of the rolling stock of the tramway to parts of the turbines for electricity generation. To give an idea of proportion, at the same time, only one independent metal-mechanical shop was larger: that of Stasi and Pattini, which at that time had about 100 employees.

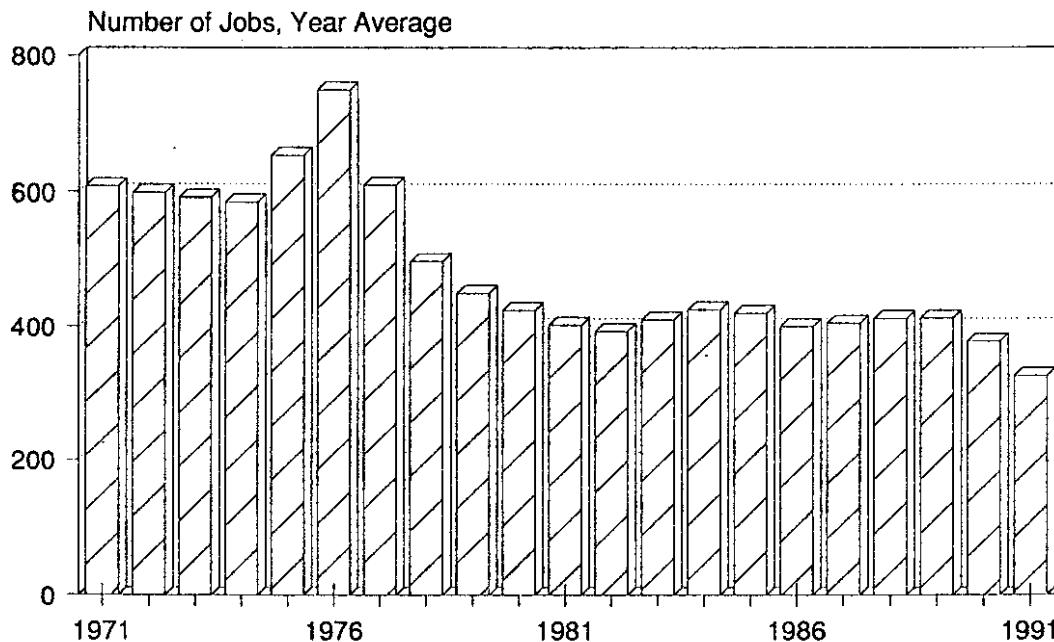
The shops in continuous-process industries and in public utilities and transportation were very important up to the late 1940s. In the wine-industry, the largest bodegas had shops capable of undertaking almost any kind of repair including the casting (in foundries) of parts of the machinery used in wine-making.²⁵ The shops in the bodegas also employed a sizable number of people. Pictures taken in some shops belonging to bodegas show them to be quite important. Some of the larger shops employed between twenty and thirty people (see Mastrangelo and Schmid (1991).

Progressively, the shops in continuous-process industries became smaller and tended to pass on to outside shops all the major repairs. In the public sector, except for the large installations of the railroad, whose labor force was substantially reduced only after the mid-1970s, most repair facilities were downsized in the late 1960s.

Although the railroad arrived in Mendoza in 1885, the first important repair shops date from 1925. That year the traction shop opened and so did the shop in charge of repairing steam engines. The diesel shops would not open until 1957. These shops employed hundreds of workers and important numbers of technicians and engineers. In 1940, for example, the shops of the Ferrocarril Pacífico in the city of Mendoza employed 731 people (Guía 1941, 351).

After the railroad became a state enterprise in 1948, employment in the railroad shops followed politics. President Frondizi's government, for example, in 1961 met workers strikes and demands with a partial closure of the shops. In 1973, when a third Peronist government was elected, and a union leader from the metallurgical union became Mendoza's vice-governor, employment in the shops increased again to reach a peak in 1976. That year the military staged a coup, took over power, and went after employment in the public sector. As a result, employment in the railroad shops began dropping. The new democratic gov-

Fig. 4.11. City of Mendoza, Employment in the Railroad Repair Shops, 1971-1991



Source: Shop supervisor, personal communication. October, 1991.

ernment entering in 1983 and the one that followed did not reverse the direction of the tide (Figure 4.11).

4.4) Linkages to Capital-goods Production

Summing up, to the early specialization in wine-making, other activities were added such as fruit and vegetable canning and processing, fruit and vegetable cooling and packing, petroleum extraction and refining. In turn, all of the agro-industrial activities were connected to supporting tasks in the fields: irrigation and water provision, preparing the soil, pruning and fumigating the plants, protecting the crops from hail and frost, among others. Tractors and trailers had to be mobilized for the fruits of the land to reach the factories. The bodegas and processing plants themselves had to be built. Machinery and equipment had to be constructed or brought and put into place. Buildings and machines had to be maintained, upgraded, and eventually replaced.

Irrigation means tapping and taming the streams and directing their power and course. Dams, gates, and canals had to be designed, constructed, and maintained. Irrigation and the works involved in this activity went hand in hand with the erection of hydroelectric power stations. The extraction of water and petroleum from under the surface of the earth involves the use of drills, pumps, pipes, and tanks in addition to the geological equipment needed to locate and monitor the extraction of these fluids.

The semi-artisanal production of soft-drinks and beer in the late 1800s and early 1900s gave way to the establishment of a large brewery in 1921 and large soft-drink bottling plants in the 1930s and 1940s. These forms of consumption accompanied

the expansion of the middle classes in the 1950s and 1960s. The nature of the industry, constituted of low-cost, big-bulk products, played in favor of the establishment of local bottling plants.²⁶








The same can be said about mineral processing and mining-related activities. It is much more cost-effective to process minerals *in situ* than to ship the unsorted ore to the market. Though the similarity between mineral processing and the beverage industry ends there, both activities involve the use of a variety of equipment and machinery that demands regular maintenance and attention. Wine-making and the beverage industry in general link backward to glass making and chemicals. Wine-making also was the basis for the emergence of a number of forward chemical activities. Finally, the establishment of enterprises in public utilities and transportation incorporated immediately to the local milieu large repair and maintenance shops.

There are here a number of potential backward linkages to capital-goods, or in Hirschman's (1987, 210) words "constellations of linkages". Yet this does not imply, as we will see, that they will necessarily materialize locally. Although a number of elements played in favor of the development of a capital-goods industry in Mendoza, there were none of the initial necessary "factors" that would prompt the emergence of this industry. Machinery and equipment used in the rest of the local economy was largely imported; there was no skilled labor nor specialized suppliers of goods or services. In addition, the capital-goods industry did not receive until the last decade or so any favorable treatment from the provincial or national government.²⁷ Yet, as we will see in the following chapters, over several decades a capital-goods industry developed in the province.

Figure 4.12. Wine-Making and its Linkages to Capital-Goods Production

AGRICULTURAL TASKS	Linkages to Capital-goods
Preparing the soil	Earth-moving equipment, Agricultural machinery and implements
Fumigating	Fumigating implements
Pruning	Hand tools
Protecting plants from hail and frost	Smoke-producing machines, metal nets, small rocket launchers.
Irrigation	Earth-moving equipment, metal locks to divert and direct water, underground water extraction equipment (pumps, filters, drilling machines, metal reservoirs), large gates for dams, hydroelectric generation equipment (turbines, power lines, electrical equipment)
HARVEST ACTIVITIES	Linkages to Capital-goods
Collecting the grapes	Hand tools, panniers or <u>tachos</u>
Transporting the grapes	Tractors, trailers
WINE-MAKING	Linkages to Capital-goods
Crushing the grapes	Crushers
Fermenting	Vats (made out of metal, cement, or wood)
Pressing	Presses
Moving musts and wines	Pumps
Filtering	Filters
Cooling and stabilizing wine	Cooling equipment
Aging	Vats made out of different materials
Bottling	Bottling machines
Labeling and packing	Labeling and packing machines
Regular and annual maintenance	Parts and devices of different machines

Fig. 4.13. Mendoza, Chronology of Industrial Development Since 1885

1885	Arrival of the railroad	
1885-1914	Viticulture and wine-making	
1925	First railroad repair shops	
1930-60	Fruit canning and food processing	
1930s	Establishment of two cement plants	
1940-	Hydroelectricity	
1930s	Petroleum extraction and refining	
1960-74	Extraction of underground water	
1960s	First exports of machinery by local firms	
1975-85	A local capital-goods producer achieves annual sales of over 100 million dollars	

NOTES

CHAPTER 4

¹ In fact, as we will see in this chapter and in the next, these repair and maintenance shops make up a "grey zone" that defies statistics.

² The historic region of Cuyo included also the province and city of San Luis, to the east of Mendoza, on the road to Buenos Aires. Today, Cuyo includes only the provinces of Mendoza and San Juan.

³ Argentina is composed of 23 provinces and one federal district. Each province is divided into departamentos or partidos, as they are called in the province of Buenos Aires.

⁴ In 1991 the Mendoza Metropolitan Area was home to 973 thousand people (census 1991).

⁵ In English these quotations would read: "In wine bleeds life" and "...because amidst wine life comes back agitating the beat of the earth and the air". L. A. Spinetta is a very popular composer, musician, and singer in Argentinean rock music. A. T. Gómez is a popular folk singer, composer, and poet from Mendoza. Gómez's quote was taken from "Tonada del buscador", out of the collection *Tonadas de la piel*, as it appears in the cover of Benito Marianetti's (1972), *Mendoza la bien plantada*.

⁶ Yet even today no single and comprehensive account of the economic history of wine in Mendoza has been written. A number of partial works have been written (see the Bibliography). Moreover, despite the importance of Mendoza in the world production of wine, general historical works omit it (see Unwin 1991).

⁷ In time it coincides with the devastating effects of a vine disease called phylloxera. Phylloxera destroyed much of the vineyards of the Southern European countries in the latter part of the 1800s (Martin 1981; Loubere 1990).

⁸ There is no straightforward equivalent in English of bodega. A bodega is what the French call chateau.

⁹ On this topic see, for Mexico, Doolittle (1990).

¹⁰ The Cippoletti dam on the Mendoza River and the Medrano dam on the Tunuyán River, just south of Mendoza city, date from 1889 and 1894 (Morris 1969, 103).

¹¹ Forty percent of the employees working in these shops were also foreign (see section 5.2.1 of this monograph).

¹² In 1904, Biale-Massé was sent by the Argentinean government to investigate the status of the country's working class. Biale-Massé visited most of the interior of the country and wrote a voluminous and immensely interesting report. Biale-Massé travels and writing were undertaken in the face of growing discontent among laborers with their working conditions and at the time of growing popularity of anarchist and socialist ideas.

¹³ "In Mendoza, the land is for fruit as people are brute".

¹⁴ For example, Jules Huret, a French traveller who visited Mendoza at the turn of the century, observed that fruit preserves were also made in the large bodega of Antonio Tomba (Martin 1981, 124).

¹⁵ The annual per-capita consumption of wine doubled between the 1930s and the early 1970s from 42 to 90 liters (CEPA 1984, 2). The early 1970s, however, marked a peak in per capita consumption and in recent years the figure has dropped substantially (CEPA 1984, 13).

¹⁶ An irrigation canal (still in existence today) that marked the eastern limits of the colonial city (Ponte 1987).

¹⁷ A flood swept away his power generating facility at Cacheuta only three years after it was inaugurated. Legal problems with another firm in the business ended with Fader's bankruptcy and his self exile to the Cordoba hills where he pursued painting, another of his abilities. Today he is better known for his artistic rather than for his entrepreneurial achievements, so much so that his house on the outskirts of Mendoza has become a provincial museum where his works are exhibited.

¹⁸ Since 1889 the city had had gas illumination and since horse-powered tramways.

¹⁹ In 1783 and 1787, for example, there were reports of "streams of tar" in Cacheuta (close to Mendoza city) and in Sosneado (in the southern part of the province). Un-refined petroleum mixed with fat was used to waterproof containers for the transport of wines, liquors, and moonshine in the late 1700s and early 1800s. Petroleum from Mendoza was presented in the *Exposición Nacional de Córdoba*, 1868-74 (Santos Martínez 1979, 184-85).

²⁰ The new areas of petroleum production were Potrerillos, Pampa Amarilla, Sosneado, Malargüe, and Llanqueto. In 1938, Tupungato became a new area of petroleum production. Additional deposits were discovered in the 1940s.

²¹ Ludovico Pattini, the co-founder of the most important metal-mechanical enterprise in Mendoza in the 1940s and 1950s, was the person in charge of mounting *Cristalerías* machinery. He was sent to the US to buy the equipment and he personally supervised and directed the installation of the plant.

²² Manufacturing industries can be classified in two large groups: continuous and discontinuous (also called sequential processing and component-assembly systems, see Sayer and Walker 1992, 111). The first groups industries that produce goods in a continuous sequence that is rarely divisible. The latter includes industries that harbor a number of discrete processes and tasks which may or may not take place within the same workplace and in the same sequence. Examples of continuous-process industries are petrochemicals, cement, and meat-packing. Examples of component-assembly systems are household durables, machinery, and automobiles.

²³ The railroad was taken over by the government in 1948 (*Los Andes*, March 1, 1948).

²⁴ We are referring to Ferrocarril General San Martín (before Buenos Aires al Pacífico), Agua y Energía Eléctrica de la Nación, Energía Mendoza Sociedad del Estado (before Dirección Provincial de Energía and still before Compañía de Electricidad de Los Andes), Dirección Nacional de Vialidad, Dirección General de Irrigación, Fuerza Aérea Argentina.

²⁵ Centro Viti-vinicola Nacional (1910).

²⁶ Coca-Cola, for example, has a number of bottling plants throughout the country and serves regional markets from bottling plants located in most cities. This natural protection also helps to explain the survival of some local soft-drinks in some provinces despite the fierce competition of the major multinational brands. Before the concentration of the last decade, the beer market was also contested by several regional producers: in Mendoza, Tucumán, Santa Fe, Córdoba, and Buenos Aires.

²⁷ Something which contrasts sharply with most of the other economic activities of the province, such as wine-making.

CHAPTER 5

LINKAGES AND GOVERNANCE SYSTEMS IN HISTORICAL PERSPECTIVE.

THE CAPITAL-GOODS INDUSTRY OF MENDOZA, 1895-1990

In this chapter we begin to probe the premises outlined in Chapter One. Premises cluster around two major objectives. Objective one analyzes the changing pattern of linkages of capital-goods firms in the city of Mendoza, from 1895 through 1990. Objective two examines the transition in the way of organizing production in the capital-goods industry in Mendoza, Argentina. Each objective is disaggregated into three premises. Premises related to objective one deal with linkage generation, subcontracting, and the effect of linkages on the intra-city location of firms. Premises connected to objective two point to:

- (i) the transition in linkage structures and in the agreements and practices governing those structures, (ii) the combination, coexistence, and clash of new and old structures and governance systems, and (iii) the emergence of new types of firms and institutional arrangements.

Although this chapter covers the period 1895-1990, it does not present (nor does it attempt) a complete historical account of the evolution through time of linkages and governance systems. The chapter opens with a discussion on the origins of the capital-goods industry of Mendoza; an origin which some writers have situated after the 1930s, during the first import-substitution period (see Chapter Three). Here we argue that despite the openness of the economy to outside competition at the turn of the century, technical characteristics of the wine industry and a series of non-tariff barriers permitted the emergence of a capital-goods industry in Mendoza as early as 1895. This coincides with evidence provided by other studies dealing with the development of manufacturing in Buenos Aires (see Chapters One and Two).

In a general way, this chapter and Chapters Six and Seven also aim at highlighting the role of the capital-goods industry in the economic and social development of Mendoza. What is most surprising about this industry is how little attention it has received in any account of the history of the province or even of wine-making. The influence of these manufacturers in the way most goods have been produced in the province has certainly been substantial, yet almost no one has written about them. Even their presence in the rapid and titanic transformation process at the turn of the century (Chapter Four) has been negated, as we will see in the next paragraphs. For these reasons, this chapter aims to redress this gap in the literature.

This chapter also shows how firms in the capital-goods industry of Mendoza generate their own linkages as they grow. Examples include labor, subcontractors, clients, and services. The idea of linkage generation is also used to show how economic groups grow. These examples illustrate the complex processes associated to the integration (and disintegration) of tasks embodied in the historical development of the division of labor. Put another way, the emergence of new firms is the expression of a deeper vertical and horizontal division of labor. The provision by the firms themselves of certain services unavailable in the local milieu is an instance of the specific historical circumstances limiting the social division of labor. Seeing the growth of economic groups through the lenses of the division of labor provides a fresh perspective on a major economic and social issue in Argentina and other semi-industrialized countries.

Before we begin our discussion, a brief overview of the capital-goods industry of Mendoza and of some methodological details will situate the case study in context. The capital-goods industry is part of the metal-mechanical industry. The latter groups a number of firms of different sizes which make metal products, equipment, and machinery. The former includes only those firms which make equipment and machinery for other industries, such as for example crushers and filters for the wine industry or turbines for the generation of power. The metal-mechanical or metal-working industry of Mendoza is the fourth in importance in Argentina after those of Buenos Aires, Santa Fe, and Córdoba. The last economic census (1985) reveals that this manufacturing industry in Mendoza had over 1000 establishments which employed 8600 people. The metal-mechanical industry represented about 20% and 14% of the establishments and personnel employed in manufacturing in the province for that year, respectively. Most of the employment and value of production of the metal-working industry of Mendoza is accounted for by capital-goods producers.

Part of the field-work undertaken in Mendoza consisted of a survey of 43 metal-mechanical firms carried out from October, 1991 through March of 1992. Most firms employ over five people and produce capital-goods. All the firms visited are located in the Mendoza Metropolitan Area. Additional interviews and secondary sources complement this survey. More details can be found in section 1.6 and in the Appendix.

5.1) The Emergence of a Capital-goods Industry in Mendoza

Some researchers have noted —mistakenly I believe—that the expansion of vineyards and wine-making in Mendoza in the decades from the 1880s to the 1910s had not led to the appearance of other industries. For example, Balán (1979, 35) using data provided by the census of 1914, writes:

"No agricultural machinery or manufacturing equipment of any kind was produced in Mendoza; no casks for the conservation or transport of wine were made, nor were bottles or corks. The [wine-making] industry had integrated from the growing of vines to the elaboration of wines, musts, and alcohol, and their commercialization. Yet this process had not given way to the emergence of other specialized industries".¹

In his view, the capital-goods needed for production, and the consumer goods demanded by the workers employed in the wine-making complex, came from outside the region, from Buenos Aires and from abroad. Balán (1979, 38) argues that the development of both types of industries in Mendoza was inhibited mainly by the openness of the local economy within a developing capitalist national system.² This meant that local elites could and did negotiate favorable conditions with the national government to support the development of the wine industry in exchange for political support. The same kind of explicit support did not exist for a capital-goods industry, at least not in the early decades of the century.

Yet, two elements which Balán does not take into account favored the local producers of machinery and equipment. One was the technical characteristics of wine-making, the other the non-tariff barriers protecting local manufacturers. The development of the wine industry in Mendoza generated a strong and only partially met demand for custom-made machinery and for the undertaking of the annual overhaul of the equipment and the minor repairs and modifications that were needed. Demand was met by shops inside the bodegas and by independent firms. The process has been identified by other authors.

Cueto (1990, 73), for example, basing himself on equipment exhibited at the Museo del Vino (Wine Museum)³ and on daily newspaper information on the arrivals of machinery to the Mendoza train station, affirms that:

"...even before 1900 are found already rudimentary copies of those imported models, in wood or metal, produced in Mendoza....The importance and magnitude of these shops transpires clearly in the notable reduction of wine-making machinery registered as coming from Europe, since 1914" (Cueto 1990, 73).

Even Balán's account, based on balance statements of a major bodega at the turn of the century, shows that large amounts of capital were invested in the bodegas, but only some of that corresponded to imported machinery and equipment.

"....in a bodega it was very significant the work undertaken locally and accumulated through time, in plants, wine, warehouses, and productive equipment. Among the important items in the inventory, only the vats were all imported...."

The bodega....was....open, spatially and functionally to the [lo-

cal] environment. [It was]....dense in activities, depended on the environment....The bodega [needed to have]...repair shops...." (Balán 1979, 25-26).

As we saw in Chapter Four, the repair shops were very large and capable of undertaking all kinds of tasks, including foundry, coopers, and mechanical repairs. Yet, already as early as 1895, there were a number of independent shops capable of undertaking all kinds of tasks and even of making some equipment. As we will see in the following sections, local capital-goods producers enjoyed a number of non-tariff advantages.

The census of 1895 reveals without doubt the presence of a metal-mechanical industry in Mendoza and of a few producers of machinery and equipment.⁴ Now at that time, perhaps most of the capital-goods production was part of the bodegas. That is why a look at secondary data (such as census data) does not reveal the precise size of capital-goods production. Since repair and maintenance is an integral part of the capital-goods industry, then a substantial part of the industry is hidden from scrutiny (see section 4.3). As we argue at length in the methodological appendix, ready-made categories (as census categories are) might not be helpful at the time of carrying out a study such as this one. In fact, the census hides a substantial portion of the capital-goods industry under the "wine-making" category.

That there was a fluid relationship between these repair and maintenance shops and independent producers is shown by the fact that skilled workers and technicians moved between these workplaces (see section 5.1.2 below). However, the movement seems to have been outward from the bodegas and other large undertakings in what amounts to a broader social division of labor.

Yet the size of the independent metal-mechanical industry in 1895 was not negligible. The total capital invested in these firms was equal to the value of "all the equipment used in production"⁵ of two of the largest bodegas in the province: Tomba and Benegas (Figure 5.1). Sales realized during 1894 by these shops equaled almost three times the value of the buildings of Tomba and Benegas;⁶ and we should bear in mind that most probably the sales figure is lower than the actual sales volume for that year.

The metal-mechanical industry of Mendoza in 1895 had 84 establishments which employed 409 people, only 11 of them women. As shown in Figure 5.2, most of them are one-person shops or very small outfits.⁷ Yet we already find larger undertakings dedicated to the repair and production of machinery, carriages and carts, and metal construction. Information on these shops is summarized in Figure 5.3, which lists 15 firms with six or more employees.

By the turn of the century, then, we can begin to speak about the emergence of a capital-goods industry in Mendoza. This contradicts some authors' interpretations of the historical development of manufacturing in Mendoza and in Argentina in general (see section 3.4.1). Import-substitution began —to some extent— much before the 1930s, as it is commonly argued. The development of a capital-goods industry can be examined by looking at how firms dealt with problems of labor, subcontractors, clients, and services.

Fig. 5.1. Mendoza, The Relative Size of the Metal-Mechanical Industry in 1895

<u>Bodega Antonio Tomba y Hnos.</u>	
Permanent Employees:	47
At harvest time:	82
Value of production equipment:	250,000 (m\$N)
Value of bldgs. used in production:	100,000
Annual expenditures in wages:	40,000
<u>Bodega Tiburcio Benegas</u>	
Permanent Employees:	74
At harvest time:	204
Value of production equipment:	300,000
Value of bldgs. used in production:	100,000
Annual expenditures in wages:	25,000
<u>Metal-Mechanical Industry</u>	
Total employment:	409
Value of sales during 1894:	595,314
Value of bldgs. used in production:	159,425 (a)
Value of production equipment:	191,535 (b)
Value of inputs being processed:	204,970 (c)
Value of total assets (a+b+c)	555,930

(m\$N) All monetary values in pesos moneda nacional.

Source: Original schedules, 1895 Census.

Figure 5.2. The Metal-Mechanical Industry of Mendoza in 1895

ACTIVITY	NUMBER OF FIRMS							
	Occupation per Shop (Number of People)							
	1	2	3	4	5	6-10	11-20	21-50
Smithery	6	16	7	4	3	4	1	
Smith/Carpentry		2	1		2	2		
Smith/Other	1				1			
Body Shops	1	4	1	1	2			
Carriage Shops	1			1		1	2	
Tin Shops	2	3	1	1				
Silver Smelter								1
Mechanical Shops							2	2
Others	2	1	2	1				
TOTAL	13	26	12	8	8	7	5	3

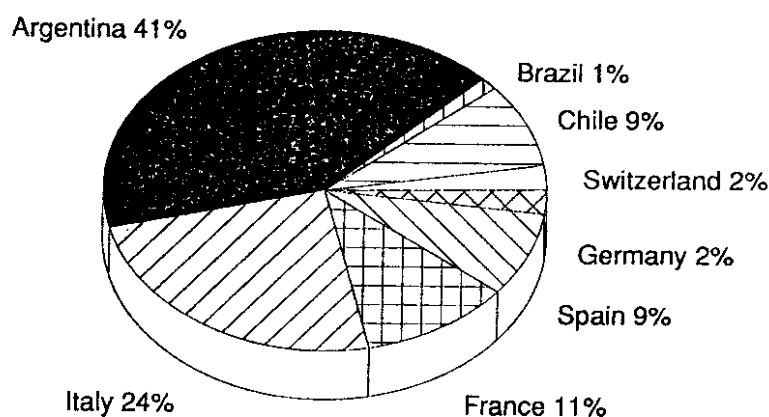
Source: Original Schedules, 1895 Census.

Figure 5.3. Mendoza, The Top Fifteen Metal-Mechanical Establishments in 1895

NAME OF THE OWNER	ACTIVITY	PEOPLE EMPLOYED	ASSETS (in pesos)
Giacomo di Antonio	Smith/Carpentry	6	4,000
Felipe Baigorria	Smithery	6	1,800
Benedicto López	Smithery	7	5,500
Luis Peserutti	Carriages/Carts	7	4,000
Isidro Pereira	Smith/Carpentry	8	2,000
Juan Caligari	Carriages	8	10,000
Juan Chaine	Smithery	10	3,000
Otto Arnold	Carriages	12	10,500
Reinaldo Yungs	Carriages	13	34,500
Torre dela Rosendo	Vars./Construcc.	16	40,000
Stopyrel/Wittenstein	Smithery	18	90,500
Baldés y Miret	Mechanical shop	20	45,000
Carlos Berri	Foundry, mech.shop	25	45,000
Soc.Minera Uspallata	Silver smelting	25	46,000
Roger Michel	Agricult. machinery	50	101,000

Source: Original schedules, 1895 Census.

Fig. 5.4. Mendoza, National Origin of Shop Owners in the Metal-Mechanical Industry, 1895



Source: Elaborated from Census 1895.
Shops total 83.

5.2) The Generation of Linkages through Time

5.2.1) Labor and Subcontractors

Labor

On one end of what used to be the favorite promenade of the Mendocinos at the turn of the century —the Alameda—today stands a statue which commemorates Mendoza's most famous blacksmith: Fray Luis Beltrán.⁸ Out of the hammer, the anvil, and the billow of Beltrán and his aids came the cannons and the bayonets of the Ejército Libertador (Liberating Army) that in the 1820s would, like Hannibal's armies over the Alps, pass over the Andes to defeat the Spanish in Chile and Perú. Mendoza, as other areas of the interior of the country, had had since the time of the colony artisans and blacksmiths who would make and repair objects in iron, copper, and bronze.

Yet it is not until the late 1800s that we begin to find larger shops which make and repair equipment, machinery, and metal structures.⁹ In time it coincides with the arrival of the first major wave of European immigrants, the technical upgrading of viticulture and wine making, and the change in the commercial orientation of the province, with the arrival of the railroad to Mendoza in 1885, from Valparaíso (Chile) to Rosario and then to Buenos Aires (see Chapter Four).¹⁰

The new shops did not rely completely on European labor and skills. In his official visit to Mendoza in 1904 Biale-Massé noted that in 1874 Mendoza "had the best shops of the Interior of the Republic, which satisfied all the population's needs". Many of those shops lost their artisans as a result of the battle of Santa Rosa, part of the revolution of 1874 (Biale-Masse 1904 [1985, vol.3, pp. 344-47]).¹¹

Hence, artisans were replaced by European entrepreneurs and skilled workers in the metalworking shops of Mendoza in the last decades of the 1800s. Thus, the census of 1895 reveals that almost 60% of the shops were owned by Europeans, a majority of them Italians, but also Spaniards, Frenchman, and Germans (Figure 5.4). The Europeans arriving in Mendoza were, on average, more skilled and had more resources than the native craftsmen and entrepreneurs.¹² Thus, in contrast with the figures for owners, sixty percent of the workers were born in Mendoza or in other provinces of Argentina; the remaining 40% was made up of foreign-born workers.

The high proportion of Italians in the labor force of the province and particularly in the metal-mechanical industry will continue well into this century. This will give the industry a large measure of cohesion. The last important arrival of Italians takes place right after the Second World War (Chapter Four). As late as the 1940s and 1950s first-hand observers report that in many shops the majority were Europeans with Italians making up a substantial proportion of them (Interviews in Mendoza).

When skilled laborers were not brought directly from Italy, they were trained in the shops themselves. Even though as early as 1918 the province had a technical school, where mechanics, woodworking, and mechanical smithery were taught,¹³ all

throughout the century most training was done inside the shops (see next section below).¹⁴ Labor became skilled through an apprentice system. The system was regulated as part of the substantial modifications introduced by Perón in working conditions, in the 1940s. Apprentices, who until then had been paid according to the whim of the shop owner, were now assigned by law a minimum salary. Yet, despite the modifications introduced by Perón, the system has survived until today.

With Peronism also came an expansion of technical education and the establishment of the Universidad Tecnológica.¹⁵ A number of high schools, which taught basic skills in addition to the usual high school curricula, were established. Apprentices were also taught their skills in more formal "schools" in the larger work-places: the railroad, the tramway maintenance shop, and some of the largest firms. For example, the railroad set up an Apprentice School (Escuela de Aprendices) in 1958. IMPSA, today's largest capital-goods producer in Mendoza, has a Centro de Capacitación Técnica (Technical Training Center), named after the firms' founder, Enrique Epaminondas Pescarmona. The center coordinates a number of training activities which take place in-house, and in national and foreign institutions. New skills are taught in both production and management, for technicians, engineers, and workers (Banco Provincia 1987; Pescarmona 1989).

Medium and large firms have not only begun sending people abroad, but they are pooling resources to train people in short courses offered at local universities and at ASINMET, the association of metallurgical enterprises. There are also some fairly recent attempts at bridging the traditional gap between, on one side, technical colleges and schools, universities, provincial government, research centers, and on the other, the firms. For example, a plan called Plan Dual provides students of technical high schools the opportunity to work part-time at one firm and acquire practical experience during the last year they are enrolled. The main university in Mendoza, the Universidad Nacional de Cuyo, has recently signed an agreement with a number of local firms, most of them in the metal-mechanical industry, whereby they have established a foundation which would bring both sides closer.

The previous paragraphs show firms in fact created their own pool of labor. Even though since very early in the century the city had formal institutions where workers and technicians learned basic skills, firms continued to rely on their own systems of training. An apprentice system provided the framework for learning and socializing. Some firms even developed their own internal schools. More recently, firms send skilled workers and technicians abroad, and pool resources to train employees from different firms. Firms not only solved in large measure their own labor needs, but by doing so they contributed to an expansion of the industry. As we will see in the next section, most firms were created by skilled workers who left the very enterprises where they had learned their trade.

Subcontractors

Because firms' boundaries are ill-defined, in-house training spilled outside the physical limits of firms and despite firms' efforts to retain human capital skilled workers and technicians left and set up their own enterprises.¹⁶ Indeed, one of the major

channels through which the complex of firms reproduces itself is through the movement of skilled workers. As can be seen in Figures 5.5. and 5.6, through time some skilled workers left the shops where they had learned their skills and moved to set up their own establishments, frequently beginning with work provided by their former bosses. Figure 5.5. shows what we may call a genealogical tree of firms covering the whole period of study. The tree shows the movement of skilled workers among enterprises, the development of subcontractors, and spinoff effects. These processes give continuity in time to the industrial complex. As Storper and Walker (1989, 111) put it:

"Any successful industrial center spawns a succession of technologically interconnected activities, linked by movement of personnel, continuity of firms, spinoffs of new companies, and common university and government ties".

The creation of new firms meant some vertical disintegration, but also horizontal disintegration of production. In other words, not all new firms became subcontractors. Many firms emerging from other firms became their competitors. Often the firms created by skilled workers who left a firm resembled their former enterprises. They produced the same products for the same or similar markets and made use of the network of suppliers and acquaintances they had made in their previous job.

Thus, contrary to conventional theory, firms did not emerge after a network of subcontractors was already in place. On the contrary, new firms developed at the same time subcontractors did.

Founding a firm and succeeding was not and is not an easy task, as we can see from the career paths of three skilled workers summarized in Figure 5.6. Yet, as I will argue further on in this thesis, founding a firm was much easier before the mid-1970s than it is now. There are some obvious reasons, such as deteriorating salaries and shrinking local demand, but perhaps more important in the long run is the speed and nature of technical and organizational change. Before, it was possible for a gifted man with little schooling to add talent to hard work in order to succeed in the adventure of founding a firm. To the technical knowledge he had stored in his head through years of work he could add the friends and acquaintances he had made inside the industry and among potential clients. Since the late 1970s that is changing. Much of the new technical information is now more difficult to grasp without formal schooling and cannot be as easily transported. Strong and expanding markets are not anymore at home, but overseas.

5.2.2) Clientele

Just as in very few industrial sectors there are ready-made suppliers, so too is a clientele built over time. During the period from 1895 up to the 1930s, local metal-mechanical firms were much less protected from foreign competition than in the following decades. Yet, many of them were able to convince local clients as to the advantages of buying their products (see section 5.1.1, above). Firms moved quickly from the repair of machinery into the production of new equipment. Some of the equipment and machines were copies of those coming from Europe (see section 5.1.1 above).

Many firms which began representing European and North American companies in local markets in time moved into the making of machinery themselves. These firms carried catalogs from foreign companies and were also in charge of the installation and maintenance of the machinery brought from outside the country. In many cases, local producers began making slightly modified copies of machinery made in the Pampa region, on the eastern side of the country. For example, agricultural machinery geared to tasks associated with grain and cattle production was adapted to the needs of vineyards and orchards (Pérez Romagnoli 1987).

Until the 1960s their market had been mainly local, regional, and for some firms national (Figure 5.7). The producers of equipment for the wine industry served the wine-making region paralleling the Andes chain: from Río Negro in Northern Patagonia, to La Rioja, Catamarca, and Salta in the Argentinean Northwest. The manufacturers of equipment for the extraction of ground-water and irrigation catered to a large area extending from the arid Patagonian plateau to the boundary with Bolivia in the north, following the arid diagonal that scars Argentina from the southeast to the northwest. The makers of pumps, drills, and other metal parts used in the petroleum industry sold in a region which corresponded to the arid parts of Argentina. To some extent, so did the firms which built canal gates and the enormous mechanical metal structures which make possible the production of hydroelectricity.

As early as the 1960s (and perhaps sporadically before) capital-goods producers in Mendoza began exporting, mainly to Latin American countries.

"Some of these establishments, Cónдор and Rouselle, export to several South American countries; the latter firm, for example, has sent to Chile, Colombia, and Uruguay equipment for distilling and for wine-making" (Marzo and Inchauspe 1967, 475).

This process of internationalization was also taking place in other industries and in other areas of the country at the same time, as a number of researchers have noted (Ablin et al. 1985). Yet Figure 5.8 shows most firms have only begun exporting in the last 15 years. As is true of a number of other industries, the main foreign market has been Latin America, especially neighboring countries.

Their ability to compete with foreign producers of machinery was based on a number of non-tariff advantages; most of them are even true today. Advantages include the physical closeness of clients,¹⁷ the opacity of capital-goods markets, the existence of non-tradable goods and services (non-tradables, post-sales services, reconditioning of used equipment), the lack of planning by users, and the time it takes to import.

Figure 5.5. Mendoza, The Development of a Capital-Goods Complex, 1895-1990

Fundición de Berri (1888-1935?)	Fábr. de Carruajes Otto Arnold (1887-1924?)	Michel Roger (1890?-?)
		Talleres Metalúrgicos Rouselle (1897)
Industrias Metalúrgicas Pescarmona (1907)		
	La Metálica (1915-1928)	
Talleres Stasi (1921-1962)		Talleres Ferrocarril (1925)
	Talleres Cía. de Electricidad de Los Andes (193?)	
Frannino (1935)		
	Talleres Cóndor (1945)	Arquímedes Rossi (1945)
La Victoria (1951)		
	Electra (1956)	Inquimet (1955)
		Talleres Fuerza Aérea (194?-197?)
Byron Jackson (1965)		
	Kobe (1962)	
Gasquet Sudamericana (1965)		Silvestrini y Barbier (IMDEC) (1968)
	Talleres San José (Cartellone) (1970?)	
	Metalúrgica/Aceros Cartellone (1980)	IEF Sudamericana (1978)

(PART A: Main Firms)

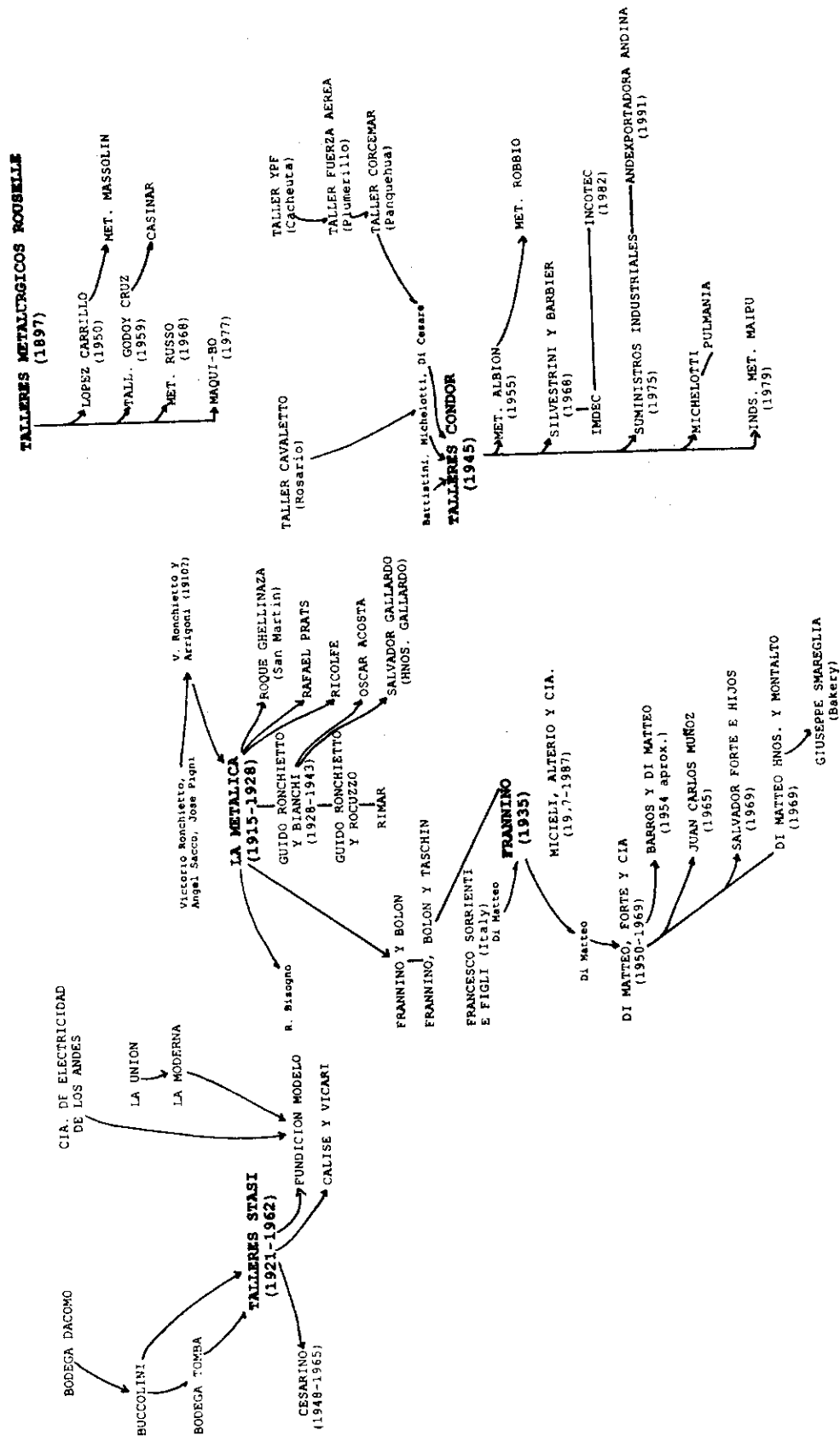


Figure 5.5. Mendoza, The Development of a Capital-Goods Complex, 1895-1990 (PART B: The Emergence of Firms and The Movement of Skilled Workers, Some Examples)

Figure 5.6. Mendoza, The Career Path of Three Skilled Workers in the Capital-Goods Industry

DI CESARE

EXPERIENCE

- Born +1922
- 1937-42 Repair shops of YPF, the national oil company, in Mendoza
(Apprentice)
- 1943 Repair shops of the Air Force in Mendoza
(Mechanic/draftee)
- 1944 Repair shops of YPF
(Lathe operator)
- 1944 Repair shop of Acevedo y Shaw (Construction Company)
(Shop supervisor)
- 1945 Repair shop of Corcemar (Cement processing plant. His father was the shop supervisor)
(Lathe operator)
- 1945 With Battistini and Battistini's father bought a firm called Nadal (bronze foundry). The new society became Battistini y Di Cesare, and later Talleres Metalúrgicos Cóndor, de Battistini y Cia. (Wine-making, food processing, and agricultural machinery). This was one of the top firms in the 1960s and early 1970s.
- 1974- Di Cesare left Talleres Cóndor and founded Suministros Industriales (Industrial services and supplies)
- 1991- Founded Agroexportadora Comercial (A firm which makes garlic oil)

(PART A)

Figure 5.6. Mendoza, The Career Path of Three Skilled Workers in the Capital-Goods Industry

RUSSO		
	EXPERIENCE	STUDIES
Born 1939		
1952-55	Terranova shop, Bologna, Italy (Apprentice)	Technical School
1955-60	Tecnicagua (Irrigation equipment) (Lathe operator)	Industrial High School National Technical Institute
1960	Mercedes Benz Repair shop (Machinist)	
1961-63	Mercedes Benz Repair shop (Inside subcontractor)	
1963-67	Talleres Metalúrgicos Rouselle (Wine-making equipment and related machinery) (Technical draftsman, Designer, and Production Supervisor)	National Technical University (3 years)
1967-68	Byron Jackson (Petroleum equipment) (Quality control)	
1969	Talleres Metalúrgicos Mendoza (Wood- working machinery) (Shop supervisor)	
1968-	Metalúrgica Russo (Founder and owner)	

ACOSTA	
	EXPERIENCE
Born +1919	
1933-39	Ronchietto y Bianchi (Wine-making equipment) (Apprentice)
1939-44	Maintenance shop of Bodega Arizu (His uncle was the supervisor) (Lathe operator)
1949	Senitram (Foundry and equipment repair) (Lathe operator)
1949-50	Chelle (French firm which imported and made wine- bottling equipment) Chelle sold business to Cristóbal Santos (wine-bottling and heavy metallurgy)
1950-59	Founded firm with Loyo: Acosta y Loyo
1959-	Loyo left and Acosta incorporated his sons Acosta e hijos (Equipment for bottling <u>gamaianas</u> or 5 and 10 liter garrafas)

Source: Interviews in Mendoza, 1991.

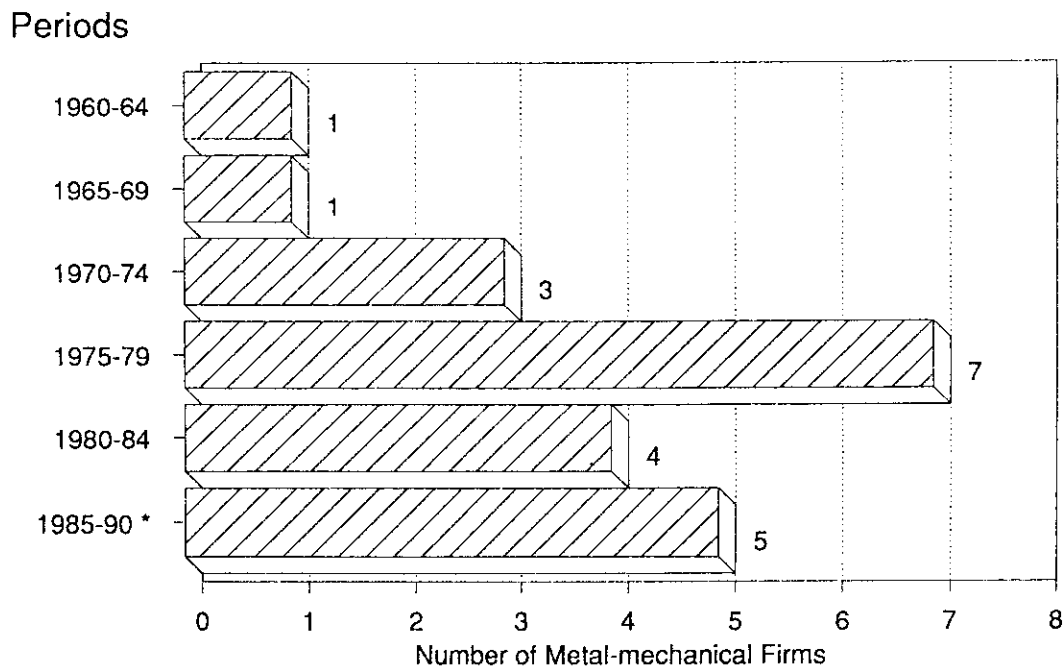
(PART B)

Figure 5.7. Mendoza, Location of the Customers of the Major Capital-Goods Producer, 1949-1962

PROVINCES	NUMBER OF FIRMS	
Mendoza	578	Local
San Juan	73	Regional
Buenos Aires	13	National
City of Buenos As.	7	
Rio Negro	6	
Santa Fe	4	
Tucuman	2	
Santiago del Estero	2	
Cordoba	2	
Others	3	

Source: Sales' papers of Stasi. Courtesy of Ing. Stasi, Mendoza.

Fig. 5.8. Year in Which Exporting Firms Made their First Sale Abroad



Source: autor's survey, oct-dec 1991.

The Regional Economy as a Territory of Learning

As argued elsewhere in this thesis, the comparative advantage in the internal and external market of the local capital-goods industry emerges from its intimate relationship with the main economic activities of the province.¹⁸ It is not by chance that Mendoza has become the leader in South America in the wine-making equipment market. In the same manner, it is not by chance that from Mendoza have emerged a number of firms which make equipment for water extraction and irrigation and which have big market penetration in the Andean countries.

Indeed the very close relationship between industrial activities in Mendoza and the capital-goods industry has its origin in the repair and maintenance shops of large *bodegas* at the turn of the century. As we saw in Chapter Four, both the continuous-process industries that emerged in the 1930s and 1940s, and the transportation and public utilities enterprises, had sizeable repair shops. These shops existed because neither the *bodegas*, the cement plants, nor the tramway could instantly find an outside shop that would be able to do the maintenance and repairs that were needed from the start.

The close relationship between manufacturers and users of capital-goods in Mendoza grows out of the non-standardized characteristic of both demand and supply. Manufacturers produce most machinery and equipment upon request. Or, in Sayer's words (1986, 120), "...particularly for custom products... seller-user proximity is critical." Therefore, the market for capital-goods is not as transparent as the one for intermediate inputs or for commodities, where generally it is fairly simple to define a product's characteristics.¹⁹ The market for capital-goods is hence relatively opaque. It is opaque because both demand and supply are segmented and because it is difficult to define the characteristics and price of the machinery produced.

The opacity of the markets where manufacturers and users of capital-goods converge

The opacity of the capital-goods markets has to do with the following elements. First, there is one fundamental characteristic of the product: it is custom made. Even in capital-goods which are relatively standard, such as complete lines for wine and soft drinks bottling, the possible combinations of elements, capacity of the line, and their disposition in terms of plant layout are virtually infinite. Custom made means that there is necessarily much interaction between buyer and seller. This interaction reaches an extreme when what is sought is the solution to a problem which has not been fully solved previously (see Chapter Six). Truly, in this case what is being carried out is an experiment in which client and manufacturer participate, but in which the initial roles begin to blur, for the buyer is contributing to build its own solution. The need for this kind of close and continuous interaction makes the markets opaque, for neither the client nor the manufacturer may launch a big search (of manufacturers or clients) each time they need to solve a problem. This close working relationship entails a considerable investment of time and money; the best way to make it profitable is to continue the relationship in time.

There are at least two other elements which contribute to the

opacity of the capital-goods markets of the type described here. One is the variety of machines and equipment made to meet a host of needs. However, markets are different not only in terms of the products, but also in terms of the clients who comprise each market. Large market segmentation appears, which, to the untrained eye seems homogeneous. In Argentina, however there is a great variety of clients with multiple demands.

At the same time, the opacity of these markets impedes commercialization in remote countries. For example, firms with significant sales in the United States, have had to establish agreements with firms in that country or they have set up commercial and technical offices.

Non-tradable goods and services

The most extreme case of protection includes goods which cannot be sold internationally and for which the protection from other producers outside the country is practically absolute. The other side of this protection is the almost complete inability of the producers of these goods or services to place their goods in other national markets. Several factors are at play here. First, we have those parts and processes which almost necessarily (due to the frequent and continuous interaction) have to be contracted to local or regional firms, or, at most, to national firms. These include the majority of the tasks carried out by specialized subcontractors: foundry, machining, thermic treatments, and paint. The need for interaction is even greater in the case of non-specialized subcontractors (see section 6.2.2).

Second, among goods and services which are not easily tradeable internationally we have those which, for a number of reasons, do not have a foreign market counterpart or, at most, more than one or two Latin American countries. Included in this group are firms which produce capital-goods for small, culturally-bounded, niche markets. For example, the manufacturers of machinery to bottle liquids in *damajuanas* (five, ten, and 20 liter carafes) are in this group as are firms specialized in the repair of makes and models of equipment little known outside the country.

The installation of the equipment sold, the repairs, maintenance services, and everything that would fit into post-sales services constitute other forms of non-tariff protection enjoyed by local firms. Particularly at harvest time, when time is precious for wine-makers and other firms in agriculture, to be close by (or today a phone call away), even for minor problems, is a big advantage local producers of capital-goods have had over foreign competitors.²⁰

The repairs and the reconditioning of used equipment is an activity that cannot easily be matched by firms operating outside Argentina. It is, moreover, even doubtful whether there is a margin for extra-regional enterprises, such as those from Córdoba, Buenos Aires or Santa Fe. This situation is compounded by the lack of standardization of parts among similar equipment manufactured by different firms. The repairs' markets are even further segmented.²¹

The periodic repair and upgrading of existing equipment and machinery constitutes a substantial proportion of industrial in-

BODEGA	
Machinery bought	270,500
Accessories	26,100
Inputs for in-house maintenance	18,858
Repairs contracted to outside shop	14,080

Source: Sales papers of Stasi. (In pesos moneda nacional for the period 1956-63).

	1983	BREWERY 1985	1987
Machinery bought	156	70	1500
Repairs & maintenance	394	313	1175

Source: Balance statements. (In thousands of US dollars).

Figure 5.9. Mendoza, Expenditures in Machinery and Equipment in a Bodega and a Brewery

vestment. Figure 5.9, shows repair and maintenance as a proportion of total investment made by two firms, one in a 10-year period, 1950-60, and another in a 5-year period, 1984-88. Although there are no full sets of data for all firms because of confidentiality and disclosure concerns, my six months of field-work indicate that these proportions are probably similar among other firms.

Traditionally, the machines made in Mendoza for these industries are built to last many years. The main parts of these machines last decades and are made of cast iron or steel, while most of the rest is stainless steel or aluminum.²²

The Lack of Planning by Users

Another form of protection of local markets is the lack of planning by users. Or as a firm's manager puts it: "users have no plan of use". This also makes it impossible, in turn, for the importer to plan ahead, since for some kinds of equipment, a certain volume must be imported to make the operation profitable. For example, with respect to tubes for the extraction of underground water one of the owners interviewed reflects:

"The guy cannot import only a few meters.... the costs he has [in terms of] port, getting it out of customs [desaduanes].... is the same for 100 meters as for 1000 meters".

The Time it Takes to Import

Lastly, but not unimportant, it has to be highlighted that the traditional elements of protection to foreign competition have played and continue to play a large role. Even today, transport

BRANCHES	MACHINERY, EQUIPMENT, AND TOOLS (in thousands of pesos spent during 1973)
Food and Beverages	6,853
Non-Metallic Minerals	428
Metal Products Machinery & Equipment	1,132
TOTAL Auto-construction	8,413
Total Bought from National Producers	115,686
Total Bought from Foreign Producers	10,716

Source: Census 1974.

Figure 5.10. Mendoza, Auto-Construction of Machine-tools in Manufacturing by Branch in 1973

costs continue to be relevant. But perhaps more relevant is the effective time it takes to import a machine from Europe or the US; even today it takes no less than six months. This makes an instant response by an importer about a local request impossible and, conversely, enables a local producer to take an order, even promising to deliver a few months down the road.

In addition to freight, expenses associated with the change in transport medium (break-in-bulk factors), and unloading charges, must be added to the expenses. There are telephone and fax charges, bank expenses, commissions, and tariff rates with which to contend. Although tariffs have not always been high (such as before the 1940s and in recent years) they constitute a substantial portion of the total expenses.²³ A local firm estimated that at the beginning of 1992 a machine used in the wine industry and costing about US\$ 32,000 in Italy would get to Mendoza at no less than US\$ 50,000, or almost 60% more than the original FOB price in Italy.

To sum up, in this section we have reviewed the elements which have played in favor of the development of a clientele for local producers. As we saw at the beginning of this chapter, even in the absence of tariffs protecting and nurturing indigenous capital-goods production, as early as 1895 we can identify a capital-goods industry in Mendoza. The elements we have identified include: the physical closeness of clients, the opacity of capital-goods markets, the existence of non-tradable goods and services (non-tradables, post-sales services, reconditioning of used equipment), the lack of planning by users, and the time it takes to import. At least the first three sets of elements have to do with the interaction between clients and producers. In many cases, however, because producers have emerged from the repair shops of clients, the distinction is hard to make.

5.2.3) Services

As it has been argued elsewhere, services is a catch-all category which englobes a number of activities which fall outside manufacturing, agriculture, and resource extraction (see Sayer and Walker 1992, 56, for a critical review). We have chosen three kinds of services which today we would normally expect to find outside of the firms themselves. In the following paragraphs electricity, machine-tools, and information will be used as examples of services which the firms themselves had to internalize because they were not available locally.

The following paragraphs also tell us something about services and the division of labor. Conventionally it is argued that services are separated from manufacturing. Yet, many services are the product of a deeper social division of labor (Sayer and Walker 1992, Chapter 2).

Electricity

Up to the first decades of this century, the major shops had to generate their own electricity. The census of 1895 reveals that a few had steam machines while others tapped hydraulic energy from streams and canals (see Chapter Four). A publication from 1910 tells us that the establishment of Carlos Berri—one of the major metal-working shops of the time—had a 60 HP turbine that was propelled by the water running on the Canal Tajamar (Album Argentino 1910). The energy was transmitted to the dozen machine-tools in the shop through pulleys attached to a long movable metal rod in turn connected to the turbine. The large repair and maintenance shops inside the bodegas also needed electricity. As in the case of independent metal shops, each bodega had its own source of energy. Another publication of the initial decades of this century provides us with similar examples. The first example is from the Bodega Barraquero, a major wine-making establishment located very close to the shop of Carlos Berri.

"All the complicated machinery inherent to the fabrication and conservation of wine elaborated in such large proportions moves by way of a 200 HP electrical motor which provides light and power to the bodega".

"The machinery of the Calise Brothers... moves with [the electricity of 100 HP] provided by a waterfall".

In neither of these cases, then, did lack of a central power plant stop these entrepreneurs from producing. The production of electricity was only one more hurdle to be dealt with, and not a service to be purchased from outside the firm. Not even the lack of machine-tools to work metals stopped firms from producing.

Machine-tools

During the two wars and at other times, machine-tools could not be imported from abroad and were built by the shops themselves. As argued in section 5.1.1 a firm is both a producer of goods and of technological knowledge. That is, through production a firm makes and learns how to make, and more so in the case of capital-goods producers. Because they fabricate

machinery and equipment, they are more thoroughly versed in the use of materials and mechanisms towards the solution of specific problems. During the course of field-work in Mendoza I found firms which built some of their machine-tools for metal-working by themselves. This was a consequence either of the impossibility of importing them from abroad during the two world wars, or of their high cost in the absence of credit mechanisms. In most cases, machine-tools were copied and built without the use of any charts, relying solely on memory, manual and mechanical dexterity, and passion.²⁴ Before the age of electronics it was indeed possible to make in-house and even with limited resources lathes, stampers, and other machine-tools.

A very interesting case is that of the firm headed by Stasi and Pattini, a firm which was the top metal-mechanical enterprise of Mendoza from the late 1930s until the early 1960s. In the early 1940s the firm received an order from Cervecería Quilmes, already at that time one of the largest beer brewers in the country, and located in Quilmes, then a town 40 kilometers south of the city of Buenos Aires. The order involved the construction of large metal parts for a new set of filters at the brewery. The firm of Stasi and Pattini did not have the large vertical lathe needed to machine these parts. Since they were not able to get the tool, they built it themselves.

Other cases we might mention are those of Enrique Buccolini who, some decades back, also built a vertical lathe, which is still used at the shop now headed by his son in General Gutiérrez, a district of Maipú, a few kilometers southeast of Mendoza.²⁵ Pedro Bajda, born in Slovenia, devised his own system, hand-tools, and equipment for the construction of coopers. Rafael Prats designed his own primitive lathe with scraps and used the traction of his Model T Ford to move it.

Currently, in Mendoza, machine-tools are still being built by the firms themselves as Figure 5.10 shows. Data were taken from a publication of the census bureau. From this we can infer that the phenomenon is widespread. Also note in this figure that the auto-construction of machine-tools and other equipment and machinery is also present in two other industries besides metal-working. These industries are food and beverages and non-metallic mineral products, two industries which have large plants with important repair and maintenance shops.

The auto-construction of machine-tools is a phenomenon that has been recorded by other authors in other places of Argentina and in the rest of Latin America (see, for example, Katz 1986; Kantis and Delgobbo 1991). It is also something that I have been able to observe in surveys of small and medium-sized firms in the metal-mechanical industry of the Avellaneda and Quilmes districts, in the southern part of the Buenos Aires Metropolitan Area.

The examples of electricity and machine-tools pertain to the area of production and are temporarily placed at the turn of the century and the two world wars. With time, firms have begun requiring more and more technical information. Because that information has rarely been available locally, outside the firms, enterprises have had to devise their own systems of acquiring it.

Information

Most observers agree that the stars of the capital-goods industry of Mendoza before the 1960s were the shop and foundry of

Carlos Berri and B. Balducci (1888-1928), the establishment of the Ronchietto brothers (1915-1943), and the firm founded by Alberto Stasi and Ludovico Pattini (1921-1962).²⁶ Yet none of these enterprises had research and development facilities (R and D), however peripheral. Not even the shop headed by Stasi, which had almost 700 clients in the last decade of its existence, and had enormous facilities spread over four hectares, devoted space or manpower to R & D. Some old timers in the industry argue that perhaps that was the key to the collapse of Stasi.

In any case, until then, technical information remained mostly in the memory of those who had decades of experience building equipment, copying machines, and improving existing designs to meet new challenges. In part the situation was a left-over from an era in which most of those in the industry—even those at the head of shops—had very little formal education beyond a few years of elementary school. For example, no plans were drawn of existing models, nor did people see the need to systematize the available information. In the early 1960s two firms (who became the leaders well into the 1970s) set up technical departments. The central task of these departments seems to have been the drafting of plans and sketches of existing models. This made it easier to modify and improve products. Technical information had become an important component for market share by the 1960s.

The drafting of machine-plans was accompanied by an extremely quixotic gesture: the creation by some firms of their own archives and research libraries. Two of them remain so important even today that students and professors from local colleges and universities resort to them. One of the libraries is part of the provincial library system and it is certainly much more important than the libraries at any of the colleges of engineering at the national university in Mendoza (Universidad Nacional de Cuyo). It subscribes to over 220 technical journals and has more than 6000 volumes. The other is less open to the general public but facilitated the writing of several theses of students from Mendoza and San Juan. This library currently subscribes to 50 journals although for many years it received about 150 periodicals.

In this section we have looked at how firms solved a number of problems through the generation of linkages. We have looked at this problem using the examples of labor, subcontractors, clients, and services. Labor and services were instances of inside linkages, clients and subcontractors of external linkages. Next we turn to an examination of a very specific case of linkage, though widespread in Argentina and other semi-industrialized countries. We are referring to the creation of separate firms within a holding by banking on internally developed expertise. Previously, that expertise had been constructed to solve an internal problem.

5.3) The Economic Group as an Extreme Case of Linkage Generation

The economic group is an extreme case of linkage generation. Although economic groups vary by origin, here we are referring to a group of legally separated firms owned by the same shareholders and with inter-connected directorates. Some studies have been carried out on economic groups in Argentina and

Latin America (see sections 1.7.4 and 3.5), and elsewhere. Most of this research, however, has concentrated on the country's largest groups based in Buenos Aires, despite evidence of the existence of a number of economic groups in the interior of the country.

One important way for economic groups to grow is the identification of unmet demand through the solution of their own day-to-day problems. In other words, because these large organizations function in economies where, as Fajnzylber (1990) would have put it, there are many empty cells, they continuously run into problems which cannot be easily and readily fixed by calling a specialized firm from outside the holding. Once these firms have had to find a solution to their difficulties by calling on in-house talents and resources, and by incurring what are sometimes substantial expenses, they can then bank on the acquired expertise and on a market that they know no one has yet exploited. This pattern of expansion suggests that economic groups pull themselves up by their bootstraps.

Examples taken from two economic groups in Mendoza will illustrate this process. One example is the Grupo Industrial Casale, the other Industrias Metalúrgicas Pescarmona Sociedad Anónima (IMPISA). The two firms had their origins at the beginning of the century with the arrival to Mendoza of two immigrants: Pablo Casale and Enrique Pescarmona. Until today they have remained largely family firms. Casale specialized in mining and mineral processing, while IMPISA was for many decades essentially an enterprise dedicated to the construction of large metal structures. The heydays of Casale were the 1960s and early 1970s, whereas IMPISA became a major firm and then a conglomerate during the 1980s.

In 1979 four firms constituted the Grupo Casale: Carbometal SA, Pablo Casale SA, Fabril Casale SA, and Electra SA. Combined, these four firms had 12 industrial plants, four mines and quarries, 2000 workers and employees, 40 engineers, 90 technicians, and engineering and industrial research labs. In addition to a number of mineral and chemical products, Casale made electric transformers, mining equipment, lifts, cranes, electric-welding machinery, hydro-mechanical equipment, and complete turn-key industrial plants (Los Andes, 5/11/1979, p. 5).

Although Casale was founded at the end of the 1920s, one of the firms of the holding, Electra SA, was created in 1956. According to the firms' executives,

"Electra emerged in 1956, as a consequence of the needs of Carbometal SAIC [one of the core firms of the holding] to have a team of specialized personnel in the maintenance of transformers for its ovens and services...."

[Electra] was not only able to meet the needs of the parent enterprise, but it also covered orders made by Agua y Energía Eléctrica, Segba, the Dirección de Energía de la Provincia de Buenos Aires²⁷ and other public and private firms....[in addition to exports]....

Parallel to the transformers division, in 1956, in Electra began functioning a division of mechanical engineering and metal constructions....

In 1969, the firm...[began making] reduction gear... (Los Andes, 5/11/1979, p. 9).

Thus, as we can see from this quote, because Casale's needs in terms of specialized maintenance could not be met with resources drawn from outside the holding, Casale developed its own solutions by founding Electra, a new firm. In turn, Electra developed its own external clientele, cashing in on an existing niche in the market.

IMPESA provides a number of similar examples. The firm was founded in 1907, but until the mid-1970s it remained a medium-sized metal-working firm with under 200 employees. By the mid-1980s IMPESA had grown to occupy around 2000 people in its two plants, and its annual sales had reached 100 million dollars. IMPESA had become a holding with interests in a number of fields. The IMPESA Corporation is made up of IMPESA (heavy metallurgy), Trater SA (thermic treatments), Autopartes (parts and reduction gear), Invertel (communications), ICSA (electro-mechanical engineering and data processing), Transapelt SA (heavy transport), IMPESAT (satellite communications), Metansa (metallurgy, Colombia), and Lagarde SA (fine wines).²⁸

Many of these activities which the firm now offers as products and services for other firms began as in-house solutions for the firm. Trater, for example, was an endeavor developed to provide in-house capabilities of carrying out the thermic treatment of parts. Trater is now perhaps the major specialized provider of this industrial service in the province. Autopartes was set as a separate division in charge of developing reduction gear for engines. Today Autopartes is a separate firm and with its specialized capabilities is a major competitor in the province. ICSA emerged as the result of expertise developed by IMPESA in the electro-mechanical and computerized control areas of its cranes. Transapelt grew out of the firm's investment in coming up with ways of transporting to work-sites the large metal structures built at the plants in Mendoza. Trasapelt now provides special transport services to firms outside the holding.

5.4) Information Linkages and the Transition from Machine-facture to System-facture²⁹

In this chapter we have seen how firms generated in-house the solutions they could not find outside of their doors. What characterized the long period that spans from the turn of the century into the mid-1970s is that the capital-goods producers of Mendoza could rely to a large extent on their investments in fixed capital (buildings and machine-tools). We saw that the exports of some firms in the 1960s were the result of setting up modest R & D facilities. Yet firms relied little on the environment external to the firm, except for indirect connections through the labor market and the skills of some specialized subcontractors. Of course there were strong linkages with customers, linkages that many times went back in time several decades. The situation will change between the end of the 1970s and the mid-1980s.

The transition from a time in which firms could put their onus on machines to an epoch where what counts is the system in which firms are inserted can be placed around that time. As

Kaplinsky (1985) argues, the transition can be described as a shift from machine-facture to system-facture. Put in other words, if firms were islands, now they need to insert themselves in a productive fabric. In the new situation, fixed capital has in fact been devalued and what counts now is investments in intangibles. These include the development of subcontractors, quality control, ways of getting, processing and using information, R & D, continuous labor training, and marketing.

In the past, for most of these small and medium-sized firms, getting bigger meant acquiring machinery and equipment, expanding capacity, and hiring more people. They still face the need to invest in fixed capital, but now the investment choices and needs have enlarged. They need to invest more in intangibles. Because no firm can in fact address all these demands simultaneously; firms are moving into greater contact and collaboration with other firms. Moving from the island to the productive fabric is a theme that runs along the paragraphs of the next chapter.

NOTES

CHAPTER 5

¹ Yet the same 1914 census, in its list of occupations, counts over a thousand coopers in Mendoza (Salvatore 1986, 237). In addition, all the writings of the time make reference to the local fabrication of casks.

² This idea can be traced to much of the writings on dependency and Latin American structuralism (Kay 1989) and their extension into regional topics (Rofman 1974a-b).

³ On the Museo del Vino see also, Cueto 1987.

⁴ Ironically, it would be surprising to writers in both the dependency and neo-classical schools of economic thought to en-

counter a capital-goods industry (however incipient) so early and in such a backward place as Mendoza. It is less of a novelty, however, to those interested in technology and who have gone inside the black box of technology (Rosenberg 1976). These neo-Schumpeterian researchers, writing from an evolutionary perspective, know that it is almost axiomatic that any work-place generates at the same time a product or service and knowledge. Most of that knowledge is then re-cycled into production as minor innovations. As a number of studies have shown (Katz 1986 1987b; Bisang 1989), minor innovations which are made cumulatively to existing equipment and machinery by the very same people (technicians, skilled workers, engineers) who operate them, account for substantial improvements in productivity over time.

⁵ Quoted from the original schedules of the 1895 census.

⁶ Tomba was considered to be the largest *bodega* of the world at the time. "For the transport of grapes [Tomba] has 93 tanks of 10 hectoliters each placed over flat trailers, over 182 oxcarts, 1180 mules, 90 horses, and 110 oxen. The mechanical coopers can prepare 1000 barrels daily having numerous personnel. There are also other sections such as carpentry, mechanical shop, bronze foundry, a chemical-enological lab.

That is a truly industrial town..." (CVN 1910).

⁷ This is still true. Small establishments have not disappeared and they are more than what the economic census reveals.

⁸ See, for example, a note on the annual ceremony commemorating Beltrán's birthdate in *Los Andes*, Sept. 7, 1982.

⁹ This can be observed from the reading of the Commercial Guides (*Guías Comerciales*) edited at different times during the second half of the 1800s and in this century.

¹⁰ *La provincia de Mendoza...*

¹¹ See note on Biale-Massé in Chapter Four.

¹² Europeans also enjoyed a higher social standing than the creole workers. Discrimination played against workers of native stock (see, for example, Salvatore 1986; for an analysis of a similar process in the Pampas see Richard Slatta's magnificent *Gauchos and the Vanishing Frontier*, 1983).

¹³ The school was *La Escuela de Artes y Oficios de la Nación* and initially offered courses in mechanics, woodworking, and mechanical smithery. By the early 1940s the school taught courses for foremen and supervisors in road construction, mechanics, woodworking and cooperage, smithery, electricity (electrical installations and power plants), electro-communications, and film-making. By 1940, 200 students had graduated. Pictures taken around that time show the annual exhibition of works completed by students. Exhibits shown include a number of machines and equipment used in the wine industry at the time. The school also had shops, labs, and a library, and it took in some outside jobs for profit. These tasks had given the school \$ 25,354.41 *moneda nacional* from 1925 to 1939 (Guía 1941, 280-281).

¹⁴ As Storper and Walker (1989) argue, firms do not only teach workers a skill, they socialize them in the environment in which they work.

¹⁵ First created as *Universidad Obrera Nacional* in 1949 and with a college in Mendoza since 1953 (Santos Martinez 1979, 206).

¹⁶ For a broader discussion of firm's boundaries see Dosi, Teece, and Winter (1992).

¹⁷ The central competitive edge of these firms is their proximity to clients. This allows for substantial interaction, experimentation, and technological learning. Many studies on competitive-

ness stress the importance of being close to the market. In capital-goods production, a number of technical reasons make proximity to the market the biggest edge against competition. See, for example, the results of an enormous empirical study on regional competitiveness undertaken by the EEC (CEC 1990), along a more theoretical vein (Rothwell and Zegveld 1985, 73).

¹⁸ In the national market the big competitors have traditionally been in Buenos Aires and Rosario (García, Groisman, and Pérez 1988). Yet, being close to the main market, for example in the wine industry, is so important that at least a few firms moved from Buenos Aires, where they were originally based, to Mendoza.

¹⁹ Commodities are so standardized that they can even be traded in future markets such as those of wheat, orange juice, or bauxite.

²⁰ A manager interviewed in Mendoza, whose firm makes wine-making equipment, said that: "it is common that when harvesting [the grapes] by mistake, stones, scissors, hooks fall inside the *tachos* [containers used to carry the grapes by hand from the fields to the trucks]...which upon entering lagers and crushers ruin the machinery". Further on in the interview he added:

"At the time of the harvest we have two vehicles which visit continuously the *bodegas*, sometimes, they even go to San Juan, Salta, Río Negro. That has a major value for the buyer".

²¹ In recent years, wine-making, as well as the food processing and canning industries, has gone through an important restructuring process in which firms have closed and equipment has been replaced. As a result, there is a large supply of used equipment and machinery.

²² This contrast with the materials used by foreign producers. "Eighty percent of imported machines is plastic. They are [to last] for four or five years. Plastic here is a little expensive. Our machines last 50 years".

²³ Today (December 1991) they stand at about 20% for most capital-goods made in Mendoza.

²⁴ We have to keep in mind that as a group those in the metal-mechanical industry are selected by social contact, family ties, and, in the past, ethnic ties. In the same manner that certain professions as the military, or medicine run in families, metal-working is a passion to which people are socialized from the time they are very small. The metal-working society expects sons and daughters to follow on the trail of their parents and when they do not they are seen as deserting from parental guidance and ideals. In turn, sons admire what their fathers and grandfathers did and hold them in reverence.

²⁵ I have pictures of that lathe.

²⁶ See my *Soplando vida al metal. Historia de la metalmeccánica mendocina, 1895-1991*. Mendoza: Primera Fila (forthcoming).

²⁷ These three have long been the major power companies in the country. Their geographical scope is: the whole country, the city of Buenos Aires and most of the surrounding conurbation, and the province of Buenos Aires.

²⁸ IMPSA has offices in Mendoza and Buenos Aires, and affiliates in Pittsburgh (IMPSA International), Bogotá (IMPSA Andina), Sao Paulo (IMPSA Brasil), and Hong Kong (IMPSA Asia); with additional international offices in Beijing, Kuala Lumpur, and Santiago. IMPSA is also involved in a number of joint ventures in Uruguay, Paraguay, Argentina, Colombia, and Shanghai. In the last few years IMPSA has acquired shares in a number of privatized state enterprises including airlines, railroads, and telecommunications, among others.

²⁹ Some of the ideas in this section are derived from Borello 1992b-c.

LINKAGES AND GOVERNANCE SYSTEMS IN THE TRANSITION, 1980-1990

This chapter has three major sections. The first one looks at linkages and governance systems in the last decade. A typology of firms is devised to examine linkages and governance systems in the metal-mechanical complex of which capital-goods form part. Two major groups of firms are identified: contractors and subcontractors. Contractors are divided in two groups: firms in the metal-mechanical complex and firms outside of it. Contractors belonging to the metal-mechanical family include three types of firms: specialized, traditional and independent. Those outside contain continuous-process industries, construction, and major engineering works. Subcontractors include four types: specialized, independent, captive, and moonlighter. This typology of firms is used to discuss the different kinds of linkages and their forms of governance.

The second section analyses in greater detail the kinds of contracts and agreements that regulate linkages in the capital-goods industry of Mendoza. Specifically, this section focuses on four topics: contracts with non-specialized subcontractors, the management of contracts by specialized contractors, the place of gossip as an instrument of linkage regulation, and agreements and strategic alliances among a group of specialized contractor firms.

The third section pulls together the detailed description of linkages and governance systems enunciated in the first two parts of the chapter and probes the question of the transition in production organization. More specifically, it looks at the transition by contrasting old and new linkage structures, governance systems, and agents and institutions.

6.1) The Organization of Production and the Structure of Firms in the Metal-mechanical Industry

As is known, it is possible to disintegrate a substantial portion of the production in the metal-mechanical industry.¹ A firm need not necessarily make by itself all the parts that go into the final product. This would be a total integration of production. Total integration is fairly common in developing countries. In industrialized countries production is commonly disintegrated, with a variety of firms specialized in different steps of the production process. The steps include the fabrication of parts, the provision of special services, assembly, the coordination of production, among others.

In Mendoza we find a relatively low level of disintegration combined with a large offer (by firm) of products and models (a wide production mix).² These characteristics seem to be changing. In recent years (since 1980) we are witnessing a conscious process (in some firms) of carefully weighing the choice of

doing it in-house or sending it to outside shops: what those in the trade call "make or buy" (see Chapter Two). This does not mean that high vertical integration is due to a lack of information or a non-rational behavior. The need to be highly integrated reflects the conditions of production that have prevailed in Argentina and in developing countries in general. These conditions include extreme uncertainty, lack of adequate suppliers, and shifting government policies.

6.2) The Fabric of Relationships within the Metal-mechanical Industry of Mendoza

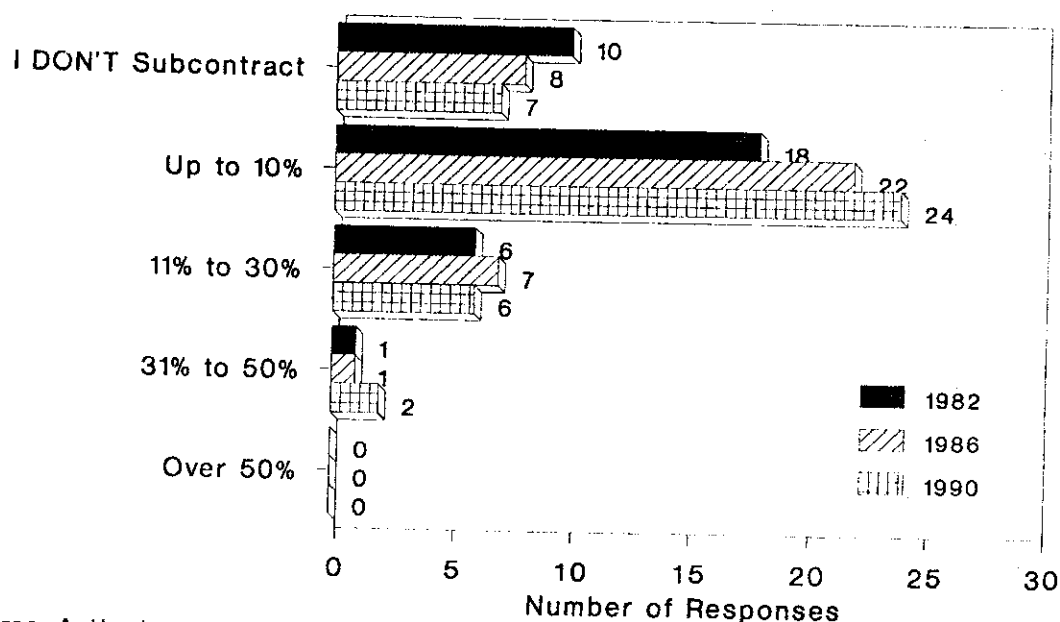
6.2.1) Introduction

Generally speaking, disintegration of production involves the emergence of two types of agents: contractors and subcontractors (also called suppliers or outsources). A range of possible situations exist, from the firm making practically everything all by itself, to the specialized subcontractor working exclusively for other firms. In the latter, it is common to find subcontractors who even use almost exclusively the raw materials provided by contractors.³ Between these two extremes, a variety of firms act as contractors, subcontractors, or even both simultaneously.

The fabric of relationships within the metal-mechanical industry may be examined from different perspectives. We may begin by looking, first, at the proportion of total output is contracted out by firms. In general, we find a low level of disintegration of production. Figure 6.1 shows that in 1990, of all the firms surveyed, slightly more than half contracted only up to 10% of total output (24 cases). About 14% contracted between 11% and 30% of their total production for that year (6 firms). Only two enterprises were sending out between 31% and 50%. Sixteen percent of the firms did not give out work to other units.⁴ Data for 1982 and 1986 seem to indicate a trend towards a small increase in the degree of subcontracting in recent years (Figure 6.1). This can be appreciated in Figure 6.3, which shows the same data, but at the level of the firm. Figure 6.3 combines the two directions of material linkages: forward and backward. Forward linkages (towards contractors) are shown at the top of the figure (from left to right). They encompass five different situations, from the firm that does not work as a subcontractor to the firm which is a specialized subcontractor (over 50%). Backward linkages (toward subcontractors) are depicted on the left of the figure (from top to bottom). They also include five possible situations, which range from the firm that very rarely uses subcontractors to the enterprise that passes on over 50% of its production to other firms. Arrows show the individual

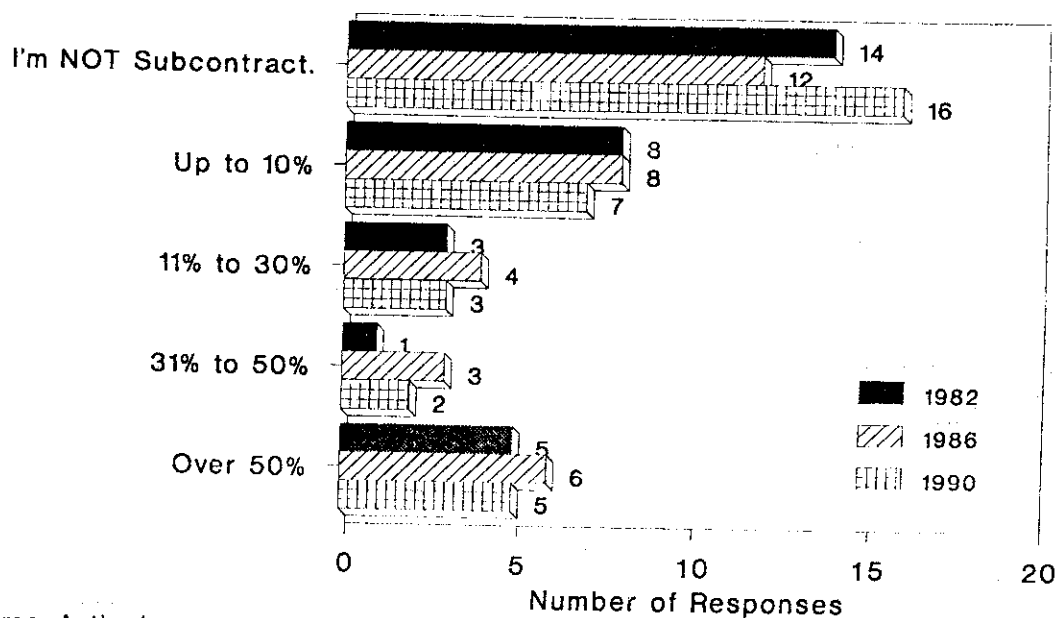
movement of firms in two time periods, 1982-86 and 1986-90. Numbers inside the cells are codes to identify individual firms which have changed their levels of integration. Black dots identify firms which have not substantially changed their degrees of integration.

Figure 6.1. What Percentage of your Production do you Subcontract? (% in Relation to Each Year's Sales)



Source: Author's survey, Oct-dec 1991.

Figure 6.2. What Percentage of your Production you Undertake or Undertook as a Subcontractor of other Firms?



Source: Author's survey, Oct-Dec 1991.

The trend towards more subcontracting, however, is not widespread. Thus, in the period 1982-90, only seven firms substantially change their levels of subcontracting, while the rest maintain similar rates.⁵ Only one out of the seven becomes more vertically integrated. The greatest changes in the levels of subcontracting take place in the more recent period (1986-90), since of all the seven firms only two change their levels of subcontracting in the period 1982-86. Other qualitative information, to be brought into the discussion later, supports the hypothesis that since the early 1980s a group of firms is searching for ways to increase their productive capacity through greater use of subcontractors.

Even though we lack complete and detailed information the existing evidence shows that in previous decades, at certain conjunctures, firms increased the volume of work they gave out to other shops. The peak might have been reached during the 1970s. It was during those peaks that new firms emerged (see Figure 5.5). However, today's situation is unprecedented. In the past, the increase in subcontracting generally was due to the impossibility of responding quickly to a growing demand by making use of existing installed capacity. The orders passed on to other firms consisted of tasks, processes, or parts which could have been produced in-house: capacity subcontracting.⁶ In the past, an increase in demand resulted almost automatically in an increase in personnel and in investments in buildings and machinery.

Today we witness a different situation. Most subcontracting responds to a search for more specialization. Large and medium-sized firms acting as contractors also face a tradeoff which did not exist in the past; in addition to the (traditional) need of making investments in fixed capital, firms need to invest in intangibles (management, research and development, marketing, labor training, etc.). Subcontracting then becomes a strategic decision taken by the firm in response to new productive and market conditions.

In sum, within the metal-mechanical complex two types of relationships may be identified: backwards in the chain, from contractor to subcontractor; and forward, from subcontractor to contractor. Let us examine now what proportion of firms work as subcontractors of other firms (Figure 6.2).

Of the total number of metal-mechanical firms surveyed, subcontractors were a smaller proportion than contractors. Almost a third (16 firms) did not act as subcontractors. Seven firms targeted up to 10% of their production to contractor firms. Three firms did it in a proportion ranging from 11% to 30%, while two oriented between 31% and 50% of their production to contractors. Finally, five establishments oriented more than 50% of their annual production to contractor enterprises.

As it was shown with degrees of subcontracting, most firms did not substantially modify their levels of sales to contractor firms (Figure 6.3). Thus, in the period studied only eight firms substantially changed their proportion of sales to contractors. It is noteworthy that there are contrasting dynamics in the two sub-periods. Of the seven firms which changed their levels of sales to contractors between 1982 and 1986, six did it to the right of the figure (increasing the proportion of their work as subcontractors). On the contrary, of the five establishments which moved in the following sub-period, all migrated to the

left of the figure.⁷ Lastly, a combination of the two dimensions (backward and forward) shows that few firms change simultaneously their subcontracting and contracting relationships.

Up to this point we have a general overview of the degrees of integration/disintegration. What these figures fail to show is that there is a wide variety of subcontractors and contractors, and that when they meet they establish a diversity of relationships. We now move on to describe subcontractors, contractors, and the contracts which govern their relationships.

6.2.2) Subcontractors

In both the literature and the industry subcontractors are also called suppliers and outsourcers. Four types of subcontractors operate in the capital-goods industry of Mendoza: specialized, independent, captive, and moonlighters (or aspirantes).⁸ Figure 6.4, shows a synthesis of the characteristics of each type of firm. The figure uses the language of topology to show firms, relationships, and their location in the production chain. Nodes (points) represent firms while segments show transactions.

Working as a subcontractor in Mendoza does not carry a high social prestige among those in manufacturing. Owners of some subcontracting shops even feel the need to excuse themselves for their profession. The social stigma attached to working as a subcontractor is reflected in the language. In the parlance of the local industry, for example, it is often said that subcontractors "don't fabricate anything." Socially, what is most valued (and that which generates more pride) is making products which derive from in-house technological developments. Producing under license agreements does not generate high social prestige.

Specialized subcontractors

The specialized subcontractor serves many firms. In Mendoza, there are specialized subcontractors which work with as many as between 300 and 500 clients, and these figures include only those in the province. These firms are specialized in doing one task or industrial process. That task or process is generally something which demands a special skill or ability and does not justify having a specific stock of in-house machinery.

Figure 6.5 describes the tasks undertaken by specialized subcontractors: foundry, lathery, and special machining, among others. Figure 6.6 displays the same information from a different angle, since it shows a breakdown of the number of times mentioned and firms. Few firms perform foundry or thermic treatments, but many carry out non-specialized tasks.

Specialized subcontractors do not normally have significant backward linkages since they offer services and parts to firms which, economically speaking, are situated closer to the final consumer. Tasks undertaken by the specialized subcontractor are generally normalized tasks, which demand relatively little interaction between contractor and subcontractor. Because of this type of firm's knowledge, the equipment it generally has, and more than anything, the fact that it serves a host of clients, the specialized subcontractor has a relatively strong negotiating position with respect to contracting firms. We will look at this, in more detail, when we discuss the contracts established between contractors and subcontractors.

Figure 6.3. Changes in the Degree of Subcontracting and in the Work as Subcontractor (1982-1986-1990)

1982

FORWARD LINKAGES

BACKWARD LINKAGES	Doesn't Work as a Subcontractor	Works as a Subcontractor up to 10%	11-30%	31-50%	Over 50%
Doesn't use Subcontractors	• • • •	• • • •			• • • •
Gives out to Subcontractors up to 10%	• • • • • • • • • •	• • • • •	•	•	• • • •
11 to 30%	• • • • •	•	•		
31 to 50%			•		
Over 50%					

(PART A, 1982)

1986

FORWARD LINKAGES

BACKWARD LINKAGES	Doesn't Work as a Subcontractor	Works as a Subcontractor up to 10%	11-30%	31-50%	Over 50%
Doesn't use Subcontractors	•	•	• •	•	• • • •
Gives out to Subcontractors up to 10%	• • • • • • • • • •	• • • • •		• •	• • • • •
11 to 30%	• • • • •	• •	•		
31 to 50%			•		
Over 50%					

(PART B, 1986)

Figure 6.3. Changes in the Degree of Subcontracting and in the Work as Subcontractor (1982-1986-1990)

1990

FORWARD LINKAGES

BACKWARD LINKAGES	Doesn't Work as a Subcontractor	Works as a Subcontractor up to 10%	11-30%	31-50%	Over 50%
Doesn't use Subcontractors	•	• •	• •		• •
Gives out to Subcontractors up to 10%	• • • • • • • • • • • • • • •	• • •	•	• •	• • • •
11 to 30%	• • • •	• •			
31 to 50%	• •				
Over 50%					

(PART C, 1990)

FORWARD LINKAGES

BACKWARD LINKAGES	Doesn't Work as a Subcontractor	Works as a Subcontractor up to 10%	11-30%	31-50%	Over 50%
Doesn't use Subcontractors					
Gives out to Subcontractors up to 10%					
11 to 30%					
31 to 50%					
Over 50%					

Firms's Shifts → 1982-86 -----→ 1986-90

Note: Dots represent firms which have not changed substantially their level of Subcontracting or their work as Subcontractors.

Source: Author's Survey, Mendoza 1991.

(PART D, 1992-1990)

Figure 6.4. Specialized, Independent, Captive, and Moonlighter Subcontractors

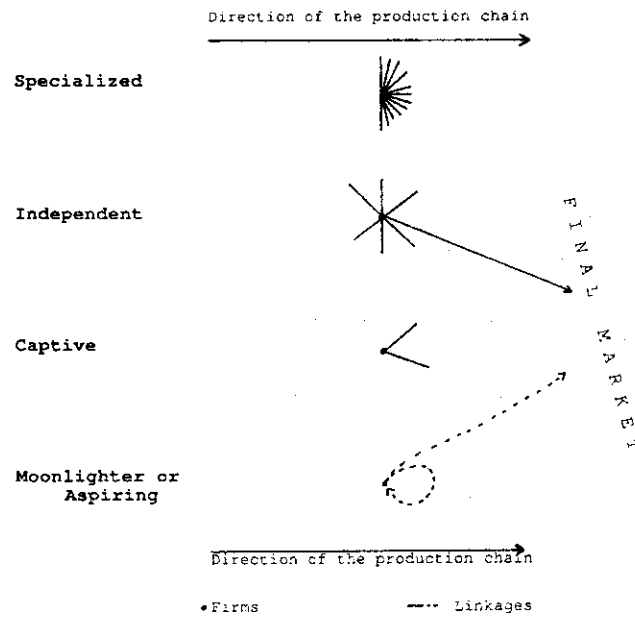


Fig. 6.5. Use of Specialized Subcontractors

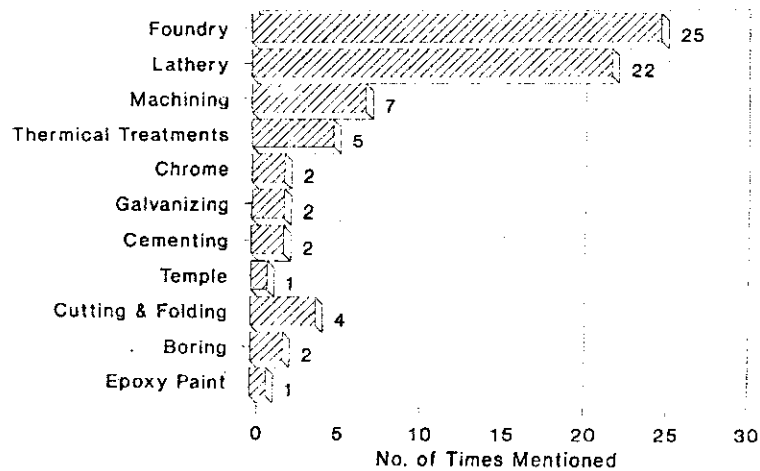
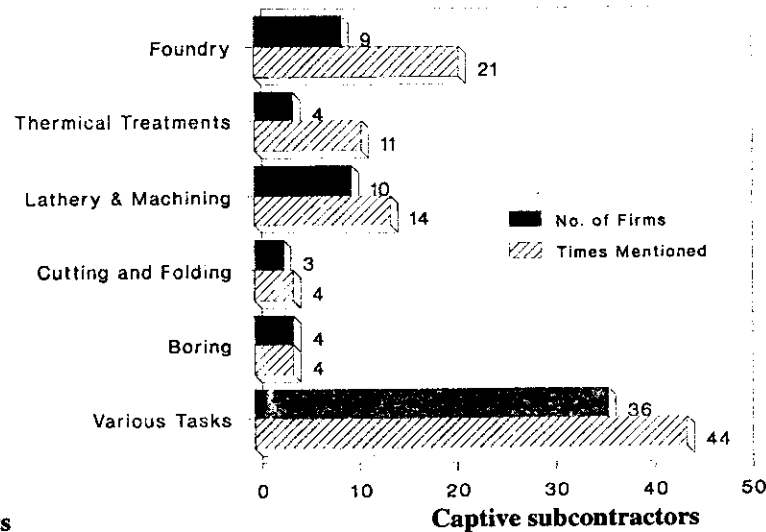


Fig. 6.6. Types of Subcontractors



Independent subcontractors

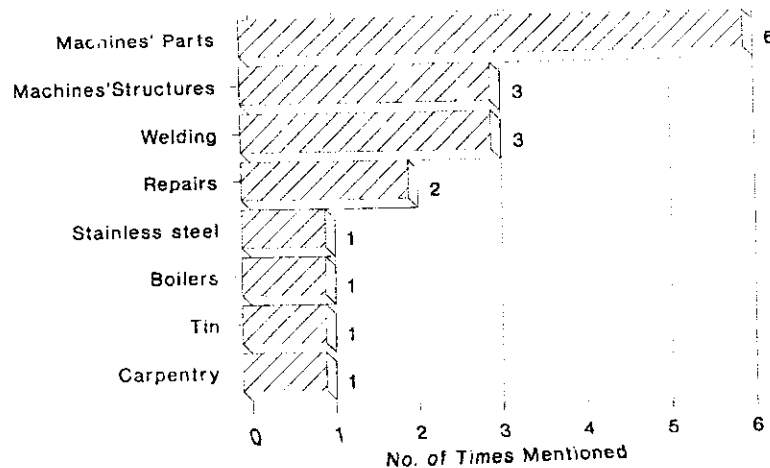
A similar position, though somewhat weaker, is the one occupied by independent subcontractors. Although they work part of the year as subcontractors they also make their own products. Often they pass on to other firms part of the work. As we have sketched in Figure 6.4, independent subcontractors split their working time between orders for other firms (acting as subcontractors) and the production of their own products. These two endeavors give them some bargaining strength with respect to contracting firms. Thus, independent subcontractors have contacts backwards and forward in the productive chain, in addition to contacts with final markets. Yet, independent subcontractors do not act as subcontractors firms in the construction industry which in turn place orders to other firms. In general, independent subcontractors treat the two activities separately.

Independent subcontractors belong to the group of non-specialized subcontractors and carry out a variety of tasks (Figure 6.7).

Captive subcontractors undertake repairs of machinery or produce parts almost exclusively for one or two contractors. They are small but established firms. That is, they have their own working space (*local propio*), legal status, and their own machinery and tools (however simple and few). Within the group of firms surveyed in Mendoza we find a few which belong to this category of firms now, and others that were captive subcontractors in the past. Captive subcontractors are also found in firms which carry out repairs and overhaul equipment and machinery used by continuing-process industries in Mendoza, such as cement, beer, and petrochemicals.

Frequently the owner or main partners have had relationships with the contractor firm. Here we commonly find skilled workers who have left a firm to become captive subcontractors of that same enterprise (see section 5.2.1). Clearly, there are degrees of dependency of the captive firm on the contractor. Many firms attempt, with time (and frequently successfully) to diver-

Fig. 6.7. Use of NON-Specialized Subcontractors



sify their clientele, even though many times the contractor firm tries to block these attempts or exerts different forms of pressure.

Moonlighters or "aspirantes"

A last category of subcontractor is that of moonlighter or aspirante. The literature refers to moonlighters as informal, clandestine, illegal, and underground. Moonlighters work in a given factory for the normal number of hours, just like the rest of the workers, but after they clock-out they begin to work for themselves, for their own dream. Moonlighters also work nights, sometimes into the wee hours of dawn; they are busy on weekends and they deprive themselves of leisure time; they aspire to a better life.⁹ Many times it is a number of workers who join efforts in what is de facto a firm's embryo, and thus they labor, sometimes for years, twelve and fourteen hours a day before taking the big jump: setting up their own firm. In economic terms this kind of work lessens labor costs, not only because of work intensification, but also because taxes and pension payments are not made.

A moonlighter will frequently use the installations and tools made available to him by the very same firm for which he works his normal shift. He stays working after-hours or borrows hand tools and works at home. He often moonlights at home or in the backyard of his parents or grandparents. Thus, the moonlighter uses machines, tools, and buildings which would otherwise be idle. This increases industrial productivity even though the work is labor intensive.

Many times the extra work is oriented to the very same firm for which he works during the day. He then becomes a sort of inside subcontractor, which resembles the nature of the shops of Buenos Aires and of other cities elsewhere at the turn of the century (Falcon 1986).

The phenomenon is not new in Mendoza. Most of the shops surveyed began this way. What is new is the magnitude of the phenomenon. Moonlighting is associated with the low salaries received by workers in recent years (in comparison with what they made 15 or 20 years ago), and the low barriers of entry into a number of metal-mechanical activities such as light iron-work (carpintería metálica) and repairs of simple machinery.

Although an explicit goal of this study was not to measure the magnitude of moonlighting, I would estimate that moonlighters make an extra shift which is no less than a third of the total number of workers in the metal-mechanical industry of Mendoza. That translates into about 2700 workers.

6.2.3) Contractors

Contractors may be classified in two major groups according to the industries they belong: contractors within the metal-mechanical industry and contractors outside of this industry (Figure 6.8). Within the metal-mechanical industry we find three types of contractors: specialized or professional, integrated or traditional, and independent contractors/ subcontractors (Figure 6.9).

Fig. 6.8. Types of Contractors

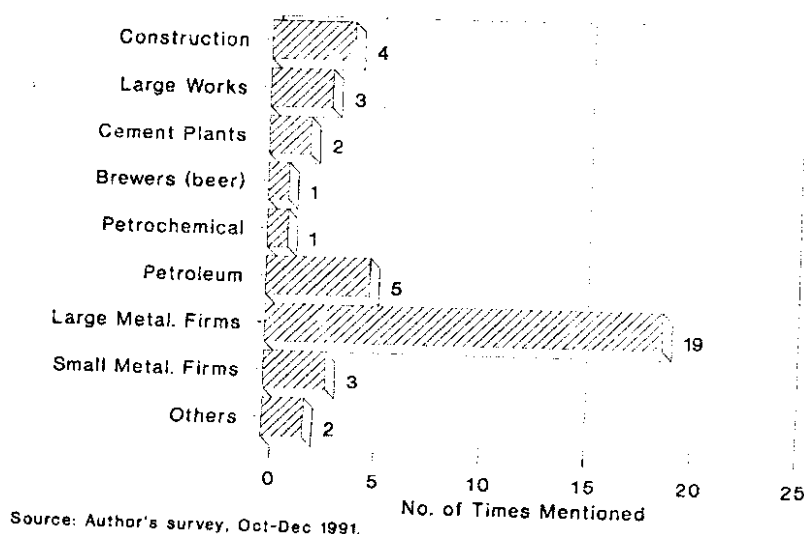
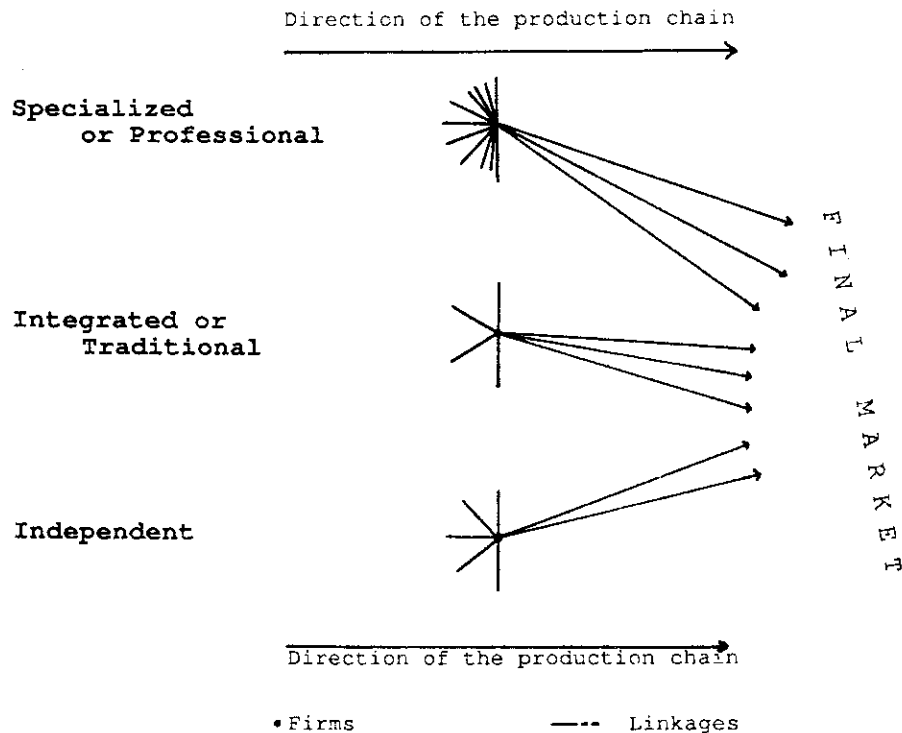


Figure 6.9. *Specialized, Integrated, and Independent Contractors*



Contractors within the Metal-mechanical Industry

Specialized or Professional

Specialized contractors are firms that subcontract using systematic criteria based on the costs of producing a certain part or carry out a specific task in-house. They are firms which are in the position to know with a large degree of certitude if it makes sense to produce something in their own plants or not. Specialized contractors play the inverse role of the specialized subcontractor (Figure 6.9). Not only do they calculate costs at different levels of their own establishments (machine, shop section, work-team, hour/man/machine), but they also know which firms can do different tasks and at what costs and compliance levels. Information is the lifeblood of these firms: how to search for it, how to store it, and how to use it. They establish systems which make it possible not only to access data, but also to store and retrieve it easily.¹⁰ Such systems include computers, internal files where drawings and blue-prints are kept, and in the largest firms CAD and CAD/CAM systems.

Specialized contractors also have a quality control office that examines incoming parts and raw materials and decides which are to be rejected. The office of quality control, together with the personnel in charge of drafting the forms and conditions of price tenders, are the two major bargaining weapons used by these firms against subcontractors. Only specialized subcontractors can seriously compete with contractors by rejecting clauses of contracts or inserting their own clauses. Some of the best foundries use this latter strategy.

Specialized contractors have a relatively well defined (and institutionalized) policy for subcontractors. Although not always on equal terms, sometimes specialized contractors organize meetings with the subcontractors to discuss issues of quality, prices, and delivery schedules. Specialized contractors try to influence how subcontractors work. For example, they often intervene on decisions about purchases of tools and machinery, and on other topics affecting quality, production schedules, and prices. In general, subcontractors reject (at least in a veiled form) the intervention of contractors in the work process developed under the roof of their own shop. Most admit that, through their contact with larger and more powerful firms, they have learned.

In some cases the specialized contractor uses a productive structure that resembles a *bandoneón*:¹¹ a series of concentric rings centered on the technical heart of the firm and its more skilled workers and technicians. First we find overtime hours for the permanent personnel, then a ring of temporary workers. Outside the firm there is a first group of subcontractors who are well known and are considered "part of the family", and who almost always receive a "good work load." Finally, in the outer rings we find other subcontractors.

The *bandoneón* opens and closes with a *double logic*: the rhythm of demand and the search for specialization. In general, as one moves towards the outer rings what counts is the volume of demand. That is, subcontracting by the parent firm responds to a shortage of installed capacity, despite the utilization of temporary employees and overtime for the permanent workers and technicians. The first circle of subcontractors tends to carry out tasks, which the contractor firm usually is unable to under-

take in-house due to a lack of appropriate machinery and tools.¹²

Integrated or Traditional

Integrated or traditional contractors generally depart from the premise that it is always better to make than to buy. They assume a priori that it is cheaper to manufacture in-house all the parts that go into a machine, than it is to pass the work on to other firms. This belief, which for several decades formed the credo of the local metal-mechanical industry, is neither unfounded nor capricious, even though during the last few years some local firms have begun working with the opposite philosophy.

The high vertical integration of traditional firms responds to several factors. First, we have the high cost of coordinating transactions in a turbulent and highly uncertain macroeconomic framework, a framework characteristic of Argentina for several decades. Second, for a long time, most industrial production has been targeted almost exclusively to local markets; these markets are relatively small, fragmented, and demand is erratic. All of this conspires against both a greater division of labor among firms and a greater product/task specialization. Third, for many decades, there have been few subcontractors offering a reasonable combination of quality and costs. Each establishment tended towards an almost complete vertical integration, carrying out even those tasks undertaken today by specialized subcontractors.

Firms in this group vary in size, but most are medium and large. They have a traditional management structure and an artisanal approach as to how to organize production. For these firms, more demand is satisfied by in-house capacity or work-force expansion. After the crisis of the end of the 1970s, most of these firms had high levels of idle capacity stemming from overstocking of machinery and from loans taken at very favorable or negative rates.

What little these integrated or traditional firms give out to subcontractors are, in most cases, tasks which cannot be carried out in their own shops. These tasks include foundry and special machining. Integrated or traditional firms treat their workers paternalistically. Paternalism is evident as they try to keep the bulk of their work-force despite the seasonality of production.¹³

Contractors Outside of the Metal-mechanical Industry

Continuous-Process Industries

Continuous-process industries, such as cement, beer, petrochemicals, the bottling of mineral water and soft drinks, chemicals, and glass making in general have in their plants repair and maintenance shops (see Chapter Four).

Like the wine industry, the size of these repair and maintenance shops has been reduced and they have begun externalizing large portions of the overhauling and repair of equipment and machines.¹⁴ Although most of these large plants still have repair

shops, the bulk of their needs are satisfied by external shops (Figure 6.8). In many cases, external shops are headed by ex-workers of these very same large firms.

Construction Industries

A wide portion of the metal-mechanical industry is closely linked to the several specialties of the construction industry. At the national level (and this regularity can be observed in any country of the world) the metal-mechanical industry has its most important links with the construction industry, as can be seen from the national input-output tables.¹⁵ Although this research project did not attempt to cover the whole spectrum of firms, which make items ranging from metal doors and windows to enormous metallic structures for large engineering works, besides machinery and equipment, some of the firms surveyed have one or more product lines oriented to residential or commercial construction. The group of metal-mechanical firms in Mendoza catering to the construction industry is so complex that it would demand a separate research effort. However, some points about the subcontracting relationships between construction firms and metal-mechanical establishments are noteworthy.

There has always been a movement of entry and exit of workers, technicians, and metal-mechanical firms inward and outward of construction. The movement has followed not only the cycles of the construction industry but also the ups and downs of the different metal-mechanical branches. For example, a comparison of the economic censuses of 1974 and 1985 shows a marked reduction in the degrees of subcontracting of those metal-mechanical branches connected to the construction industry.¹⁶

Independent of the direction of these cycles, the construction industry also serves as a buffer or refuge for firms without clientele and for workers who get laid off. This is very much the case in the construction of homes and even more so in the home improvements sector. In truth, there is a myriad of niches where there always seems to be room for one more firm. This is a favorite environment of the moonlighter firm. The magnitude of this phenomenon is evidenced by the more than 500 single-person firms which shop at the local cooperative of metallurgical raw materials (CIMETAL). Numerous ads in the local press offering tools and simple semi-industrial machinery for metal-working also attest their size.

Within the firms surveyed, I found some which were pushed to diversify mainly as a result of the crisis in the wine industry which followed the Greco boom.¹⁷ A large proportion of them re-orient their sales into light iron-work (*carpintería metálica*), acting in some cases as subcontractors of construction firms. The decision to move into this new market carries investments in some machinery such as folders, welding machines, and guillotines. Other larger firms shift to engineering works where they do heavy metallurgy for firms which get contracts from the state to build dams, gates, hydroelectric power stations, and other major undertakings.

Finally, there are firms indirectly affected by the crisis in the wine industry. This is the case of some specialized subcontract-

tors. In the survey, for example, we find a firm which previously worked casting parts for producers of machinery, but in the face of the drop in demand is now making mainly metal parts for new water and sewage installations. This example, and others in this section, show the difficulty of defining the boundaries of industries which are quite ambiguous (see also Walker 1985). To some extent, industry boundaries are defined by a core collection of practices, practices all participants know, though they do not necessarily accept.

In this section we devised a typology of firms to uncover the different material linkages binding firms within the capital-goods industry and between that industry and the rest of the local economy. Implicit in that discussion were the practices and agreements cementing linkages. In the next section we will further pursue this topic by looking at specific instances and examples of governance systems.

6.3) Governance Systems: Contracts and Agreements Regulating Linkages in the Capital-Goods Industry of Mendoza

Although the schemes which appear in the figures above show the existence of relationships among firms by similar lines, in fact, firms' transactions are very diverse. Each transaction or relationship between firms involves some kind of agreement (written or verbal, tacit or explicit) which we will call a contract. Many relationships are subjected to a written contract signed by both parties, but both that type of transaction, as well as the ones based purely and strictly on trust (*relaciones de palabra*), generally have a relationship which goes much beyond what a contract may define.

Agreements or contracts are geared to solve a whole series of problems associated with transaction costs. The division of labor among firms means a number of transaction costs. Moreover, these costs go beyond mere market imperfections. According to Ottati (n.d.), transaction costs are dependent on problems of opportunism, uncertainty, and ambiguity. Opportunism means gaining advantages in transactions by way of a lack of loyalty and frankness. Opportunism is an obstacle to transactions when there are important asymmetries between the firms conducting a transaction. Uncertainty is given by the social and macro-economic framework, but its effect varies as a function of the structure of firms (and thus the distribution of the burden of risk) and of specialization. Ambiguity in a transaction means not being able to value or interpret its contents. This generates problems in defining compensations (such as prices) and interpreting the agreement.

Or in Storper and Walker's words (1989, 134-135):

"The principal limits to the formation of stable, workable market exchanges are uncertainty (incomplete information, an uncertain future), small numbers (few parties, irregular transactions), bounded rationality (inability to handle all information and contingencies), and opportunism (misrepresentation, renegeing)" (after Alchian and Demsetz 1972).

In Mendoza, opportunism is limited by the medium-long longevity of relationships in an environment in which everyone in

the industry knows each other and where they will probably meet again.¹⁸ Contrary to what takes place in the Italian industrial districts, the asymmetry of many of Mendoza firms works against the establishment of a deeper division of labor, and consequently, of greater specialization.¹⁹

The capital-goods industry of Mendoza combines the proverbial macro-uncertainty of Argentina, with the vicissitudes of the majority of the final markets to which local metal-mechanical production is oriented: the wine industry, agriculture, and public works. Inside the metal-mechanical industry, uncertainty is augmented by the lack of specialization and the relatively excessive capital density of many firms.

As for ambiguity, it is partially solved in the case of the kinds of tasks undertaken by specialized subcontractors or suppliers. This is not so in those tasks carried out by non-specialized subcontractors (Figures 6.6 and 6.7). Ambiguity is probably augmented by the type of non-serial goods produced. In the following paragraphs we give some examples of the kinds of contracts governing linkages in the metal-mechanical industry of Mendoza.

6.3.1) Contracts with Non-specialized Subcontractors

The problems of ambiguity and opportunism may be observed in linkages with non-specialized subcontractors. Ambiguity is present since, generally, the work which is passed on to non-specialized subcontractors is not standard and contains an important quota of unknowns with respect to their monetary valuation and technical specifications. Ambiguity is not mitigated (from an economic and technical point of view) through time. These are tasks which vary and which frequently have many experimental characteristics, so that in economic and managerial terms each transaction begins from a *tabula rasa*.

The ambiguity in this type of transaction, compounded by the asymmetries among contractors and subcontractors, gives way to problems of opportunism. This means that a firm (normally the contractor) takes larger benefits than those originally agreed upon. As we will see, the uncertainty created by these two problems is reduced in two ways. One method is formal, through written and/or verbal agreements between the parts. Another is informally, through bonds of cooperation. These bonds are mainly personal and are woven through time. Put a different way, for things to be carried out now and in the future, relationships between non-specialized subcontractors and contractors have to be permeated with bonds which go beyond strictly economic matters.

6.3.2) The Management of Contracts by Specialized Contractors

Specialized contractors, who can work with between a dozen and 200 subcontractors *simultaneously*, have tried in different ways to make more predictable and stable relationships with the subcontractors with which they work. This is known in the language of industry as the development of suppliers or subcontractors. Specialized contractors use written contracts to guide their relationships with subcontractors, but that alone is

not sufficient to assure compliance and quality. Another of the formal instruments utilized by this type of contractor is the price tender (concurso de precios). Both the price tender (which aims to obtain the lowest price) as well as the written contract (which tries to bind the subcontractor to technical specifications and delivery times) are more part of a rite than precise and infallible instruments to assure price, quality, and delivery times. Specialized contractors strive to establish long-term relationships. This is something that cannot be attained simply with a well-written contract. It is necessary to build through time bonds of a different type. The corollary may be that it becomes even artificial to separate economic transactions from social and family relationships. There is a necessary overlap between the economic space of the firms and the relational space of the individuals who make up those firms.

6.3.3) Sanctions for Breach of Contract: Gossip as an Instrument of Social Sanction

Gossip is an instrument to reduce the danger of opportunism in transactions with a high content of ambiguity. In effect, gossip lessens the transactional costs of firms. Contracts have a legal validity but, in general, non-compliance does not result in legal but rather in social sanctions. A specialized lathe operator put it in this way:

"The very system of work has done the selection of good suppliers [subcontractors]. It is similar to what happens with Quaker Oats: when it is mixed with water the good stuff goes to the bottom and the bad, the straw, floats on top.."

Further on in the conversation he added:

"A part of my capital is the guarantee of what I do".

Gossip begins to play a relevant role here. To tell and hear stories is fun in itself, but in this case it smooths relationships and controls behavior. One of the informants told a colleague on the phone: "In this business stories run faster than us."

The effectiveness of gossip is enhanced by geographical boundaries. In other words, the size and form of the city and its location make possible greater social interaction. It can be hypothesized that in a larger metropolitan area such as Buenos Aires, social sanction would have less importance. Other, more formal ways of building a reputation would take precedence. In a general way, "... geographical boundaries limit movement, turn social interaction inward and solidify (and differentiate) social relations" (Storper and Walker 1989, 138). We will deal in more detail with the geographical base of industrialization in the next chapter. Before that we will discuss one more example of governance systems in the capital-goods industry of Mendoza by referring to strategic alliances.

6.3.4) Strategic Alliances

The last example I will present to illustrate the idea of governance systems is that of strategic alliances. What follows is taking place at the same time that aggregate figures are showing a decrease in the inter-relationships of firms not only in

Mendoza, but also in Argentina (Kantis and Yoguel 1991). Though the topic of strategic alliances is fairly new in the literature, there are already a number of contributions (see, for example, Gordon 1991; Morales and Quandt 1992). Strategic alliances are being forged at a variety of levels and with a number of purposes. These include, for example, those among large and small firms and between national and multinational companies, and for purposes which include such things as competition, technological development, and penetration of new markets. Census figures reveal that between 1973 and 1984 overall subcontracting dropped in Mendozan manufacturing. Firms tended to integrate production within their own plants rather than letting others establishments do some parts or processes. Yet, our own survey and other sources suggest that at least among some firms in the metal-mechanical industry of Mendoza there is increasing collaboration and they tend to function as a system of firms rather than in isolation.

Three recent examples may be mentioned. In all cases, the provincial government had an important role to play. IMAA, Industriales Metalúrgicos Argentinos Asociados is a group of five medium-sized firms from Mendoza. They have joined efforts in an export consortium that sells to the foreign markets of the ex-Soviet Union and Eastern Europe. This group of firms is legally bound under a new figure of business enterprise, previously unknown in Argentina: a UTE (Unión Transitoria de Empresas) or Transitory Consortium of Enterprises. It is one of the more serious attempts to build a consortium of firms, which although individually they continue to compete in national markets (as well as in all the other foreign markets), they are moving towards a greater production complementation and a multiplication of each firm's individual strengths.

Even though this strategic alliance of firms is initiated exclusively to sell in foreign markets, today the firms which make up IMAA are carrying out several tasks oriented towards a more rational use of their resources. Thus, for example, they are taking collective steps to improve quality so that their products will meet all the European Community and North American standards.

Similar examples, although of a smaller scale due to the firms involved, are the CANG group (in the area of fruit, vegetable, and wine refrigeration), and the group of firms which came together to participate of the recent improvement and upgrading of a number of provincial hospitals in Mendoza. In the latter example the main contractor was the Medical Division of Siemens Argentina.

Agreements Among Leading Disintegrated Firms: The Case of IMAA

IMAA results from a five year agreement with the Soviet Union signed in 1989 for a total of more than 32 million dollars. This agreement was the result of a mission to the Soviet Union led by José O. Bordón, then governor of Mendoza, and a group of local entrepreneurs. Over five years, the firms Talleres Cóndor, Frannino, Gasquet Sudamericana, Arquímedes Rossi, and Inquimet are to pull efforts into a so called UTE, Unión Transitoria de Empresas (Temporary Union of Firms) to provide different kinds of machinery and equipment for the food

and beverage industry (Los Andes 12/6/1989, Supl. Económico).²⁰ These are medium-sized firms occupying between 20 and 100 employees. Firms estimate that, for example, during 1991 this contract would mean the use of their full capacity for 8 months of the year (Los Andes 7/25/1991a, Perfil Económico). In addition, "more than 12 small shops are working for the group in areas of lathes and other metallurgical tasks" (Los Andes 12/6/1989, Supl. Económico). We may estimate the total employment of this UTE at around 300, which would make it the third largest manufacturing establishment in the metal-mechanical industry of the province.²¹ The local entrepreneurs involved in this operation highlighted the fact that they had been able to put aside differences and to work together:

[Norberto Battistini] *"None of us alone could assume the contract, and I believe that a sign of commercial maturity is given by the fact that the group is made up of firms which have competed in the same market for more than 40 years"* (Los Andes 12/6/1989, Supl. Económico).

[Eduardo Frannino] *"In the modern world there is no more room for individualism Only the sum of wills may carry a people to do the big things needed by that same people"*

It wasn't easy.... Difficulties made us strong, putting aside each firm's individualities and fusing in only one philosophy" (Los Andes 6/11/1990, p. 5).

The role of the provincial government is highlighted by governor Bordón using a tennis analogy:

"We are not going to enter the world playing separately, with an inefficient State or with speculator entrepreneurs, but playing doubles, with a State willing to be efficient and with entrepreneurs which want to risk and invest...." (Los Andes 6/11/1990, p. 5).

Other examples

A second example is provided by the constitution of another UTE of metal-mechanical firms, in this case for the provision of certain equipment for four hospitals in the province of Mendoza. Equipment contracted includes beds, stretchers, desks, and other hospital equipment. The contract is part of the upgrading of the hospitals: Central and Materno Infantil (both in the capital), Italo Perrupato (in San Martín), and General Alvear (in General Alvear). The overall contract of 10 million dollars was awarded to the División Electromédica of Siemens SA (Clarín 9/2/1991, p. 19; Los Andes 7/25/1991b, Perfil Económico). The UTE of local firms is made up of six enterprises: Giufre, Conal, Forma, Cuyomet, Arangio, and Stegma. Overall these firms are smaller than the ones making up the other UTE mentioned above. The money involved is also much less than the sales to the Soviet Union. The first part of the contract with Siemens involves sales for about 150,000. This means work for 45 to 60 days for each of the six firms involved in the project. These firms occupy between 10 and 40 people. The overall employment for this UTE may be calculated at around 200 people. However, the initial discussions within the local organization of metal-mechanical firms (ASINMET), involved 28 firms.

Again, as in the previous example, entrepreneurs point to the importance of being able to solve differences among themselves and work together.

[Norberto Battistini] *"We keep on underlining the importance of coming together to work, because we think that for the present this is more important than the amount of the contract...."*

This enables the associates [of ASINMET] to be better acquainted with one another and to participate in the future in other bids. After this job, for example, we will already have all the matrixes for all the hospital elements we are making now" (Los Andes 7/25/1991b, Perfil Económico).

As in the example above, firms specialize in certain tasks and there is disintegration of production. All of this means an increase in the interconnection of firms.

[Norberto Battistini] *"[Jobs are divided] by types and according to the elements each firm has. Among themselves they study the kind of jobs to do and then they divide the tasks. It is like a utilization of the comparative advantage of each enterprise working in keeping with the rest. It makes no sense that two firms under-utilize two elements if they may agree on utilizing each fully one element...."*

[There is already] greater specialization. Each firm already has its own matrixes, for example, for sinks, for beds, and thus for all the other elements" (Los Andes 7/25/1991b, Perfil Económico).

To sum up, the alliances being forged by different firms in the metal-mechanical industry of Mendoza have as their overriding objective the search for greater specialization. An important actor in this process is the local government. The search for greater collaboration is also prompted by diminishing domestic sales and a greater reliance in foreign markets.

6.4) Continuities and Discontinuities in the Transition: Linkage Structures, Governance Systems, and the Emergence of New Agents and Institutions

In the previous section we looked at the different kinds of social practices that govern linkages. A point to which we have so far only made a passing reference is the temporality of practices. This is relevant in the context of linkage structures and more so in terms of describing the transition to flexible forms of production. In other words, governance systems are introduced at a certain point in time and begin to coexist (or clash) with previous practices. This was illustrated through the words of some of the participants in the new firm alliances. Entrepreneurs pointed out they had to put aside previous ways of relating to each other. The same can be said about a connected theme: the management of contracts by specialized contractors. Other practices such as gossip, for example—which we have already discussed explicitly—or the advancing of 40% of the value of a machine as down-payment are practices entrenched and clearly established. Yet we may hypothesize that the latter practice was introduced at some point in time and that there is a story behind its introduction.

In the same manner, the low social esteem attached to working as a subcontractor, and more so as a captive subcontractor, clashes with the new practices and the new emerging networks of firms. Diminishing domestic sales are pushing firms to become part of these new networks. Yet the networks tend to have a pyramidal shape that puts most firms in them in an unequal power situation. The larger firms at the top of these hierarchies must also (and frequently) resort to license agreements with foreign competitors in order to survive. Again they face the dilemma of developing new social practices that place under a more favorable light the use of foreign licenses instead of relying solely on in-house developments.

The corollary to this chapter is that the practices attached to governance systems vary with the linkage structure they support. In other words, strategic alliances and the problems associated to the management of contracts by specialized contractors are attached to the emergence of those very same agents and a deeper social division of labor (section 6.1). Strategic alliances also involve three types of agents that did not have a large role before the transition. First, there are the firms themselves. Though most of them have been around for a number of decades, a new generation of people and old people with new ideas now command them. Second, we have a larger role taken by the provincial government mediating in establishing and coordinating contacts and sales in foreign countries. Finally, intermediate institutions that congregate firms and institutions which connect more closely universities and research centers, firms, and state bodies are being forged to address new problems and new challenges that necessitate the pooling of resources and greater collaboration among previously isolated agents. This is particularly true in the case of labor and managerial training, an improvement in quality and foreign marketing, and the dissemination of general technical information.

Viewed from a different perspective, changes in linkage structures, governance systems, and in the nature of agents and institutions reflect changes in the mode of regulation. As it was stated in Chapter One, the mode of regulation embodies both state (government) and non-state institutions and rules.

In our case study, the emergence of new ways of organizing production is paralleled by a number of developments at the level of the mode of regulation. First, there are a number of

changes similar to those taking place in other countries. Labor markets are becoming more flexible. Centralized and collective industry-wide wage bargaining is being replaced by bargaining at lower levels (industrial branch or firm). State regulations on contracts, firing and hiring, and working conditions are being relaxed. The state is retreating from major infrastructural investments and from large and bold planning interventions. Paradoxically, as it has been noted by other writers, the retreat of the state from the public sphere is in itself a major show of interventionism (Scarpaci 1990). The rhetoric of unleashing the positive forces of the market comes along much talk on making local industries and services more competitive in the global economy.

In this context, the provincial government of Mendoza, in connection with some of the major firms operating in the province, has been building since 1983 a new image for Mendoza. The image is of collaboration among government, private firms, and intermediate institutions. The "new Mendoza" even recycles the traditional siesta, a major local cultural institution, as an asset that increases productivity. A national TV campaign launched a few years back (and paid mostly by a group of five major firms in Mendoza) argued that because of siesta "in Mendoza each day has two mornings". This, of course, run against the view in Buenos Aires of the siesta as a waste of time. It is now widely recognized by the general public in most parts of the country that Mendoza has a government (and a public sector) that sets it apart from most other provincial administrations. Mendocinos themselves take pride in their government and contrast it with an inefficient, wasteful, and insensible national government.

In terms of non-state institutions and rules, the transition in production involves the adoption and acceptance of practices. Thus, for example, the traditional leeriness of engaging in inter-firm ventures is supplanted by collaboration. Essentially paternalist labor relationships are being challenged by labor practices based on labor segmentation. An aversion (by most firms) to become subcontractors of other (large) firms clashes with a new perspective that celebrates being part of a network commanded by a known and very successful contractor firm.

Firms can no longer function as islands detached from other producers, but must move into a system of firms. This tendency has immediate and future territorial consequences.

**Figure 6.10. Historical Continuities and Discontinuities in the Capital-Goods Industry of Mendoza:
Linkage Structures, Agents, and Institutions**

LINKAGE STRUCTURES		
Old		New
Horizontal and simple		Pyramidal and complex
Capacity subcontracting		Specialized subcontracting
Vertical integration		Vertical disintegration
Strong linkages with local clients		Strong linkages with foreign clients
Weak linkages to metalworking subcontractors		Strong and complex linkages to metalworking subcontractors
More demands prompts expansion of in-house capacity		More demands prompts expansion of in-house capabilities of coordinating external capacity

AGENTS		
Old		New
Integrated contractor		Specialized contractor
		Independent subcontractor
		Non-specialized subcontractor

INSTITUTIONS		
Old		New
Trade organizations		Provincial government
		Intermediate mediating institutions institutions try to connect firms universities, the state, and firms' organizations

Figure 6.11. Mendoza, The Evolution of the Capital-Goods Industry in Terms of Linkage Structures and Governance Systems

	INDUSTRIAL	GOVERNANCE	SYSTEMS	
TYPES OF INPUT-OUTPUT SYSTEMS ↓	All ring no core (no hierarchy)	Core-ring, coordinating firm (some hierarchy)	Core-ring, considerable hierarchy	All core (vertical integration = all hierarchy)
Atomistic Producers	Mendoza, early 1900s			
Process Producers				
Agglomerated Network, mostly small units	Mendoza, early 1960s			
Agglomerated Network, some large units	Mendoza, early 1970s	Mendoza, early 1990s		
Dispersed Network, mostly small units				
Dispersed Network, some large units				

Source: based on a typology by Storper and Harrison 1990, 15.
Data from Mendoza gathered from interviews and secondary sources.

NOTES

CHAPTER 6

¹ For a more ample treatment of these topics see the introductory chapter of Katz (1986); see also, Chudnovsky and Nagao (1983).

² Katz and Kosacoff (1989) argue that this is characteristic of Argentinean and Latin American manufacturing.

³ It has to be kept in mind that there is dynamism through time among different types of firms—a firm may pass from one category to another. This does not necessarily mean a sequence or evolution, be it linear, circular or cyclical. In the same manner, as shown in section 5.2.1, workers and technicians move between firms of different types. See also the outstanding works of Solinas 1982; and Schmitz 1982; which show, with examples from the textile industry in Italy and Brazil, the bubbling and fermenting dynamics of firm formation and workers' careers.

⁴ Note that we are assuming firms have only one establishment. A fair assumption in the context of this study where the majority of the firms surveyed have one plant.

⁵ Data are missing/do not apply, in eight cases for some of the three dates: 1982, 1986 or 1990.

⁶ See the classification of forms of subcontracting in Holmes (1986).

⁷ Some firms move in both periods.

⁸ There are many problems related to the construction of classifications and typologies which we cannot address here (see, for example, Harvey 1969). As for firm classifications see, for example, Taylor and Thrift (1982), Pavitt (1983).

⁹ In the popular talk of Mendoza, someone who is very aspirante is someone with an iron will, tenacity, and desires personal success.

¹⁰ The question of the use of information is expanded further on in the chapter.

¹¹ A bandoneón is an accordion-like instrument brought from Germany (apparently by sailors) in the early decades of this century to Buenos Aires where it became the star instrument of tango music.

¹² In its essence this description comes close to the flexible production model sketched by David Harvey (1989, 150-55),

¹³ Normally, there is more work at the end of the summer and in the spring, that is, immediately after the grape harvest and before it. During the winter, the flow of work slows to a trickle.

¹⁴ For a larger discussion see Borello (forthcoming), Soplando vida al metal. Historia de la metalmecánica mendocina, 1895-1990. Mendoza: Primera Fila.

¹⁵ For the case of Argentina see Lifschitz (1986).

¹⁶ Nineteen-seventy-four was a peak in the construction industry. Indeed the period 1973-76, which corresponds to the Peronist government overthrown in 1976, is one of the periods in Argentinean history in which more housing and public works were undertaken.

¹⁷ The Greco boom (and bust) was the culmination of one of the most serious crisis of overproduction in the wine-industry of Argentina. By the mid-1970s twice the annual wine production had become part of the regulatory stock. Tax incentives in place in the late 1960s had prompted the plantation of thousand of additional hectares with vines which were entering production. Wine consumption increased because prices were controlled and real salaries expanded. After 1976, with the military in power and new financial regulations in effect, Greco began building an empire that included what became the second largest private bank in the country and dozens of bodegas and other firms. The tremendous expansion of Greco was financed with speculative maneuvers which increased the price of wine and with self-loans. Greco rode what everyone in Argentina knows as a financial bicycle. At one point loans and speculative operations caught up with Greco and with his fall, fell the whole regional economy. Land devaluation and falling agricultural prices were compounded by dropping real salaries and an exchange rate that favored imports (CEPA 1984; Manzanal and Rofman 1989).

¹⁸ "...if the foreseen longevity [of the relationship] is medium-high, opportunist behaviors are deterred by the higher probability of being caught and the associated fear of possible extortions" (Ottati n.d.).

¹⁹ During field-work I found firms which felt they had been short-changed or at least that their counterparts in a deal had acted opportunistically. Excepting the case of a firm which had initiated (and won) a trial for the un-authorized copy of a patented product, the rest of the cases emerged from asymmetrical relationships among firms: late payments in a subcontract or displacement of a smaller firm from an export consortium.

²⁰ An UTE is a fairly recent form of enterprise recognized legally in Argentina. Other forms are SA, Sociedad Anónima (stock company), SRL, Sociedad de Responsabilidad Limitada (limited company), and others.

²¹ Estimations are based on data for the 1985 economic census. Total employment for the 12 small shops is estimated at around 50, or no more than 5 per shop.

CHAPTER 7

LINKAGES AND GOVERNANCE SYSTEMS FROM AN URBAN AND REGIONAL PERSPECTIVE

This chapter looks at linkages and governance systems from an urban and regional perspective. The first part places in a wider perspective the connection between industrialization and urbanization. The second part discusses the intra-metropolitan consequences of the linkage structures and governance systems identified in the previous chapter. The third part looks at the role played by the capital-goods industry in the geographical industrialization of Mendoza.

7.1) Industrialization and Urbanization

The central role of industrialization in the transformation of economies and societies has been recognized by classic and contemporary social scientists. In the specific case of Latin America, even the broad concepts around which much scholarship circulates are connected to industrialization: import-substitution industrialization, comparative advantage, export promotion, infant (nascent) industry, bourgeoisie, and informal sector. The regional planning field incorporates other industrialization-related concepts as growth poles, primate cities, and regional development. Latin American scholarship perhaps has been even more concerned about industrialization and its role in the transformation of the continent.

Yet it is paradoxical that, though much Latin American scholarship has asserted the need to differentiate between center and periphery, the same premise was not upheld within the continent, and certainly very rarely within a specific country. In other words, though the point was made that Latin America was different and specific, few provisions were made for allowing for inter-country contrasts and certainly none for intra-country variations. Dependency theory and Latin American structuralism hinged on an assertion which put the question of space into the center of the discussion by recognizing that neither reality nor science are universal. But this assertion was generally not extended into its fullest dimension by recognizing, for example, the territorial base of industrialization.

The bulk of the literature on industrialization and urbanization in the Latin American context is pitched at the regional or national levels. Thus, very little has been written on the intra-city or intra-metropolitan level. How does industrialization affect city form? Even the standard available text on the subject makes little reference to this problem.¹ For all practical purposes, then, cities—even huge metropolitan areas—are dots in the map. Moreover, besides some obvious references to the difference between primary cities and peripheral areas, little detailed analyses have been carried out on the wide variation

among firms in different regions and cities and on the diverse conditions of production prevailing at different geographical locations and scales. This section aims to fill that gap by focusing on two aspects of the territorial organization of production: (i) the division of labor and urban form, and (ii) industrial development and geographical industrialization.

7.2) Integration/disintegration of Production and the Location of Firms within the City of Mendoza

Social scientists have been concerned with the relationship between industrialization and urbanization though most have never made explicit where and how they connect, or as Herbert Blumer (1990) put it: "how does industrialization enter group life?" For our purposes here we could translate this question as "how does industrialization enter urban life?" Or, paraphrasing Allen Scott: what are "...the precise mechanisms that govern these relationships between the production system and urbanization in capitalist societies" (Scott 1986a, 27).

The mechanisms Scott identifies are associated with the social division of labor and more specifically to the vertical disintegration of production. The vertical disintegration of production alludes to the process of fragmentation of parts of the labor process into different units of production. For example, vertical disintegration occurs when a textile mill ceases to carry out in its premises the dyeing of fabric and subcontracts that process to another establishment. The social division of labor also embodies the idea of horizontal disintegration of production: the emergence of new firms where similar processes are carried out, or, to use the same example, the appearance of new textile mills. Capital and information flows also connect the different firms in the industrial complex. Thus we have a multiplicity of linkages within a complex structure.

Fragmentation of the labor process or disintegration will occur when it is cheaper to externalize a step in the production process than to do it inside the firm. In technical terms this means that transaction costs are lower than economies of scope. Economies of scope allude to the economies which may be obtained by carrying out two or more different tasks within the enterprise instead of putting out part of the process to outside producers (Scott 1986a, 27; Storper and Walker 1989, 130-31).

Economies of scope are negligible or negative and hence disintegration is more likely under four circumstances. The first case is where processes can be technically and economically separated one from the other. The second is when markets are

"uncertain and unstable". The third circumstance is the different optimal scale of different processes. The fourth case is where the existence of segmented labor markets makes externalization a way to tap into secondary labor markets (Scott 1986a, 27-28).

Scott and others have postulated that different linkage structures yield different urban forms. Scott notes that transactional relations (linkages) "often have onerous geographically dependent costs attached to them". The greater these costs per transaction, the greater the likelihood that producers will tend to converge spatially. Convergence is more likely where transactions have one or more of the following characteristics: "linkages are small in scale", "linkage structures are constantly changing", and "linkages are problematic...(in the sense that any given transaction must be carefully negotiated)" (Scott 1986a, 28).

Scott (1986a, 28) summarizes the connection between linkage structures and urban forms as follows.

"Industrial establishments that are small in scale, produce unstandardized outputs in small batches, and face unstable markets, are especially likely to have linkage structures with some or all of the three features noted above [linkages are small in scale, linkage structures are constantly changing, and linkages are problematical in some way]. Such establishments are also likely to be strongly marked by vertical and horizontal disintegration. The combined effect of these organizational and transactional relations is to encourage intense geographical as well as functional association among producers" (emphasis added).

Let us pause at Scott's summary and contrast what he has to say with what we find in the case of Mendoza. The capital-goods industry of Mendoza is made up of establishments of all sizes but most of them are small by Latin American standards and microscopic by North American parameters. Most of what they produce is custom-made and in small batches. Finally, the uncertainty and instability of markets probably reaches world records. Yet if there is something that has until very recently described the industry succinctly is the high vertical integration of firms and low functional and geographical association.

What accounts for this contrast?

First, in the absence of a dense fabric of capable specialized subcontractors, firms cannot disintegrate part of their production. Vispo and Kosacoff's (1992) recent study of the IBM plant in Martinez (Buenos Aires) illustrates this point. They found out that managers at that plant had to go out and find and "develop" suitable subcontractors. In contrast, managers at IBM plants in the US had a waiting list from where prospective subcontractors were screened. The IBM officials in the US could well take the very existence of subcontractors as a given, as something the market would provide.

Second, very unstable markets will not lead necessarily to vertical disintegration, but to the opposite behavior. Firms smooth rapidly changing markets not only by diversifying their mix of products and product lines, but also by doing everything they can in-house. Thus firms maintain a reasonable level of

occupied capacity. They certainly incur in additional costs, but are thus better prepared to maintain at least a core of skilled workers. As these firms carry out tasks which are many times peripheral to the main line(s) of products of the firm they acquire expertise in a number of areas. This, in turn, potentiates their capacity to shift products and models.

Third, rapidly changing prices in the context of year after year of very high inflation make long-term subcontracting relationships very difficult, for compensations have to be continuously negotiated. As it is known, although price indexes can be calculated, they reflect average price increases. That is, not all commodities increase their prices simultaneously nor they do so at the same rate. In a context of high inflation (such as 10% a month) and more so in hyperinflations (over 50% a month), the gap among relative prices conspires against the adoption of a single (or even a combination) of indicators by the parties engaged in a long term relationship. When the inflation rate is very high many firms will simply stop selling for they run the risk of burning their working capital. When prices are moving rapidly a firm can only be assured of its own prices, but not of the price at which it will be able to replace its stock of inputs and tools.

Fourth, what we have said so far conspires against the emergence of all kinds of subcontractors. Yet despite the significant capital outlay in which specialized subcontractors have to incur, it is more likely that they, instead of other types of subcontractors, will emerge. This is so because specialized subcontractors pool orders from hundreds of firms and thus can surmount some of the problems we have outlined above. Yet, because they are relatively scarce they are able to exert power and need not go out to find their clientele.

We have described in this thesis the linkage structures and governance systems supporting the capital-goods complex of Mendoza. Up to the very recent past most capital-goods producers had in fact very little material linkages connecting the different shops. Metal-working shops were either strongly connected to clients (and had very little if any production linkages with other metal shops) or were even part of those same industries in the form of plants' repair and maintenance shops. The emergence of new firms did not necessarily mean further disintegration and specialization, but rather the creation of a larger productive capacity. In essence each shop tended to function as an artisan, able to carry any task and to produce any product.

Firms tended to be close to their clients or to the bustling commercial and industrial districts of the turn of the century. The locational pattern of most Mendoza shops paralleled the pattern of their major clients. Thus, for example, firms working fundamentally for the wine industry would tend to locate near the hodegas; firms working for the cement industry would tend to locate close to the two major cement-processing plants. A similar co-location strategy held for firms making equipment for the beer industry and soft drinks. Yet even until the early 1980s almost all metal-mechanical firms remained highly integrated and a complex network of firms did not emerge within the industry.² Today, the trend seems for small- and medium-sized firms to cluster near the larger firms with whom they work.

In the same manner that metal-mechanical shops trained workers, generated a network of firms, and developed a clientele, they also led the direction of the city's growth. In most cases, the built environment followed the location of plants and shops, so much so that—in the absence of zoning regulations—a few decades later firms found themselves in the middle of a neighborhood. In many ways they spearheaded the direction of city growth.

A good example is the provincial legislation approved at the end of the 1970s to designate an area on the fringes of the city as industrial zone. The demarcation of this area in the southeast of the city followed the previous location of a number of firms (see Scott 1983, 247). Thus policy followed what amounts in fact to a fait accompli. The fairly recent clustering of metal-mechanical firms in this area of the city points to the newer ways of producing from a system of firms rather than in isolation. It also underlies the diminishing significance of local clients and their replacement by foreign customers.

7.3) The Role of Capital-Goods Firms in the Geographical Industrialization of Mendoza

In the industrial context we normally tend to think of technology as something which resides inside the firms. In other words, the concept of technology leads us to look at two groups of elements inside the firms: equipment and machinery, and organization. Yet a large portion of the technological stock of the metal-working industry of Mendoza is dispersed in several planes of the local milieu outside the firms.³

The geographical character of the historical development of the metal-mechanical industry of Mendoza can be observed from the following exercise. A comparison of the names of the firms surveyed by the economic censuses of 1964 and 1985 reveals that only about 20% of them survive.⁴ Despite the economic and political ups and downs which took place during that period, everyone would agree the metal-mechanical industry of Mendoza made an impressive, qualitative leap forward.⁵

Naturally, the question that emerges from contrasting an impressive process of firm rotation with a significant technological advance is: what is the mechanism through which technological knowledge is stored and transmitted from the dying to the emerging and continuing firms?

The question directs our attention to the local milieu, but where? and how? There are four major avenues used by the firms in the acquisition and transmission of technological knowledge. One is the diverse flows connecting firms within the industry, a point already raised in the previous three chapters, but especially in Chapter Five. The flows involve the movement of skilled workers from one firm to the other and material linkages. They also include formal and informal contacts among entrepreneurs in a relatively small milieu such as Mendoza. Such contacts involve meetings and gatherings in the association of metal-working firms (ASINMET) and in the cooperative for the acquisition of raw materials and inputs (CIMETAL). Then there are other kinds of contacts not directly related to work, such as family and friendship, that because the trade runs in families are hard to differentiate from formal meetings.

A second avenue of transmission and acquisition of information is the rest of the local economy, where the metal-mechanical industry plays a pivotal role. As argued elsewhere in this thesis, a substantial portion of the technological learning acquired by capital-goods firms results from their constant and fluid relationship with local and regional clients in the diverse areas of the economy.

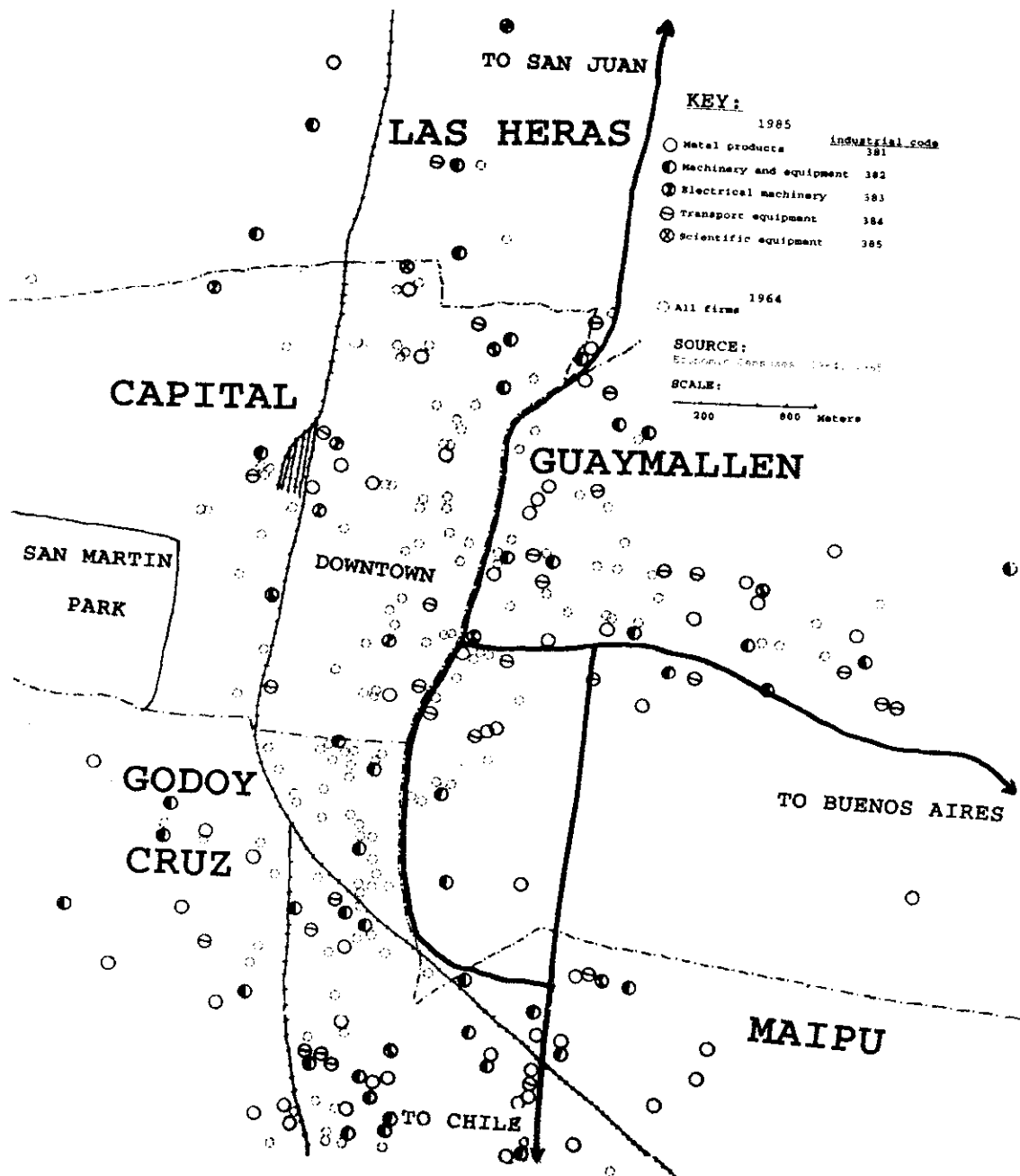
A third source of information originates outside of the country. The metal-mechanical industry of Mendoza has always had a steady relationship with the producers and users of machinery and equipment in several countries, in particular those of Southern Europe: France, Italy, and Spain. These three countries have been the model in the production of equipment for wine-making. Spain was exemplary in the construction of machinery for olive oil. The equipment for food processing and agriculture has mainly come from the United States, especially California and the Midwest.

There are many examples of the direct relationship between the industries of these countries, especially European, and the metal-mechanical industry of Mendoza. One is the direct transplant of skilled workers, technicians, and even firms and machinery from Italy to Mendoza. Another is the constant come and go of enologists between France and Mendoza. In more recent years, machinery fairs which take place annually in Milan, attract local entrepreneurs. In many cases (and here is where the territorial base plays a role), the influence of the developments taking place in those countries is not direct. Rather it reaches the local environment through mediating agents. One is the bodega or food processing plant. In many cases they import a machine unknown locally. That machine is then taken apart, studied, and copied (after some modifications) by local producers. Another agent is the importer or representative of imported machinery, who in some cases has become a manufacturer. Yet another mediating agent is the entrepreneur who brings into the local milieu new ways of organizing production. Interviews in Mendoza reveal that in recent years firms are trying flexible forms of production they have observed in Europe and especially in Italy. Survey results show that a significant number of entrepreneurs acquire technical information in their visits to manufacturing plants abroad.

A fourth channel through which firms receive (and to a lesser extent transmit) technological knowledge is the public and private agents and institutions. These include local universities and research centers, firms' consultants, firms' associations and unions, and state institutions. As opposed to the other three sources we have mentioned (the industry itself, customers, and foreign countries), this is not a traditional source of information. Moreover, until a few years ago, in Mendoza, there were no firm's consultants nor state agencies dedicated to these topics.

These four channels through which technological information circulates cannot be envisioned separated from their territorial support. They exist in and are part of the city of Mendoza and they also shape the direction and rate of growth. According to Storper and Walker (1989, 144), technology is one of the three "...principal dimensions of production flexibility... made possible by the formation of the territorial production complex". The other two, which we have not examined in this section, are the division of social labor and the local labor market. Storper and Walker's comments on this regard merit quoting them at length for what they say recreates the main points we have made in this section.

Map 7.1. Mendoza Metropolitan Area, Location of Metal-Mechanical Firms in 1964/1985.



TO SAN JUAN

LAS HERAS

NOTES:
 *Letters identify individual firms.
 *Dates under the letters depict the dates in each location.
 *Some firms have more than one plant at the same time.

SOURCE:
 Author's interviews in Mendoza, 1991.

SCALE:
 200 400 Meters

CAPITAL

DOWNTOWN

GUAYMALLEN

GODOY CRUZ

MAIPU

TO BUENOS AIRES

TO CHILE

Map details include various letters (A, B, C, D, E, F, G, H, I, J, K, L, M, N, O, P, Q, R, S, T, U, V, W, X, Y, Z) and dates (e.g., 1943-45, 1945-46, 1946-47, 1947-48, 1948-49, 1949-50, 1950-51, 1951-52, 1952-53, 1953-54, 1954-55, 1955-56, 1956-57, 1957-58, 1958-59, 1959-60, 1960-61, 1961-62, 1962-63, 1963-64, 1964-65, 1965-66, 1966-67, 1967-68, 1968-69, 1969-70, 1970-71, 1971-72, 1972-73, 1973-74, 1974-75, 1975-76, 1976-77, 1977-78, 1978-79, 1979-80, 1980-81, 1981-82, 1982-83, 1983-84, 1984-85, 1985-86, 1986-87, 1987-88, 1988-89, 1989-90, 1990-91, 1991-92, 1992-93, 1993-94, 1994-95, 1995-96, 1996-97, 1997-98, 1998-99, 1999-00, 2000-01, 2001-02, 2002-03, 2003-04, 2004-05, 2005-06, 2006-07, 2007-08, 2008-09, 2009-10, 2010-11, 2011-12, 2012-13, 2013-14, 2014-15, 2015-16, 2016-17, 2017-18, 2018-19, 2019-20, 2020-21, 2021-22, 2022-23, 2023-24, 2024-25, 2025-26, 2026-27, 2027-28, 2028-29, 2029-30, 2030-31, 2031-32, 2032-33, 2033-34, 2034-35, 2035-36, 2036-37, 2037-38, 2038-39, 2039-40, 2040-41, 2041-42, 2042-43, 2043-44, 2044-45, 2045-46, 2046-47, 2047-48, 2048-49, 2049-50, 2050-51, 2051-52, 2052-53, 2053-54, 2054-55, 2055-56, 2056-57, 2057-58, 2058-59, 2059-60, 2060-61, 2061-62, 2062-63, 2063-64, 2064-65, 2065-66, 2066-67, 2067-68, 2068-69, 2069-70, 2070-71, 2071-72, 2072-73, 2073-74, 2074-75, 2075-76, 2076-77, 2077-78, 2078-79, 2079-80, 2080-81, 2081-82, 2082-83, 2083-84, 2084-85, 2085-86, 2086-87, 2087-88, 2088-89, 2089-90, 2090-91, 2091-92, 2092-93, 2093-94, 2094-95, 2095-96, 2096-97, 2097-98, 2098-99, 2099-00, 2100-01, 2101-02, 2102-03, 2103-04, 2104-05, 2105-06, 2106-07, 2107-08, 2108-09, 2109-10, 2110-11, 2111-12, 2112-13, 2113-14, 2114-15, 2115-16, 2116-17, 2117-18, 2118-19, 2119-20, 2120-21, 2121-22, 2122-23, 2123-24, 2124-25, 2125-26, 2126-27, 2127-28, 2128-29, 2129-30, 2130-31, 2131-32, 2132-33, 2133-34, 2134-35, 2135-36, 2136-37, 2137-38, 2138-39, 2139-40, 2140-41, 2141-42, 2142-43, 2143-44, 2144-45, 2145-46, 2146-47, 2147-48, 2148-49, 2149-50, 2150-51, 2151-52, 2152-53, 2153-54, 2154-55, 2155-56, 2156-57, 2157-58, 2158-59, 2159-60, 2160-61, 2161-62, 2162-63, 2163-64, 2164-65, 2165-66, 2166-67, 2167-68, 2168-69, 2169-70, 2170-71, 2171-72, 2172-73, 2173-74, 2174-75, 2175-76, 2176-77, 2177-78, 2178-79, 2179-80, 2180-81, 2181-82, 2182-83, 2183-84, 2184-85, 2185-86, 2186-87, 2187-88, 2188-89, 2189-90, 2190-91, 2191-92, 2192-93, 2193-94, 2194-95, 2195-96, 2196-97, 2197-98, 2198-99, 2199-00, 2200-01, 2201-02, 2202-03, 2203-04, 2204-05, 2205-06, 2206-07, 2207-08, 2208-09, 2209-10, 2210-11, 2211-12, 2212-13, 2213-14, 2214-15, 2215-16, 2216-17, 2217-18, 2218-19, 2219-20, 2220-21, 2221-22, 2222-23, 2223-24, 2224-25, 2225-26, 2226-27, 2227-28, 2228-29, 2229-30, 2230-31, 2231-32, 2232-33, 2233-34, 2234-35, 2235-36, 2236-37, 2237-38, 2238-39, 2239-40, 2240-41, 2241-42, 2242-43, 2243-44, 2244-45, 2245-46, 2246-47, 2247-48, 2248-49, 2249-50, 2250-51, 2251-52, 2252-53, 2253-54, 2254-55, 2255-56, 2256-57, 2257-58, 2258-59, 2259-60, 2260-61, 2261-62, 2262-63, 2263-64, 2264-65, 2265-66, 2266-67, 2267-68, 2268-69, 2269-70, 2270-71, 2271-72, 2272-73, 2273-74, 2274-75, 2275-76, 2276-77, 2277-78, 2278-79, 2279-80, 2280-81, 2281-82, 2282-83, 2283-84, 2284-85, 2285-86, 2286-87, 2287-88, 2288-89, 2289-90, 2290-91, 2291-92, 2292-93, 2293-94, 2294-95, 2295-96, 2296-97, 2297-98, 2298-99, 2299-00, 2300-01, 2301-02, 2302-03, 2303-04, 2304-05, 2305-06, 2306-07, 2307-08, 2308-09, 2309-10, 2310-11, 2311-12, 2312-13, 2313-14, 2314-15, 2315-16, 2316-17, 2317-18, 2318-19, 2319-20, 2320-21, 2321-22, 2322-23, 2323-24, 2324-25, 2325-26, 2326-27, 2327-28, 2328-29, 2329-30, 2330-31, 2331-32, 2332-33, 2333-34, 2334-35, 2335-36, 2336-37, 2337-38, 2338-39, 2339-40, 2340-41, 2341-42, 2342-43, 2343-44, 2344-45, 2345-46, 2346-47, 2347-48, 2348-49, 2349-50, 2350-51, 2351-52, 2352-53

"...the flexible milieu of the territorial complex promotes technological innovation because each center comprises a stock of know-how, labor skills and firm capabilities. Marshall (1900) recognized this contribution to the dynamics of capitalist development by noting that skills and information were 'in the air' of industrial districts, such that the 'mysteries' of production 'became no mysteries'... In the process of conducting business in territorial networks, one learns about the manifold facets of production in the local complex. This leads to the formation of a business culture in which practical forms of knowledge about production processes and markets are socialized, and tastes and sensibilities about materials, machines, and product designs are refined. For example, innovation in specialized tile equipment in the Sassuolo district of the Third Italy has been stimulated by the close interactions between tile producers (with their needs) and equipment producers (with their specialized capabilities)" (Storper and Walker 1989, 145-46).

As the quote implies, there are parallels between the industrial districts of the Third Italy and the Mendozan case. Yet we do not mean to equate the two. Fundamental differences separate them. In terms of our discussion, the deep discontinuities among firms in the capital-goods industry conspire against socialization of technical information. The feeble linkages connecting many firms to others create further impediments to the dissemination of information. As it was pointed out in the previous section, a number of micro and macroeconomic factors conspired against the establishment of complex networks of firms.

Yet new developments are pointing to a transition in the way of organizing production. That transition will have two kinds of territorial dimensions. On the one hand, it will modify the present and future location of firms. This will have immediate consequences at the intra-metropolitan level and hence will impact on urban form and on the direction of the city's growth.

On the other hand, the transition changes the prevailing flows of technical knowledge and hence part of the geographical industrialization process. The result are two major contrasting tendencies. First, the new linkage structures make firms in the industry more interdependent and the general tendency points to greater functional and spatial association. Second, the previous trend does not necessarily mean the emergence of a more autarchic regional economy, but in many ways the opposite. Many local firms of all sizes are becoming part of networks of firms that depend to a large degree on foreign markets and foreign technology. The transition also has consequences in terms of questions of integration/disintegration of production and on the future reproduction of the local capital-goods industry into the future. As we argued in the previous two chapters, there is a tendency towards greater vertical disintegration of production. Yet, this tendency is accompanied by greater collaboration and the emergence of strategic alliances among firms. The latter means, of course, a contrary trend towards integration.

On the question of the reproduction of the industrial complex into the future in Mendoza, the transition poses two major obstacles. First, a greater reliance on foreign markets curtails the potential contacts and experience skilled workers may make before they leave an enterprise and set up their own. Second, the new more pyramidal structures of firms block the horizontal transmission of information among enterprises and skilled workers. It also leaves out of an intimate contact with the major technological developments those workers which are hired on short-term contracts and those workers which labor in subcontracting firms at the bottom of the hierarchy. Whereas previously information on markets, products, and processes was, so to speak, "in the air" and widely available to those in the industry, now that information (or at least the cutting edge) tends to be more concentrated. It is then likely that from the transition what is going to emerge is a smaller number of larger firms.

NOTES

CHAPTER 7

¹ Robert N. Gwynne (1986). *Industrialization and Urbanization in Latin America*. Baltimore: Johns Hopkins University Press.

² A high level of vertical integration also means low specialization both in terms of products and tasks undertaken within the enterprise.

³ Camagni 1991 Introduction, p. 8.

⁴ Here we are referring to the number of firms; if employment or value of production were used we would probably find a larger rate of survival simply because establishment rotation is higher for smaller establishments. Establishments with less than six employees were excluded.

⁵ Jorge Katz (1986 1987b) reminds us that technological development is a maturative process, but the emphasis of his works has been placed in the evolution of technological learning *inside* the firms.

CHAPTER 8

SUMMARY, CONCLUSIONS, AND CONSIDERATIONS FOR FUTURE RESEARCH

This chapter closes the dissertation. It has three sections: the first section summarizes the main conclusions which have already been advanced in previous chapters; the second interprets and amplifies some of those conclusions in a larger framework; the third suggests some fruitful lines of future research. The summary of conclusions also includes a discussion of the methodology and techniques used. Some of the methodological problems and issues highlighted are treated in greater detail in the appendix at the end of this monograph.

8.1) Summary and Conclusions

8.1.1) Methodology, Techniques, and Subject Matter

I am deeply convinced that neither the issues involved nor the richness attained in the course of research could have been possible without a substantial amount of fieldwork. To begin with, the topics involved do not easily match accessible and available data. Indeed, it may be argued that the further one moves from common sense conceptions and understandings of how things work, the harder it is to find already collected secondary data. Yet, paradoxically, other sources of information which are not commonly used suddenly become of interest. At times it would seem that we are so blind that we cannot see the obvious although we stop at all kinds of artifacts created by the cultures which surround us.

Despite the support this thesis provides for fieldwork-based research, geography and other allied disciplines with interests in the planning field seem to rely less and less on first-hand experience (Rundstrom and Kenzer 1989). Some researchers are questioning this trend and showing that, for example, in industrial geography the fundamental research needs to involve fieldwork (Schoenberger 1991). A recent review of the state of the art in Latinamericanist geography also presents a strong support for ways of gaining first-hand knowledge in urban topics (Griffin 1992) and in social and economic affairs (Lawson 1992; Scarpaci 1992). In light of the previous paragraph about ready-made data, to rely almost chiefly on secondary sources and tertiary accounts seems like a dangerous trend that runs against creativity and the development of a critical perspective.

The same happens with concepts. This thesis has employed certain tried methods and techniques and hence their accommodation to a new situation. It has also meant the confrontation of two concepts (linkages and governance systems) with their representation in a concrete case study. Contrary to positivist methodologies which do not allow room for an intimate contact between concept and reality, the approach used here involves a theorization (see Sayer 1984), a further

refinement and clarification of the concepts used as the research unfolds. Hypotheses are guides, paths through which the researcher circulates in the field, and not unchangeable placards against which findings are thrown like pieces of mud to see whether they stick.

This study emerges from a time and a space. Industrial geography is moving in the direction of a closer dialogue with anthropology not only by way of the methods used but also by way of the questions asked. Method and theory, tools and subject matter are related as revealed by an interesting debate on industrial geography in Great Britain (Massey and Meegan 1985). This dissertation is one example but others abound. The connecting, if not always converging, interests of what some participants already call the "Californian school of industrial studies" (Storper and Walker 1989, introduction), are largely based on fieldwork, as the products of such writers as Scott and Storper attest. On the other side of the Atlantic, a number of European writers are also advancing the field of industrial studies from a perspective largely based on fieldwork (Camagni 1991; Massey and Meegan 1985). In Argentina, the large research program undertaken by a joint team of researchers in the Consejo Federal de Inversiones (Federal Council of Investments) and the Economic Commission for Latin America and the Caribbean (United Nations) is also approaching the study of manufacturing from an interdisciplinary perspective that stresses the importance of gathering primary data.

8.1.2) From Industrial Location to Geographical Industrialization

This research set out to examine to what extent the geography of manufacturing is more the result of firms' own activities than the effect of existing favorable conditions of production. I chose to look at this problem from the perspective of the organization of production conceived as the confluence of two concepts: linkages and their forms of governance. The organization of production is examined in a historical account centered on a case study of the capital-goods industry of Mendoza, Argentina.

A conventional argument in location theory is that firms locate in certain regions because favorable conditions exist. Both localization and urbanization economies tend to concentrate in capital, primate cities, especially in South America (Gwynne 1986). To use an example taken from an industry —such as the capital-goods of Mendoza— with high demands on labor and technical skills,¹ and which is located in the interior of a semi-industrialized country such as Argentina, would only make it more difficult to disprove this tenet of industrial location theory.

Nevertheless, this study shows that geographical industrialization (Storper and Walker 1989) is a more apt concept than industrial location to explain how the geography of industry is constructed. By looking at how firms solved a number of production problems through time, we have been able to paint a detailed picture of the evolution of the complex of firms which constitutes the capital-goods industry of Mendoza. The complex consists of a host of firms of different sizes and characteristics which are connected among themselves and with the rest of the economy through linkages. A typology of firms was devised to frame the description of the forms of governance that control and direct linkages.

This study shows the advantages of conceiving industrialization not as the location of plants in response to favorable conditions, but as a process initiated by the firms themselves. While a traditional industrial location analysis might have had some relevance for a study of branch plants in peripheral regions, the idea of geographical industrialization is better suited to describe the host of historical processes which are forged in a particular place to generate industrialization.

The specific conclusions associated to this point are:

** Capital-goods firms generate their own linkages as they grow. Key examples are labor, subcontractors, clients, and services.*

Labor was trained in the shops or brought from Europe. Through time some skilled workers left the shops where they had learned their skills and set up their own establishments.² A clientele is also built, so to speak, in time. A capital-goods industry emerged at the turn of the century, much before explicit measures of protection for local industry. The ability of local firms to compete with foreign producers of machinery was based on a number of non-tariff advantages; some of them are even true today. The central competitive edge of these firms is their proximity to clients. Services were secured by the firms themselves because they were not available in the local milieu. Examples include electricity during the early decades of this century, the provision of machine-tools during the world wars, and technical information after the 1950s.

** The degree of subcontracting (within the capital-goods industry and between the industry and other sectors) fluctuates over time even though vertical integration within those same firms remains high. In the long haul there is a tendency to increase the degree of subcontracting. Yet the kind (or kinds) of subcontracting prevalent at one time is (are) not necessarily the same we find at others.*

For many decades most of the (little) work put out to other firms was limited to capacity subcontracting. That is, the contractor was passing on to other firms work he/she could not do because he was working at full capacity. In recent years we are seeing the emergence on a wider scale of forms of specialized subcontracting. In this second case, the contractor passes on to other firms a number of tasks and operations. Specialized subcontracting involves the establishment of more complex relationships among enterprises. Yet, for any form of subcontracting to emerge there have to be firms which are capable of undertaking these tasks.

** Decisions on integration/disintegration within the industry depend to a large extent on the existence of other firms which may be able (and willing) to undertake certain tasks.*

The literature generally assumes that given sufficient demand—and hence a large market—some firms would perceive the new opportunities and hence would cater to those demands. Because most of the initial research was undertaken in industrialized countries, the existence of firms was taken for granted. Yet, research on semi- and little-industrialized countries shows that the very emergence of firms is problematic. Firms are not necessarily a given; more so in the case of small and medium-sized firms. Any international comparison will show that small and medium-sized manufacturing enterprises are a much smaller percentage of the total manufacturing units in developing as opposed to developed economies (Yoguel and Gatto 1989).

This dissertation then suggests that in developing economies any study that deals with subcontracting and with issues of disintegration of production has to take into account the process of firm formation. As a few studies on this topic show, a host of social, economic, and psychological processes come to play in the creation of firms (Quintar 1991).

8.1.3) From Craft to Flexibility: Theorizing the Transition to Flexible Production

The case study developed in the preceding chapters had the objective of showing that capitalism is undergoing profound changes in the semi-periphery. Couching the discussion in the language of the French regulation school, the argument was that both the regime of accumulation and the mode of regulation are in a transitional phase. I focused the analysis on production, one part of the regime of accumulation. Within production much of the preceding discussion had the objective of showing that the social division of labor (the specialization of work among different firms) is undergoing substantial changes. I used two major concepts to dissect the social division of labor: linkages and governance systems.

The combination of different types of firms with the linkages which connect them yielded different linkage structures. Linkage structures are bound by governance systems. In Chapter Six I analyzed linkages and governance systems and concluded that they are being modified. Changes in the flows among firms and in the practices and agreements sustaining these flows are accompanied by the emergence of new types of firms and new institutional actors. The argument is thus extended to imply that changes in the social division of labor—that is at the level of the regime of accumulation—are accompanied by changes in two domains of the mode of regulation: state and non-state institutions.

On a broad plane these findings coincide with other researchers' findings about manufacturing in Argentina (Vispo and Kosacoff 1992; Gatto 1990) and in other areas of the developing world (Sabel 1986; Storper 1990; 1992). Yet, in Argentina and in other semi-industrialized countries, neither the existing situation nor the one being created bear the same traits found in industrialized economies. Accordingly, we should not expect

necessarily to find a replication of what we see in Europe, Japan or North America.

Although at a macro level the industry I have studied can be placed in a context that bears many of the traits of Fordism, the industry itself is organized along craft lines. This, however, does not invalidate the whole theoretical edifice (see Chapter One). Substantial portions of Italian manufacturing, but also of American and Japanese industry, are comprised of craft shops. In the capital-goods industry of Mendoza even the few large plants resemble a collection of shops under one roof (Katz 1986).³ In this industry production was never mass-production. There were attempts in some shops to produce in long series (instead of one or two machines at a time) during the 1960s and 1970s, but they did not prosper (Interviews 1991; ASINMET 1980).

Yet until very recently the industry could neither be characterized as being organized along flexible specialization lines. Most shops are not specialized. They produce a wide range of products and models and they carry out many operations under the same roof. As such, they are neither specialized in terms of the markets they serve nor in terms of the tasks and processes they undertake. Yet, as argued in Chapter Six, all of this is changing.

Flexibility may not be an entirely apt label to describe what is happening now and what will likely transpire the future.⁴ Yet it does convey the main traits of the transition. Flexibility is apparent in some of the new organizational forms being tried within the capital-goods industry, such as the strategic alliances described in Chapter Six, and in employment and working practices.⁵ Paradoxically, however, for decades, the capital-goods industry of Mendoza⁶ has exhibited traits that the enthusiastic (and naive) researcher may interpret as proof of flexibility (for example, Sable 1986; Storper 1990). The firms I have studied show a remarkable flexibility in terms of output volume, product, the use of machinery, and restructuring. For example, in the last fifteen years, capital-goods firms have surmounted extremely wide fluctuations in demand. In several sections I have alluded to the wide mix of products and product lines characteristic of the industry. Clearly, firms are flexible in response to restructuring. That is, they re-organize their fixed and working capital in very innovative ways.

If the model of flexibility is that of the Third Italy a number of differences and similarities should be noted. The *impannatore* figure present in the industrial districts of Northern Italy is absent in Mendoza.⁷ Some of the institutions present in the industrial districts are only partially there. For example a cooperative created in the 1970s, CIMETAL, purchased raw materials for metalworking. Today it survives with some difficulty and it is being by-passed by the larger producers. There are some elements of the flexible specialization model such as the superimposing of economy and society, of firm and its environment in the case of Mendoza. However, contrary to widely held ideas, for flexible specialization to emerge there has to be a certain measure of macroeconomic stability which had been absent in the tumultuous Argentine economy of the late 1960s and 1970s.⁸ The new developments are taking place in the framework of greater political and economic stability. We may place the

new developments in the early 1980s (despite two waves of hyperinflation in 1985 and 1989).

The transition in the Mendozan capital-goods industry can be described as from "machine-facture" to "system-facture" (Kaplinsky 1985). What remains to be seen are the implications these new developments will have in Latin America and other parts of the developing world. It appears certain, however, that the transition to "system-facture" will contribute to the proverbial "structural heterogeneity" of these nations, as ECLAC analysts noted at the height of the import-substitution process in the 1960s.

In the case of the capital-goods industry of Mendoza structural heterogeneity means the following. Pre-Fordist family shops throughout Mendoza use simple tools but are part of the same manufacturing complex inhabited by firms whose major shareholders make the front pages of the nation's major financial papers and magazines. Computer-aided-design and computer-aided-manufacturing (CAD/CAM) are being used by firms whose economic space coincides with that of medium-sized firms which still keep their books by hand, and ledgers stored in huge filing cabinets.

The transition of manufacturing in Mendoza into new forms of production parallels other developments elsewhere in the nation's economy and society. Firms have become smaller. Job stability is being replaced by contracts, short-term assignments and even the outright dismemberment of some enterprises that only assemble parts now produced by their former employees in newly formed, mostly informal, enterprises. This widening gap between value produced and value returning to workers is not dissimilar to disenfranchisement and proletarianization of Argentinean and Uruguayan physicians (Scarpaci 1990).

8.1.4) Linkages and Governance Systems from an Urban and Regional Perspective

This study confirms other researchers' findings that high levels of vertical integration of production are the norm in semi-industrialized countries such as Argentina. More specifically, however, this study shows that within high levels of vertical integration there are short- and long-term variations. Historically, the long-term trend exhibits a process of slow vertical disintegration. For example, since the turn of the century and until the late 1930s, most wine makers had large repair shops within the bodegas even though already by the 1890s a number of specialized shops already existed in and around the city of Mendoza. Other industries established in Mendoza in the 1930s (canning and food processing), the 1940s (cement and glass), and the 1950s (petrochemicals) also tended to have fairly large repair shops. By the 1960s, independent metal-mechanical shops provided major equipment repairs, overhauling, and new equipment. By the late 1960s these shops were further integrated into larger units and firms. Yet, even until the early 1980s, almost all metal-mechanical firms remained highly integrated and a complex networks of firms did not emerge within the industry.⁹

Hence, the location of firms within the city of Mendoza (urbanization economies) is only marginally a function of the

location of other firms within the same industry (localization economies). This pattern appears to be changing in recent years (since the early 1980s) when some of the larger firms have consciously sought to become more efficient through a disintegration of production and hence a wider use of different subcontractors. A more prevailing use of subcontractors—with firms working with as many as 200 small and medium enterprises—requires more interaction and face-to-face contact. The rise in subcontracting influences the locational decisions of new and existing firms.

Until the 1970s, the locational pattern of most Mendoza shops paralleled the pattern of their major clients. Thus, for example, firms working fundamentally for the wine industry would tend to locate near the *bodegas*, while firms working for the cement industry would tend to locate close to the two major cement-processing plants (and the same is true for firms making equipment for the beer and soft drink industries). Today, the trend is for small- and medium-sized firms to cluster near the larger firms with whom they work.

8.2) Beyond the Conclusions: Some Reflections on the Division of Labor and Regional Planning

8.2.1) The Findings of this Study and their Meaning in Terms of the Division of Labor

The historical development of the capital-goods industry in Mendoza can be seen as an instance of the social division of labor. From being integrated into larger workplaces such as the wine, the fruit canning, and the cement industry, capital-goods shops moved out though they continued to be integrated. The development of very specialized producers was less frequent than the emergence of other craft firms. For decades, the social division of labor meant mainly an extension of the overall capacity by horizontal rather than vertical disintegration of production. The competitive weapon used by some firms during the 1960s seems to have been the separation within the enterprise of the technical aspects of production. That is, some firms saw as an advantage to take the road of deepening the technical division of labor inside the firm. Because the market was expanding, the concentration that took place during the late 1960s and the 1970s was not as the expense of the market share of others firms, but rather at the expense of the total new demand available to all firms. A measure of the increasing separation between mental and manual labor is the larger percentage of technical, managerial, and office workers as a percentage of total employees (Census 1974 and 1985).

Yet, firms and workers have resisted deskilling. The local business culture is supportive of maintaining technical and production activities integrated and hence resists a further technical division of labor inside the firms. The same happens in terms of the social division of labor. This is so because most firms take pride in their own developments and would only get into subcontracting arrangements when desperate. Moreover, there is some respect for each firm's areas of expertise (and market share).

8.2.2) The Findings of this Study and their Significance for Urban and Regional Planning

Across the globe there is an over-reaching and seemingly unstoppable wave of challenges to the role of the state in society's affairs. Latin America in general and Argentina in particular form part of this trend. Planning is in crisis in Latin America. State planning tools to direct the economy have been questioned in Argentina. Compared to the bold regional policies carried out by Latin America during the 1960s and 1970s, the late 1980s and early 1990s are relatively tame; the state is retreating from these ambitious enterprises (Browder and Borello 1992; Borello 1992d). However, although many new state policies appear to be neutral in terms of their regional consequences, this is not the case (Gatto 1992).

To speak of the crisis of planning in South America does not necessarily mean joining the neo-conservative coalitions now ruling many of the region's countries. Behind the popular support of such policies as privatization of public enterprises and reduction of the government payroll lies a deep mistrust and skepticism of the state's legitimacy to conduct the bulk of society's affairs. It is not clear to what extent the rejection of statism derives from the bureaucratic-authoritarian rule of the Southern Cone in the 1970s and 1980s.

Among Latin American intelligentsia, except for small groups at both extremes of the political spectrum, there is a growing realization that top-down, authoritarian, and essentially macro ways to carry out policies have to be replaced by better tailored, dialogued, and agreed-upon policies.¹⁰

This study shows that fostering small-scale enterprises and activities requires a good knowledge of how the networks work. One of the fallacies of growth-pole policies was the neglect of the micro-dynamics of industrial organization and of the process of firm formation (Storper 1990). In a nutshell, these grandiose plans aimed at regional development through industrialization, but they lacked an understanding of the process of geographical industrialization, more so in little industrialized or semi-industrialized countries (Aeroe 1991).

Aid agencies have jumped on the bandwagon of the informal sector, small-scale activities, and decentralization. These policies have clear urban and regional impacts. Despite the knowledge and findings that have accumulated about the informal sector and micro-enterprises, very little is known about small- and medium-sized enterprises in manufacturing. The bulk of studies undertaken on manufacturing in Latin America has concentrated mainly in large enterprises, and the perspective has been very rarely a spatial one. Most studies recognize the difference between Latin American manufacturing and that of North Atlantic countries. Some works go deeper and differentiate among national situations at the interior of the Latin American continent (Katz 1987a). Yet, only very few studies take into account the local environment or milieu in which small firms operate—an approach that would seem increasingly important to include in any study of the workings of small enterprises (Camagni 1991; Gordon 1991).

8.3) Future Research Directions

Formally, this chapter ends the story began on page one, yet, in terms of my research interests, this chapter marks a new beginning; it is the door that leads to other research endeavors and adventures. This study provides a springboard to venture into a number of new research directions.

First, if anything, this study shows the lack of studies on a number of connected areas. On the question of labor much is known in Argentina about strikes and labor organizations, but very little about the organization of work and the micro-politics of the workplace. This is even more serious as we move backwards in time. On the case study itself a number of themes merit substantial work. The wine industry merits a careful and encompassing monograph covering its economic history and organization. The capital-goods industry and the metal-mechanical industry in general have not been examined in almost any detail. Finally, very little has been written on the recent economic history of the province.

Second, fruitful research on linkages and governance systems should concentrate on the introduction of conventions and practices that accompany different linkage structures. Comparative (inter-regional) base studies already exist of the metal-mechanical industry in different parts of Argentina; hence a comparative project of governance systems could be designed. A second area which appears interesting is to concentrate on the linkages that give continuity to the industrial complex. This would entail a follow up of such processes as workers' careers and firm formation. It would also embody an analysis of the barriers of entry and on the effect on them of technical change.

NOTES

CHAPTER 8

¹ Chudnovsky and Nagao 1983, chapter 1.

² In Chapter Five, we presented and discussed a genealogical tree of firms covering the whole period of study. The tree shows the movement of skilled workers among enterprises, the development of subcontractors, and spinoff effects. These processes give continuity in time to the industrial complex. (See also Storper and Walker 1989, 110-111).

³ See the description of Italian manufacturing in Dosi et al 1992.

⁴ The systematization of the concept of flexibility is taken from Sayer and Walker 1992, 199).

⁵ Though the latter reflect in fact changes in the mode of regulation.

⁶ Or, for that matter, many industries in semi-industrialized countries.

⁷ The impannatore is a small firm that acts as a coordinator of the efforts of several small and medium-sized enterprises. The impannatore serves as the bridge between clients (normally based in other parts of Italy and overseas) and local firms. In general he/she will coordinate several projects at the same time. There is also wide variation in the tasks performed by the impannatore, ranging from marketing to product design and quality control. The impannatore also serves as the first instance in grievances among enterprises involved in a deal.

⁸ Thus, flexible ways of organizing production involving vertical disintegration are not the result (at least in the case we are examining) of market instability (as much of the literature contends), but rather of the opposite situation.

⁹ A high level of vertical integration also means low specialization both in terms of products and tasks undertaken within the enterprise.

¹⁰ In the public sector throughout the Southern Cone this trend refers to the decentralization of public services (see Scarpaci 1991), but in the Mendoza context we are witnessing a devolution of private functions to increasingly smaller units of production.

METHODOLOGICAL APPENDIX:

THE "BACKROOM" OF THE RESEARCH PROJECT

The aim of a methodological appendix is to show what ingredients were used, in what proportion, and in the hands of whom to arrive to a certain result. It is essential to set on the table, so that everyone can see them, the different steps which lead to the writing of a piece such as this one. Seasoned researchers could thus weight the value of a work. Those beginning their road into research could then learn from their colleagues. Lastly, for everyone, even for those outside the academic circles, there will be a window into the sometimes mysterious world of scientists.

A.1) ON RESEARCH AND FIELD-WORK

A.1.1) On Inspiration

I am convinced that a project such as this one is completed because it becomes an obsession. In the same way as any other person involved in a creative endeavor is driven by sheer passion, passion is the material fuelling this study. Yet, romantic descriptions of the art of creation clearly do not apply to this text. I do not believe much on the help provided by the muses of inspiration. On the contrary, I have a bureaucratic approach to creation. I have completed this study by trying to get up early every day and putting in as many hours as possible.

Paco de Lucía, a famous Andalusian flamenco guitarist, described his moments of inspiration as something that came after daily rehearsals that lasted ten, twelve hours. Obviously, I claim no parallel with Paco, but I believe in work as Roberto Arlt did:

*"The future is ours, due to the prepotency of work. We will create our literature, not talking continuously about literature, but writing in proud solitude books that contain the violence of a 'cross' to the lower jaw. Yes, one book after the other, and 'let the eunuchs snort'".*¹

A.1.2) The Story Behind the Project

This thesis is the product of a long process which began in 1989 when I started sketching ideas about two major areas of industrial research in Argentina: a typology of spaces of production and a classification of firms. At the end of 1989, when I was about to leave Buenos Aires to begin my studies at Virginia Tech, I went to Mendoza for about a week to gather information about the capital-goods industry in the province. The information I collected then in Mendoza was very useful

in the writing of the research proposal that I undertook the following year.

During the Summer of 1990 I developed a long and amorphous draft of a research proposal. I collected some unique materials at the library of the University of California, Berkeley. Yet, by the beginning of the Fall of 1990 the proposal was still a mass of poorly connected material. I was pressed very hard by time during that term. I was teaching a course, carrying a full load of courses, and writing some papers. I even went to Toronto, in October, to present a paper at the annual meeting of the Canadian Association of Latin American and Caribbean Studies (CALACS).

Yet, with the help and encouragement of my thesis advisor I was able to do several re-writes. Professor Scarpaci trusted my ideas and the general rationale of the proposal, but gave it clarity and organization. He did not try to push any pet project as it is sometimes customary with thesis advisors. I am convinced that without his advice I would have never been able to complete the proposal on time to be sent to funding agencies. A shorter and greatly modified version of the proposal was sent to the Inter-American Foundation (IAF). A summary of the proposal was sent to the Canadian Social Science Research Council (SSRC). The full version of the proposal was submitted to the dissertation program of the Geography and Regional Science Division of the National Science Foundation (NSF). Both IAF and the SSRC denied funding. Fortunately, NSF gave me the funding I needed to go to Argentina.

Despite some recent (and contrary) trends in disciplines related to urban and regional planning such as human geography, this study has its foundations in fieldwork (Rundstrom and Kenzer 1989). This is one of the reasons I took a two-semester course in field methods. As a part of that course, during the months from January through April of 1991 I undertook a mini-field study centered on the idea of linkages. The report coming out of that study was entitled "Linkages as Socially Constructed Bridges Between an Organization and its External Environment. Examples from Two Organizations in Southwest Virginia". The study aimed at exploring the linkage concept in a concrete setting from an interpretative perspective. A wide array of information sources was used in this study, but the heart of the exercise was the collection of primary data through observation and interviews. A great deal of the initial insight obtained about linkages is the result of that experiment.

At the beginning of July of 1991 I landed in Buenos Aires. I spent the month of July getting in touch with researchers and collecting information. At the beginning of August I went to Mendoza for two weeks. Two days after arrival I got sick and

had to stay in bed for three full days. Yet, I was able to interview several people and to collect a great deal of information from a number of sources. I visited several libraries and identified material to be consulted later. I also began building a list of people to be interviewed in a second phase.

The rest of August and September was spent writing a first preliminary report and collecting and analyzing data. In Buenos Aires I was able to secure data from the 1974 and 1985 censuses. In combination with data from the 1964 census—which I had collected in Mendoza—I could now follow the evolution of the metal-mechanical industry of Mendoza. Using the three sets of data—for 1964, 1974, and 1985—in the first days of October I drew three maps depicting the location of these firms in the city. During the months of August and September I also analyzed extensively both published and unpublished data from the 1974 and 1985 censuses. This analysis was deemed necessary to obtain an overview of both the capital-goods and the metal-working industries of Mendoza. Another objective of the first months in the field was to gain access to firms, public institutions, and unions. A number of strategies were used to this effect (see below).

From mid-October through mid-December I carried out the bulk of field-work in Mendoza. I spent January and half of February of 1992 going over the information I had collected in Mendoza and loading some of the information of the survey of metal-mechanical firms (see below). Before taking two weeks off I sent thank you letters to the people I had interviewed in Mendoza. In March I went back to Mendoza with 200 copies of a preliminary report summarizing the main results of the survey (see appendix B). I did additional interviews to a subsample of the firms contacted previously. In April and May I made two more short trips to Mendoza. In every trip, in addition to following up on interviews I used idle hours visiting different libraries and archives.

I was writing the dissertation all along. In fact I began writing even before I began my studies at Virginia Tech. The writing went hand in hand with the analysis of the information I was collecting. Yet, and this is one of the difficulties of research involving field-work, it is almost impossible to catch up with the material one collects. Qualitative researchers suggest one should budget twice the time or more for data analysis than one spends collecting it.

In June of 1992 I produced a second field report containing a reformulation of the initial hypotheses, a list of material collected and loaded into the computer, and a new detailed outline of the dissertation. In August I was back in Blacksburg, at Tech. I already had a number of pieces of the puzzle that was to become this dissertation, but many sections still had to be written. At the suggestion of my advisor I began writing a preliminary draft of the conclusions. Since I already had a draft of the first chapters of the thesis, a preliminary table of contents, and a draft of this appendix, what was left was to put together the substantial chapters of the dissertation. In Argentina I had already done much of the analysis of the data so that the task left was to craft the text.

By mid-November I had a complete (and readable) version of the dissertation. Certainly several versions had gone by before and in this process my advisor's input was decisive: he was reading at the same time I was writing. My thesis committee

took a first reading of the complete product between mid-November and early December. We had a meeting in mid-December and several suggestions and changes were put forward by different members of the committee. My parents and brothers came to visit us for the holidays and hence the time I had left for revisions was short. Yet, in early January I had addressed most of the major concerns of the committee and my advisor was confident I could defend by the last week of January. The defense was neither a piece of cake nor an awful experience, but I had my committee focusing on what I had written for two hours. I passed, but a number of changes yet needed to be done. Some were explicit suggestions of the committee while others were things I thought needed to be addressed. Certainly a piece of writing is never perfect, but it comes a time when—as Howard Becker would put it—one needs to put it out the door. Each one of us has his or her own standards, but time is not on the side of the scribe.

A.1.3) The Research Environment

It is pertinent to describe for those who have never been to Argentina, and even for those who have, but not in a research trip, the difficulties inherent to doing research in this country, particularly in Buenos Aires. Doing anything in Buenos Aires is difficult, more so doing research. Many ideas, even whole paragraphs of this thesis have been written aboard taxis running at 50 miles per hour on the wide avenues that cross the sprawling Buenos Aires monster. Many books and articles used in this manuscript have been read on crowded buses, waiting on line, and doing all kinds of absurd "trámites". Doing research in Argentina is a far cry from any ideal model. Private and work lives cross, intertwine, mix, blend in such a manner that the two cannot be clearly separated.

No matter how precise a research proposal may be, or how tight may time and resources be any research project involves some degree of randomness. In Argentina, that degree must reach universal heights. For example, information that supposedly is publicly available becomes secret, but secret information, may be available to those who know the right people at the right moment. A substantial chunk of time must be devoted to establishing, maintaining, and renovating contacts. A lot of the information that is useful for research purposes is to a large extent private.

At least in the social sciences, there is a continuous process of privatization of the research. The forums of discussion are few, little connected, and many of them are quite opaque to outsiders. Much of the substantial research in the social sciences in Argentina is undertaken in private research centers funded by a combination of national and international sources. Progressively, research groups have moved from public universities and state agencies and ministries to private institutes, research centers, and foundations. Few journals are published, few conferences are held, and only some research groups are interested in trying to develop wider inter-relations among fragmented parts.

In such an environment where information does not flow easily and where research is fragmented the best point of entry is the researchers themselves. That is why managing the political and spending as much as 10% of the available work hours visiting and getting in touch with researchers, politicians, and

government advisors is the way to open up the fountains of information which are scattered all over the place.

A.1.4) Information Sources

This thesis draws on a wide array of sources of information. A few general ideas have guided me in my search for data. First, I am convinced that there are no sanctified sources of data. That is, a local newspaper may be as good as any official source. In other words, although use, custom, and ideology have made censuses and other official surveys a or sometimes even the scientific source of data, there is nothing inherently wrong about utilizing other sources. Indeed, one of the drawbacks of official statistics such as censuses and surveys is that they tend to flatten reality and normalize differences. In addition, censuses and surveys are a poor source of information on context. An appreciation of context can only be gained from local newspapers, local artistic expressions, and a contact with the field.

A second idea that has guided my data collection is the notion that the available data are not neutral. That is, there is a correspondence (more or less close) between available sources of information (be them official statistics or popular sources) and some deeply held notions at the level of society. For example, in our case, censuses collect data on manufacturing based on implicit notions of what a firm, a sector, or an establishment are. Clearly, though these notions may be partially true and hegemonic they need not correspond to our needs and conceptual framework. These deeply held notions may be subsumed under the term ideology. What this means is that we have to make an effort to visualize our objects of study and the context in which they are placed from a perspective that may not always overlap with the implicit vision provided by available sources of information.

A number of ways may be used to try to counter these influences. A major guiding idea derived from anthropology is to make the familiar, exotic and the exotic, familiar. This idea may be broken up in a number of ways. One is the combination and use of publicly available sources in novel ways. Much of this information has never been used by researchers. In Argentina, for example, firms always complain about the many state agencies which continuously require them to fill out questionnaires. INDEC (Instituto Nacional de Estadísticas y Censos), the National Census Bureau undertakes every 10 years an economic census, plus annual and quarterly surveys of the major firms. Stock companies are surveyed almost annually. The Ministry of Labor also collects data on firing and hiring. Each province and many national, provincial, and municipal agencies collect data. So do, to some extent, unions and corporate organizations.

Another form of running against the grain is to collect data tailored to the need in hand. This is one of the central aims of fieldwork in all its forms: observation, interviews, collection of printed and not printed specimens which are more easily available on-site (magazine and newspaper articles and ads, in-house reports, firms' balance statements and brochures, and others).

A.1.5) The Writing

As an experiment to the research act I have taken the road most

Ph.D. students don't take. I have began writing instead of collecting tons of data. Then I have proceeded writing and collecting at the same time, using the writing not as a channel to describe what was done, but rather as a tool to reflect how far I had gone, what new questions came up, what kind of information was needed. I believe that today (February 1993), three years after I began this research project, the approach has paid off.

Most of the initial writing was done directly into a laptop computer acquired with part of the National Science Foundation grant. Most of the text has gone through several forms of rewrite going from minor style touches to major structural re-shuffling of sections and paragraphs. It is really the first time I have tried to use the word-processing capabilities of a computer as a different and specific tool for writing. I have always felt very comfortable writing by hand, generally with a pencil, and then, only after the major corrections had been completed I would type into the machine. In fact, I was using the word-processing abilities of this new age in the same manner I would have done with a typewriter. This time, I forced myself into using the computer as a different tool.

I believed and still do that the pencil constitutes a major discovery in the history of mankind. It can be transported anywhere: in a pocket, in the briefcase, or behind the right ear. It does not take up any room. It can write on almost any surface. It is widely available. Corrections can be made very easily. These were my major arguments to reject the computer in the initial writing stages. I have now discovered, however, that although the computer does not live (yet) up to these specifications it has other capabilities in terms of writing.

I like and always liked writing. It always came to me naturally. I was and certainly am now a better writer in Spanish than in English. Yet, I am convinced that I became a decent writer in English because I was good in Spanish. In turn, when I went back to Argentina in 1984, after the linguistic confusion had settled down I discovered that my writing skills in Spanish had also improved.

My head is normally boiling up with ideas. Sometimes I need to put those things out of my head and into the open. Writing calms me down; so I write. Yet, because writing is a way of showing thoughts normally the initial version is confusing, convoluted, and incomplete. Much of the anxiety about writing is the result of the poor quality of much of what we first put down on paper (or on the screen) (Becker 1986). That anxiety can be addressed by the ease of correcting and modifying text using a computer. The computer also makes it possible to write in parallel several pieces at the same time and then to assemble the pieces and see how they combine. With the computer this assembly of disparate pieces is done quickly.

I have kept one file for each chapter, methodological notes, the bibliography, and the preliminary sections (acknowledgements, preface, and list of acronyms). I have also kept a log file (where I record notes on interviews and thoughts on the research enterprise), and separate files of notes for material collected. In addition all the material collected is classified in a file called archive, here I include not only "scientific" books and articles, but also other materials such as newspaper ads, brochures, maps, photographs, etcetera. I have also kept hand-written notes on notebooks. Material from structured interviews was recorded on the forms themselves.

A.1.6) The Researcher as a Public Relations Linkage

This study provides a unique opportunity to present the inside story of how the research was undertaken as part of the research itself. In other words, since this study was concerned with linkages, it seemed natural to consider my research activities as an attempt to establish a linkage with organizations.² Once the first contact was established, then the contacted members of these organizations had to make the decision of whether to allow a linkage to become and if so, under what conditions. The whole study may be thought of as a linkage. I have chosen the idea of public relations as one kind of linkage organizations need to address for different reasons, if anything because organizations need to develop and maintain a positive public image.

Establishing a Linkage

Introduction seems like a very trivial thing, unimportant when compared to "the research design", or "the methods", or some other word in the research paraphernalia commanding a lot of respect from the lay and scientific audience alike. Yet, introduction—that is securing access and entry into a setting—was perhaps one of the key aspects of this research enterprise, and although I did not take it lightly I don't think I really succeeded in the measure I would have liked. For one thing, I don't quite think that many of the people that decided to talk to me understood then or understand now what was my study all about. However, they did talk to me, and they did give me more information than I can analyze in a short time. So maybe what counts is not so much the content of the introduction, but the form. It seems that the important issue to solve is what do people perceive at the personal level, not the precise aim of the research.

People were approached in a number of ways. One important point of entry was to use my own existing network of friends and acquaintances. Some of them would, in turn, yield a number of friends and acquaintances. From that network some contacts would be of interest some would not. This chain could be extended almost in eternum, but, in fact, the farther away from my own friend or acquaintance I would go, the more likely the chain would break, or at least lose strength.

Another way of approaching people I used was to go directly to them and introduce myself. In this case the people contacted would feel to some extent that I was an outsider with no stake and no strong connection to the local society. This would convey the feeling that they were talking to an anonymous outsider. In fact, one researcher who has worked interviewing executives, accountants, and owners of many of these firms in Mendoza told me this could play to my advantage. She added she had had a rough time doing interviews and collecting data and forecasted difficulties and dark clouds in my own project. For some reason, when one is about to undertake field work of this kind someone always tells the field-worker unsurmountable difficulties lay ahead.

I hate to receive this kind of forecast, for I know the whole architecture of the type of research enterprise I am about to carry out depends so much on entry and access, on being received by people, on being granted access to settings and information not normally available to everyone on the street. Normally, when I hear this kind of awful omen I get scared.

Yet, I am an optimistic fellow and that optimism is not only supported by my confidence in my own skills, but by a number of insights I have gained in previous field exercises.

Those insights conform my own ad-hoc approach or philosophy of fieldwork based on corporate interviews (see also Schoenberger 1991). I depart from the general assumption that most people like to talk and be heard. I consider this to be a very primary need.³ In addition, people really love to talk about what they do, what occupies their lives. However, at least in the case of Argentina, and for small and medium-sized firms most managers of these firms have few opportunities of discussing many issues with anyone. The interview, if presented as a conversation, provides managers a chance to reflect on what they do. Inevitably, this poses different kinds of demands on the interviewer for he or she has to be able to have an active role in the conversation. In a structured survey the interviewer becomes a repeater of what is written on the schedule while the interviewee regurgitates un-contexted information. As it has been noted by other researchers the response rate is much lower for this kind of survey (Sayer and Morgan 1985). Most managers are completely and absolutely fed up with official-looking forms and surveys.

A second point that plays in favor of semi-structured or un-structured interviews is the type of information required. Official surveys normally ask for numbers: occupation, sales, salaries paid, quantities produced, electricity consumed, and such things. This has reinforced the idea that only quantitative information is information. In this project, except for a few items, quantitative information was collected by way of other published and unpublished sources such as censuses and surveys. Hence, interviews concentrate on other items besides such itchy questions as sales. Generally, when those interviewed find this out they feel much more at ease.

Third, difficulties found in the fieldwork itself should be taken as data, not as hindrances. If respondents resist being subjected to an exercise they find useless, boring, threatening, or unproductive then it must mean something in terms of the research enterprise. To put the blame on the respondents is to confuse the whole issue. It is the researcher's duty to set up a way of collecting data that would be feasible to be completed. Themes of entry, access, politics, and reciprocity have to be addressed.

The Regulation of Linkages Through the use of Boundaries: The Interface Public-private

In order to regulate linkages organizations set up boundaries (see Chapters Two and Five). Boundaries are blurry zones separating organizations from their external environment, that is the private from the public sphere. These boundaries may be crossed at different points. Two important lines of entry are the telephone and the visit. Both points of entry rest on a number of formal and informal premises and conventions. The tone of these conventions defines the character of a boundary.

In a preparatory phase of this project, I interviewed managers of two organizations in Southwest Virginia: a food-coop and the branch plant of a major transnational corporation which manufactures a number of high tech products. The food-coop's boundaries are much more permeable than the manufacturing

firm. Permeability responds not only to conventions strictly related to technical demands of the product offered by each organization, but also to questions of image of each organization and to the sub-culture to which each organization belongs. Thus, the secrecy, formality, and coldness of the manufacturing firm's linkages are not only connected to the fact that the organization works in some areas connected to defense and high-technology, but also to the image the organization has built and maintains.

The Phone: In both cases the first contact with the organization was made through the phone. In the case of the manufacturing firm my advisor had talked previously to a neighbor who is a manager at the firm. This person was one of the two people I contacted at this firm. Invariably, it took three or more phone calls to set up an interview in the case of this firm, but only one or two in the case of the food-coop. In most instances, I talked first to a secretary in the manufacturing firm and only then to one of the two people I interviewed. The explanation for the inability of these two persons to answer the phone at the branch plant was always connected to work:

"He's in a meeting" or "He's on the phone, in the other line", or "He had to go on a business trip, he'll be back Monday", or "He's not at his desk now, but he's in the plant, please call back later", or "He's busy at the moment, can I take a message?"

Not once was it said: "He was really fed up and tired and he went home", or "he went on a weekend trip with his family, I guess he must be having a good time".

On the other hand, my phone calls to the food-coop were almost always answered by the managers themselves and not by secretaries. In addition, in two instances in which I did not find the person I was looking for I was given explanations that were of a completely different kind than those given at the manufacturing firm. In one case, I was told C. was organizing a baby-shower for a co-worker, and in the other instance I was told C. had "felt awful and had to go home".

Even in the references to what they were doing at the time they had received a call, the people contacted at the manufacturing firm normally made comments related to a protestant vision of life and work: "You're lucky you found me, you caught me between two meetings". Or if trying to set up a time for a meeting, there would be many times a long litany of meetings, appointments and "things to do". On the contrary, the women at the food-coop would generally make references to office parties, making popcorn, and other activities that take place in all work-places in one fashion or another.

The people in the manufacturing firm were much more careful on what they said on the phone than the people contacted at the food-coop. Indeed, in my first phone call to this organization I was told a lot of basic information about the organization although they had never met me before nor had anyone introduced me.

At the manufacturing plant the phone was used to set up meetings, to get and transmit only the needed amount of information. On the contrary, the people at the coop used the phone to communicate, not only information in the strict sense of the word, but also a different idea of life and work.

The Visit: Visiting each organization and conducting interviews

meant physical access: I had to go in person, enter a building, and find a specific person. As in the example of the telephone, boundaries proved much more permeable in the case of the plant than in the case of the food-coop. Physical access is strictly and formally regulated in the first case while in the second it seems every conscious and un-conscious effort is made to de-regulate access. A number of examples will show more clearly what I am trying to say.

Beginning with the strict physical arrangement of the two organizations, each organization provides a different kind of metaphor. The food-coop is decentralized, with bits and pieces of the organization in many different locations, and with no formal rules on restricting physical access. I made—and was encouraged to do so—visits to the three settings that make up the organization: the office in Christiansburg, one of the warehouses, and one of the host organizations. The coop has one office in Christiansburg, but two warehouses (Pulaski and Weber City), and many host organizations. I visited the Pulaski warehouse and the host organization which functions at St. Mary's church in Blacksburg. On the contrary, the manufacturing plant only has two physical locations, one of which I did not visit. Although I was not denied physical access to the South Main plant I was not encouraged to visit it either. The food-coop is open to the outside world by its very physical and organizational arrangement; each piece of the organization is an extended hand into the world, or so it seems.

Visitors to the manufacturing firm which would normally get there by car find an area in the parking lot marked "Visitors' Parking". Right in front of that area there is the main entrance to the plant. After the doors there is a small reception area. Visitors are given badges which read: "Visitor". As a visitor I was not allowed to roam freely through the plant. In all my visits, after introducing myself to the receptionist I was given a badge and told to wait until the person I was to contact in the organization would come down from the offices upstairs and fetch me. When leaving I would be accompanied back to the reception area where I would leave the badge.

I did not follow any such ritual in my visits to any of the coop's operations. Parking either at the warehouse, at the office, or at the church can be anywhere in the parking spaces available. Anyone can enter these facilities without meeting any receptionist and without having to wear a badge. Indeed, at the food-coop the aim seems to be not in differentiating the visitor from the insiders, but rather in integrating the visitor with the members. In the warehouse during bagging week, as well as at St. Mary's on distribution day I even worked. In the case of the warehouse I bagged macaroni after interviewing the host manager of the organization and rubbed elbows with some of the regulars at the warehouse. At the church, for several months I had been one of the volunteers helping to sort the food.

A.2) ON INTERVIEWS, SAMPLES, AND INTERVIEW GUIDES

A.2.1) Logistical Problems and Problems of Access to the Information

This thesis forms part of a trilogy of works on the metal-mechanical industry of Mendoza that I wrote simultaneously.⁴

Although the writing and the responsibility for what it is said here is only mine, this work results from a collective effort. Those who have participated in it are mentioned in the acknowledgements section and in the list in appendix B.

To reach a reasonable degree of success in a research project such as this one two types of problems must be addressed: logistical and of access to the information. Logistical problems (where to room and board, how to access a phone, how to move) were solved with a mixture of money, generosity of some institutions and friends, and ingenuity. More serious and more difficult than logistical problems are the problems of access to information which in a study such as this one, are absolutely central. In other words, if the researcher does not find anyone willing to talk to him/her there is no study. In a preliminary phase of field-work I obtained letters of introduction and of support to this research project from several institutions: the Ministerio de Economía de Mendoza (Ministry of Finance), the Unión Comercial e Industrial de Mendoza, UCIM (The Merchants' and Industrialists Association), and the Buenos Aires offices of the Economic Commission for Latin America and the Caribbean, ECLAC (United Nations), and the United Nations Industrial Development Organization, UNIDO. I believe these letters were very useful to obtain interviews and open doors (see copies of these letters in appendix B).

Two major streams of data were tapped: oral and written. Oral information was collected in interviews carried out by the author. Two forms of interviewing were used: structured upon a written and systematic schedule and semi-structured. All in all more than 100 interviews were carried out. Interviews involved close to 200 hours of conversations. Setting up interviews involved more than 300 telephone calls.

A.2.2) Structured Interviews

Structured interviews were done in two phases. The first one, lasted from October through December of 1991, and constitutes a survey of a sample of 43 metal-working firms in the Mendoza Metropolitan Area. When in the text I refer to the survey, I am alluding to this group of 43 enterprises. In this survey I collected information on the following topics: history of the firm, products, sales and purchases, organization of production, technology, investments, labor force, and exports (see attached form).

The survey was carried out as follows. Sixty five metal-mechanical firms were contacted by phone in the Mendoza Metropolitan Area. Though for a number of reasons information was obtained only for 45 enterprises. Only one of the firms contacted refused outright although six cases can be considered indirect refusals. In seven cases it was not possible to set up a convenient time and place for both parties. Fifty one interviews were set up. For different reasons five entrepreneurs failed to give an interview with the interviewer on-site. One interview was canceled by the interviewer. Out of the initial group of 45 enterprises for which information was obtained, in 35 cases information was complete, the ten remaining cases had a number of items uncompleted. Most of that information was obtained subsequently in additional visits and phone calls. A posteriori three cases were eliminated from the sample and one additional firm was incorporated in March 1992. The three cases excluded from the survey were: a clandestine, one-person firm which sporadically makes metal structures (doors, gates, grades); one

of the last few coopers left in Mendoza; and a medium-sized capital-goods producer from whom we expected to obtain a complete interview, but despite repeated attempts only partial information was obtained. Although information obtained from these firms is not included in survey results it has been incorporated in the writing of the text.

The second phase of structured interviews was carried out in March of 1992 with the objective of gathering additional information on exports and competitiveness in foreign markets. Ten firms were visited, nine of which made part of the original sample. The profile of the firms included in the survey is provided further on in the text along with a description of the universe and the sample frame used.

A.2.3) Semi-structured Interviews

Besides the 43 enterprises included in the survey I have visited other firms, persons, and institutions. The aim of these additional interviews has been the collection of three kinds of information. First, I have gathered information on the wider context in which the study is inscribed. Context can be appreciated from two perspectives: longitudinal and temporal. On the longitudinal axis I have interviewed clients of the firms studied, suppliers of machine-tools and metallurgical inputs, union leaders and firms's associations, public officers, financial and economic consultants, and researchers in different colleges of the Universidad Nacional de Cuyo. The temporal dimension was investigated through a number of interviews with people connected to the past of the metal-mechanical industry of Mendoza.

Second, I have sought to widen some specific topics which emerged from the survey. Even though these topics appeared worth pursuing in more depth it was impossible to do so for each of the firms included in the sample. Thus, some of these topics were explored in additional interviews. Some of the firms form part of the survey while others do not.

Finally, in some interviews I have tried to corroborate happenings, numbers, and dates. Yet, in general I sought to contrast interview information with data from written sources: previous works, censuses, newspaper and magazine articles, some firms' balance statements, etc.

A.2.4) Profile of the Firms Included in the Survey

As it was already advanced above, the survey carried out between October and December of 1991 resulted in a sample of 43 metal-mechanical firms. Most of them worked in the repair and fabrication of capital-goods, specially equipment and machinery for the wine industry and food processing. The sample also includes firms dedicated to manufacturing and repairing heavy metallurgical equipment, mining machinery, oil and underground water extraction, repair and maintenance of locomotives, agricultural machinery, equipment for continuous process industries, large metal structures for large engineering works and hydroelectricity, metal structures used in construction, aviation parts, among others.

The universe from where firms were selected is the one provided by the economic census of 1985, in particular the firms

which met the following conditions: (i) belonging to the branch 38240 of the CIIU,⁵ (ii) over five people employed, and (iii) located in one of the six departments which make up the Mendoza Metropolitan Area.⁶ The firms meeting these conditions were 42. Our sample includes 25 of those enterprises. This group of 25 firms is made up of firms of different sizes, but the representativeness increases as we move upwards in size.

Due to a number of reasons I have included other firms which do not match the characteristics of the original universe. For example, I have included some firms which although have been classified by census takers as belonging to other branches have

as a secondary line of production capital-goods.⁷ I have also included in the sample some firms which although are not capital-goods producers they supply them with parts and manufacturing services (foundry, cutting and folding, lathery, etc.). Lastly, the survey also contains a few firms which because of their size do not respond to the specifications described above.⁸ The names of the firms not included in the original universe were obtained from the telephone book and through a number of contacts.

Tables 1 and 2 show some of the characteristics of the sample and their relationship to the census of 1985. Table 3 gives an idea of the size of the firms included in terms of employment.

Figure A.1. Mendoza, Four-digit Classification and Location of a Sub-Sample of Firms Included in the Survey
(Branch and Location as Defined in the 1985 Census)

RAMA	Cap.	G. C.	Guay.	L. H.	Luján	Maipú	
38110				1			1
38131		1					1
38132	1						1
38199			2				2
38221						1	1
38230				1			1
38240	2	12	6	2	1	2	25
38299		2					2
38311			1				1
38420	1						1
38432		1					1
TOTAL	4	16	9	4	1	3	37

Figure A.2. Mendoza, Four-digit Classification, Location, and Employment of Six Additional Firms Included in the Survey

RAMA	DEPTO.	OCUPACION
38240	Capital	5
38221	Maipú	7
3845	Guaymallén	40
3819	Godoy Cruz	5
3831	Godoy Cruz	4
3831	Capital	10

Figure A.3. Mendoza, Size of Firms Included in the Survey (by Employment)

TAMAÑO	Número de firmas
Menos de 6 ocup.	6
6 a 10 ocupados	12
11 a 15 ocupados	8
16 a 20	3
21 a 25	1
26 a 30	0
31 a 35	1
36 a 40	1
41 a 45	0
46 a 50	0
51 a 55	0
56 a 60	1
61 a 100	3
101 a 150	4
300 a 500	2
Más de 1000	1
TOTAL	43 firmas

A.2.5) Advantages and Drawbacks of the Interview as the Main Technique of Data Collection

A lot can be said about the interview and this is neither the place nor the time to discuss broadly this very complex topic. Yet it is pertinent to highlight a few aspects directly connected to this dissertation. As it is explained in other sections of this monograph, this study has as its main source of information a series of interviews carried out in and around the city of Mendoza. A substantial portion of those interviews was oriented to collect systematic information on the metal-mechanical industry. I utilized a written questionnaire which I filled out at the time of the interview. The rest of the interviews gathered additional information on diverse aspects of the industry in Mendoza.

As a research instrument the interview has been utilized in a great variety of situations and disciplines. The advantages of the interview are many. Without attempting to sketch a complete list, we may mention the following. The first advantage of the interview over a self-administered questionnaire is primarily practical (though the decision to use it is not only due to practicality). This first advantage is response rate. Hypothetically, because the survey was based on a written questionnaire this schedule could have been distributed by mail or personally to the heads of the firms which interested us so that they would fill them out. The experience from previous exercises shows that this would have had very few concrete results. In contrast, for the owners and managers of these firms it is much more attractive to have the opportunity of articulating in words the world in which they work. Yet to set a survey as a series of interviews puts on the interviewer an important burden because he/she has to be able to go beyond what the questionnaire says and become an articulate discussant in the topics being explored.

Moreover, because the survey was directed to collect a great variety of information on extremely complex topics, this would have required a very long questionnaire presenting questions clearly and unambiguously. For many items in the schedule this was impossible because the ambiguity and obscurity of some questions was due to my own lack of knowledge of certain topics. Thus this ambiguity could only be resolved as the survey rolled forward. So much so that after the first six interviews the questionnaire was modified.

The second advantage of the interview and to which we have just alluded is that it produces cumulative results. That is, as the survey unfolds and interviews are carried out, the interviewer acquires new knowledge which can then be utilized in the following interviews. Contrary to a standardized survey in which, for example, all questionnaires are sent out simultaneously, setting up a survey as a series of interviews breaks up the exercise temporarily in different moments. This makes possible a certain degree of reflection and the accumulation of results as data is collected; though it also creates new problems of systematization and synthesis of the data gathered.

The third advantage of the interview is that it makes possible the simultaneous gathering of complementary information. With the researcher in person at the factory or shop this information is almost at hand's reach. For example, firms' brochures and a tour of the plant may be requested. Thus the linearity of an

interview schedule can be fleshed out with the multidimensionality of any work-site.

What we have just said speaks in favor of the active involvement of the researcher in all phases of the research project. Although it is convenient and advisable that there be a certain degree of division of intellectual labor, the writing gets better when the person doing it has had a substantial participation in fieldwork. In part, this can be addressed by having good field-workers who can do good interviews and know how to take notes. However, and as anthropologists argue, the field-work experience cannot be transferred.

At writing time the best pages are those combining in an original mix elements which most people had seen dispersed. Field-work, as any living experience, fixes in the mind in a very shining way certain episodes. Thus are accumulated what some anthropologists call "headnotes"; which in truth become very useful at the time of sitting in front of the blank page (or in this age) blank screen.

The main drawback of the interview is the cost. On average, each interview carried out in connection with this work cost 60 dollars. To that figure we should add a series of expenses to the budget, though in this case they were not directly incurred: salaries, lodging, phone, and local transportation. Finally, as any other technique of primary data collection, the interview puts the burden (and the responsibility) of data reliability on the researcher.

A.2.6) The Interview Guide

To design the interview guide I used in Mendoza I have received inspiration from questionnaires used in other surveys although none of them dealt mainly with the issues which are central to my study. These surveys are: Encuesta sobre inversiones en la industria, INDEC and ECLA, 1989; Encuesta sobre cambio tecnológico y desarrollo industrial, 1974-1987, INDEC and CONICET, 1988-89; Encuesta a la pequeña y mediana industria (in the province of Buenos Aires: CFI/ECLA/Buenos Aires province, 1988), (in Santa Fe province, including Rafaela, Las Parejas, Casilda, and Rosario: CFI and ECLA, 1990-1991).⁹ Particularly useful have been the schedules used by the team CFI-ECLA in their studies of small and medium-sized firms in the metal working industry (see, for example, Kantis and Delgobbo 1991; Koenig and Yoguel 1991; Roitter, Delgobbo, and Kantis 1991; Yoguel and Kantis 1991). To make possible subsequent comparisons with the studies of the CFI-ECLA group in Buenos Aires, Rosario, towns of Southern Santa Fe, and Córdoba, an effort was made to compatibilize the way data were collected.

NOTES

¹ Roberto Arlt (1932). Los lanzallamas. Unfortunately Arlt, despite the urgency of his drive and his desperation to put down on paper short stories and novels, lived only a short and difficult life. Yet, he had something to say and he did against the tide of his own shortcomings and poverty and his crucifixion by the critics.

² This idea was suggested to me by Professor Jan Nesor, College of Education, Virginia Tech, January 1991.

³ If that was not true then priests, pastors, psychoanalysts, and other doctors of the mind would be unemployed.

⁴ The other two are: "Organización industrial y competitividad externa: El caso de las PYMEs metal-mecánicas mendocinas", Buenos Aires: CFI/CEPAL, in press; and Soplando vida al metal. Historia de la metal-mecánica mendocina, 1895-1990, Mendoza: Primera Fila, forthcoming.

⁵ The acronym CIU alludes to the Clasificación Internacional Industrial Uniforme (Standard International Industrial Classification). The CIU is the classification used by the Argentinean census bureau (INDEC) and the census offices of

other countries to classify industries. Firms classified under code 38240 produce mechanical machinery and equipment for other industries. The American equivalent is the Standard Industrial Classification or SIC, but uses different codes and groupings of industries.

⁶ These departments are: Capital, Godoy Cruz, Guaymallén, Las Heras, Luján, and Maipú.

⁷ The census classifies firms by their first line of production.

⁸ The universe of micro enterprises, those occupying under six people, has not been covered thoroughly in this exercise. There are more than 1200 such establishments in the province according to a recent and comprehensive listing undertaken by the province's Dirección de Industria (the 1985 census only records about 800). A serious coverage of these firms would involve at least a 5% sampling, or contacting about 60 firms, something beyond the thrust and resources of this project.

⁹ I am grateful to Jorge Katz, Bernardo Kosacoff, and Francisco Gatto (ECLA, Buenos Aires) for giving me copies of the schedules used in these surveys.

INTERVIEW GUIDE, SUPPORT LETTERS, MISCELLANEOUS

This appendix contains:

- A.3.1) Interview Guide Used in the Survey
- A.3.2) Letters of Support from ONUDI, ECLA, Government of Mendoza, and the Chamber of Commerce
- A.3.3) Thank you Notes sent to Participants
- A.3.4) List of People Contacted in Mendoza.

Nota agregada al momento de imprimir este texto:

La guía de entrevistas sigue, en parte, formularios utilizados por el equipo CFI-CEPAL que llevó adelante una serie de estudios sobre las PYMES metalmeccánicas. Agradecemos profundamente la generosidad de Francisco Gatto.

El formulario utilizado en Mendoza tenía 17 páginas; la menor extensión de la guía que presentamos a continuación se debe a que han sido eliminados espacios en blanco.

GUIA DE ENTREVISTAS, segunda versión

Estudio sobre la historia y la situación actual de la industria metalmeccánica de Mendoza. En especial, el sector de máquinas y equipos. Octubre-diciembre de 1991.

Responsable:

Lic. José Antonio Borello
Master en Geografía Económica,
Universidad de Ottawa, Canadá.
Candidato al título de Doctor por la
Virginia Polytechnic Institute and
State University, EE.UU.

Este estudio está financiado por el National Science Foundation, EE.UU. y su realización resulta de interés para:

- el gobierno de la provincia de Mendoza,
- la Unión Comercial e Industrial de Mendoza (UCIM) y
- las oficinas de Buenos Aires de la Comisión Económica para América Latina (CEPAL, Naciones Unidas), y de la Organización de las Naciones Unidas para el Desarrollo Industrial (ONUDI). Las respectivas cartas de apoyo de estas instituciones están a disposición de quien las solicite.

Los datos que se solicitan serán tratados con el mayor cuidado y sigilo. En los trabajos que se publiquen a partir de estos datos se cuidará de no revelar indirectamente la identidad de ninguna de las empresas o individuos contactados. Se hará llegar a diversas instituciones y empresas copia de los informes que resulten de esta investigación.

Nombre de la empresa:

Nombre del establecimiento (si tuviera):

Razón social de la empresa propietaria del establecimiento:

Domicilio del establecimiento:

Calle/ Ruta:

No./Km.:

Localidad:

Código Postal:

Departamento:

Teléfonos:

TELEX:

Fax:

Nombre y apellido del o de los entrevistados/as:

Cargo en la empresa:

Visitas:

Fecha y hora de la primera visita/ Duración de la entrevista/Ag:

Fecha de la segunda visita (y motivo):

Fecha de la tercera visita (y motivo):

Cantidad de visitas realizadas:

¿Se visitó planta o taller?

¿Folletos?

¿Últimas memorias y balances?

CIIU: Código:

I. INFORMACION SOBRE LA EMPRESA

1.1) Fecha de fundación

de la empresa
del establecimiento

1.2) Antecedentes previos a esa fecha

como empresa
como establecimiento o planta

1.3) ¿El domicilio actual del establecimiento es el mismo que a la fecha de fundación?

SI

NO

1.4) Domicilios anteriores

Calle	Número	Barrio	Depto.	Fecha	de/hasta
-------	--------	--------	--------	-------	----------

1.

2.

3.

1.5) ¿Podría describirme brevemente el proceso de creación de la empresa?

a. (¿Porqué se creó la empresa?)

b. (Quiénes fueron los socios fundadores? Origen. Edad. Conocimientos de la industria. Educación alcanzada).

c. (Origen del capital inicial)

d. (Origen de las máquinas)

e. (¿Quién era el dueño del edificio?) ¿Cómo era el barrio donde se instaló la fábrica?

f. (Actividades más importantes en los inicios)

g. (Mano de obra)

h. Origen de las materias primas en los primeros diez años de la empresa.

i. Destino de las ventas en los primeros diez años de la empresa.

j. Relación con otras empresas locales en los primeros diez años de la empresa.

proveedores

de materias primas

de partes y componentes

de servicios

demandantes

bancos y financieras

1.6) Situación actual de la empresa

1.6.1) ¿Cuántos establecimientos tiene la empresa hoy?

1.6.2) ¿Qué otras empresas están vinculadas a esta en un grupo/ holding/o por relación familiar de los dueños?

1.6.3) ¿Algunos de estos establecimientos/empresas tiene relación con este establecimiento?

¿Proveedor de algún insumo? SI/NO

¿Comprador de parte de la producción? SI/NO

1.6.4) ¿Quién o quiénes dirigen la empresa hoy?

1.6.5) ¿A qué se debe la ubicación física del establecimiento actual?

1.6.6) ¿Qué ventajas y desventajas tiene el domicilio actual respecto a estar instalados en otra parte de la ciudad?

II. ACTIVIDADES PRODUCTIVAS

2.1) Detalle las principales líneas de producción industriales fabricadas en este establecimiento, según valor de facturación del año 1990 (en %)

LINEAS DE PRODUCTOS

Peso Relativo	(%) en 1990
1.	[]
2.	[]
3.	[]
4.	[]
5.	[]
6.	[]
7.	[]
8.	[]
9.	[]

2.2) En 1990, en términos reales, facturó Más, Lo Mismo, o Menos que en los siguientes años?:

AÑOS	MAS	LO MISMO	MENOS
1977	[]	[]	[]
1980	[]	[]	[]
1984	[]	[]	[]
1987	[]	[]	[]

2.3) Qué nuevas líneas de productos se comenzaron a fabricar en los últimos ocho años? Indique la importancia relativa de cada una en la facturación de 1990 e indique como máximo las tres razones principales que motivaron su iniciación.

	LINEAS DE PRODUCTOS		
Líneas:	1.	2.	3.
Año de iniciación	[]	[]	[]
Importancia relativa	[]	[]	[]

Principales razones:

2.4) Que línea(s) de productos dejó de fabricar en los últimos ocho años? Indique como máximo las tres razones principales que motivaron su suspensión.

LINEAS DE PRODUCTOS

Líneas:	1.	2.	3.
Año de iniciación	[]	[]	[]
Importancia relativa	[]	[]	[]

Principales razones:

III. ENCADENAMIENTOS PRODUCTIVOS

COMPRAS

3.1) Principales insumos (en orden de importancia relativa como proporción del total de compras de insumos)

INSUMOS o mat.primas	No. de proveedores por insumo	Localización de los proveedores	Tipo de proveedor	% sobre el total de las compras
1.				
2.				
3.				
4.				
5.				

3.1.1) Describame su relación con los proveedores

a. (¿Desde cuándo los conoce?)

b. (¿Porqué les compra a ellos?)

c. (¿Cada cuanto compara precios con otros proveedores?)

d. (¿Hay algún tipo de convenio formal o informal con sus proveedores?)

3.2) Contratos a terceros

3.2.1) ¿Qué porcentaje de su producción contrata a terceros? (Porcentaje en relación a la facturación total)

	1982	1986	1990
NO contrata a terceros	[]	[]	[]
Hasta el 10 %	[]	[]	[]
11 % al 30 %	[]	[]	[]
31 % al 50 %	[]	[]	[]
Más del 50 %	[]	[]	[]

3.2.2) ¿En líneas generales esto fue siempre así?

a. Sí, fue siempre así desde los primeros años de vida de la empresa.

b. No, esto ocurre desde....

c. No, ocurrió en los años.....pero no en los años.....

3.2.3) Da trabajos a terceros porque...

a. [] se trata de trabajos especiales que Ud. no puede hacer, por ejemplo:

[]

Fundición

[] Torneados y fresados especiales

[] Otros (describalos):.....

- b. ☐ son trabajos que podría hacer en su planta o taller pero no da abasto con el volumen de trabajo. No se amplía porque:
- ☐ no hay más lugar en la planta o taller
 - ☐ no le parece conveniente invertir en más maquinaria
 - ☐ no quiere tomar más gente

☐ otras razones:.....

3.2.4) Describame su relación con estas empresas a las que les contrata parte de la producción

a. ¿Cuántos talleres o empresas son aproximadamente?

b. La mayoría está ubicado en:

- ☐ barrio o distrito cercano a esta fábrica
- ☐ en el mismo departamento
- ☐ en las siguientes zonas del Gran Mendoza:.....

c. ¿Desde cuándo los conoce aproximadamente?

d. ¿Qué porcentaje de estos talleres está formado por antiguos operarios de la empresa?

e. ¿Sabe cómo adquirieron las máquinas que utilizan?

f. ¿Compara cotizaciones con otros talleres?

g. ¿En la realización de los trabajos se utiliza algún tipo de contrato?

h. Por favor, ¿me podría dar el nombre de estos talleres para que yo pueda seguir la **cadena productiva**?

3.3.1) ¿Qué porcentaje de su producción realiza o realizaba como contratista o "tercerista" de otras empresas?

	1982	1986	1990
NO trabaja como tercerista	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hasta el 10 %	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11 % al 30 %	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
31 % al 50 %	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Más del 50 %	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

3.3.2) ¿En líneas generales esto fue siempre así?

a. Sí, fue siempre así desde los primeros años de vida de la empresa.

b. No, esto ocurre desde....

c. No, ocurrió en los años.....pero no en los años.....

3.3.3) Toma trabajos como contratista porque...

a. ☐ se trata de trabajos especiales que la empresa contratante no puede hacer, por ejemplo:

- ☐ Fundición
- ☐ Torneados y fresados especiales
- ☐ Otros (describalos):.....

b. ☐ son trabajos que la empresa contratante podría hacer pero no da abasto con el volumen de trabajo. Estima que la empresa contratante no se amplía porque:

- ☐ no hay más lugar en la planta o taller
- ☐ no le parece conveniente invertir en más maquinaria
- ☐ no quiere tomar más gente

☐ otras razones:.....

3.3.4) Respecto a las empresas que le dan trabajo (las empresas contratantes):

a. ¿Cuántos talleres o empresas son aproximadamente?

b. La mayoría está ubicado en:

- ☐ barrio o distrito cercano a esta fábrica
- ☐ en el mismo departamento
- ☐ en las siguientes zonas del Gran Mendoza:.....

c. ¿Desde cuándo los conoce aproximadamente?

d. ¿Ud. o alguno de los otros socios u operarios trabajaron antiguamente para alguna de las empresas contratantes?

e. ¿Cómo adquirieron las máquinas, herramientas y equipos que utilizan?

f. ¿Compara frecuentemente sus cotizaciones con las de otros talleres?

g. ¿En la realización de los trabajos se utiliza algún tipo de contrato?

h. Por favor, ¿me podría dar el nombre de las firmas contratantes para que yo pueda seguir la **cadena productiva**?

VENTAS

3.5)

3.5.1) Estime la participación del mercado interno y el de exportación en el total de sus ventas en el trienio 1988-1989-1990

☐ Mercado interno

☐ Exportación

3.6) Indique el peso en la facturación de su producción "a pedido" (año 1990).

Inexistente	<input type="checkbox"/>	51-70%	<input type="checkbox"/>
hasta el 20 %	<input type="checkbox"/>	más del 70%	<input type="checkbox"/>
21-50 %	<input type="checkbox"/>		

3.7) ¿Cómo evolucionó en los últimos años la producción "a pedido"? (Compare los años indicados con 1990)

	1977/82	1983/89
Incremento		
Sin cambio		
Disminuyó		

3.8) ¿Qué porcentaje del trabajo a pedido se realiza con materia prima e insumos del cliente?

☐ %

3.9) Respecto de las operaciones comerciales que realiza en el mercado interno cuál es la modalidad predominante que adopta para la comercialización de sus productos? (Indique el número aproximado de clientes y el peso en las ventas de cada caso en 1990).

Número	% de ventas	
[]	[] %	Venta a distribuidores
[]	[] %	Venta a mayoristas
[]	[] %	Venta al público
[]	[] %	Venta directa a otras empresas privadas
[]	[] %	Empresas del estado
[]	[] %	Sector público
[]	[] %	Otras:

3.11) ¿Tiene alguno de sus clientes una importancia individual en su facturación superior al?:

70 %	SI []
50 %	SI []
35 %	SI []
10 %	SI []

3.12) ¿Tienen sus principales cinco/ diez clientes una importancia superior en su facturación total al 75 %?

5 clientes	SI []
10 clientes	SI []

3.13) ¿Cual consideraría usted que es el ámbito de mercado de sus líneas de productos? (en orden de importancia del "1" en adelante).

- [] Barrio o distrito departamental donde se encuentra el establecimiento.
- [] El Gran Mendoza (incluyendo Capital, Luján y Maipú).
- [] San Rafael
- [] San Juan
- [] Toda la provincia de Mendoza
- [] Mendoza y San Juan
- [] Gran Buenos Aires y Capital Federal
- [] Otros lugares en la Argentina (detalle si es posible)
- [] Exterior (detalle qué lugares si es posible)

3.14) Describame su relación con los clientes

a. ¿Desde cuándo los conoce aproximadamente?

b. Su cartera de clientes está formada, en su mayoría, por:

- [] empresas que le compran todos los años
- [] empresas que, si bien siguen siendo clientes, no le compran todos los

años (debido al tipo de máquinas o equipos que Ud. vende)

- [] clientes que se renuevan continuamente
- [] empresas a las que Ud. les trabaja una gran parte del año como "tercerista"

c. ¿Hay algún tipo de convenio formal o informal con sus clientes? (por ejemplo, en términos de preferencia en la entrega, servicios especiales de post-venta, etc.?)

3.15) Estime el monto aproximado de su facturación total en 1990
(en dólares con un tipo de cambio de 5.000 A)

- [] Menos de U\$S 250.000
- [] U\$S 1.500.000 a 2.000.000
- [] U\$S 250.000 a 500.000
- [] U\$S 2.000.000 a 3.500.000
- [] U\$S 500.000 a 700.000
- [] U\$S 3.500.000 a 5.000.000
- [] U\$S 700.000 a 1.000.000
- [] U\$S 5.000.000 a 7.000.000
- [] U\$S 1.000.000 a 1.500.000
- [] Más de U\$S 7.000.000

IV. PROCESO DE INVERSION Y TECNOLOGIA

4.1) ¿Se han realizado inversiones significativas en los últimos 15 años?

SI [] NO []

4.2) ¿En qué áreas?

4.2) Mayormente en qué años?

4.3) Aproximadamente por qué montos?

- Menos de U\$S 50.000
- U\$S 50.000 a 100.000
- U\$S 100.001 a 200.000
- U\$S 201.000 a 500.000
- U\$S 501.000 a 1.000.000
- U\$S 1.000.001 a 2.500.000
- Más de U\$S 2.500.000

4.4) Detalle la maquinaria y equipos productivos más importantes incorporados desde 1975:

-Descripción de la maquinaria o equipo:

Máquina
Año compra
Procedencia
Valor aproximado (U\$S)

- 1.
- 2.
- 3.
- 4.
- 5.

4.5) Indique cuál fue el tipo de gasto realizado en equipamiento de computación entre 1975 y 1990.

TIPOS DE EQUIPAMIENTO:

- | | |
|--|---------------|
| No. de EQUIPOS | |
| * Sistemas monoterminales con costo en "hardware" inferior a U\$S 5000. | SI [] NO [] |
| [] | |
| * Sistemas monoterminales con costo en "hardware" entre U\$S 5000 y U\$S 15.000. | SI [] NO [] |
| [] | |
| * Multiterminales con costo en "hardware" entre U\$S 15.000 y 70.000. | SI [] NO [] |
| [] | |
| * Multiterminales con centro de cálculo. Costo superior a U\$S 70.000. | SI [] NO [] |
| [] | |

4.6) ¿Cómo procede habitualmente la firma en la elección y compra del equipamiento y máquinas de producción?

- [] Propietarios definen en base a su experiencia previa.
- [] Se reúnen informalmente los propietarios con técnicos del establecimiento.
- [] Los técnicos de producción definen en base a las necesidades de mejora de la planta.
- [] Se decide en base a la consulta a proveedores de equipo.
- [] Se contratan servicios externos.
- [] Intercambio de información con clientes y/o contratistas.
- [] Otros:

4.7) ¿Utilizó para concretar la inversión realizada entre 1980 y 1990 algunos de los siguientes mecanismos de financiamiento?

- ☐ Recursos propios
- ☐ Prestamista o financiera local o regional
- ☐ Línea de crédito del Banco de Mendoza
- ☐ Línea de crédito de otro banco local
- ☐ Leyes provinciales de promoción industrial
- ☐ Línea de crédito del Banco Nacional de Desarrollo
- ☐ Derechos especiales de importación de equipos
- ☐ Créditos externos
- ☐ Avalos de bancos oficiales
- ☐ Capitalización de deuda externa
- ☐ Crédito italiano para las PYMES
- ☐ Crédito español para las PYMES
- ☐ Promoción industrial nacional
- ☐ Otros:

4.8) ¿Cuáles son los proyectos que tiene en cartera o en marcha y cuál es su estado actual? (estime la inversión en U\$S)

NINGUNO:

Proyecto 1: U\$S:
Proyecto 2: U\$S:
Proyecto 3: U\$S:

INVESTIGACION Y DESARROLLO

4.10) ¿Realiza la empresa actividades de Investigación y Desarrollo?

NO ☐ SI ☐. Por favor señale las actividades principales.

4.11) ¿Tienen sus productos marca propia?
SI ☐ NO ☐

4.12) ¿Ha patentado productos o procesos desarrollados en su empresa?
SI ☐ NO ☐

4.13) ¿En la producción, utiliza patentes o licencias contratadas?
SI ☐ NO ☐

4.14) ¿Cómo logra la información sobre nuevos desarrollos en equipos, procesos, productos, sistemas, etc.?

- ☐ Otros empresarios que conoce en Mendoza
- ☐ Cámara empresarial
- ☐ Revistas técnicas
- ☐ Proveedores de equipos
- ☐ Participación en ferias y reuniones técnicas en Mendoza
- ☐ Centro ATI de Mendoza
- ☐ Participación en ferias y reuniones técnicas nacionales
- ☐ INTI u otro organismo oficial
- ☐ Viajes al exterior
- ☐ Visitas a plantas en el exterior

4.16) ¿Ha llevado adelante algún tipo de actividad de manera conjunta con alguno de los siguientes organismos?

	SI	NO
Universidad	<input type="checkbox"/>	<input type="checkbox"/>
CONICET	<input type="checkbox"/>	<input type="checkbox"/>
CRYCIT	<input type="checkbox"/>	<input type="checkbox"/>
INTI	<input type="checkbox"/>	<input type="checkbox"/>
Sindicatos	<input type="checkbox"/>	<input type="checkbox"/>
Escuelas secundarias	<input type="checkbox"/>	<input type="checkbox"/>
Centro ATI	<input type="checkbox"/>	<input type="checkbox"/>
Cámara empresarial	<input type="checkbox"/>	<input type="checkbox"/>

4.17) Por favor, estime el valor actual en dólares de los activos fijos (máquinas, edificios e instalaciones) en el establecimiento

- ☐ MENOS de U\$S 150.000
- ☐ U\$S 1.500.000 a 2.000.000
- ☐ U\$S 150.000 a 500.000
- ☐ U\$S 2.000.000 a 3.000.000

- ☐ U\$S 500.000 a 700.000
- ☐ U\$S 3.000.000 a 5.000.000
- ☐ U\$S 700.000 a 1.000.000
- ☐ U\$S 5.000.000 a 10.000.000
- ☐ U\$S 1.000.000 a 1.500.000
- ☐ Más de U\$S 10.000.000

V. PERSONAL OCUPADO

5.1) Número total de personal ocupado (promedio) durante 1990

	PERMANENTES	EVENTUALES
Hombres		
Mujeres		
Total		

5.2) ¿Cuántos turnos se trabajan en la fábrica o taller? ☐

5.3) Indique el número de personas que trabaja en la empresa como:

TOTAL
Socios y gerentes.....
Administrativos.....
Técnicos e ingenieros.....
Ventas.....

Supervisores.....
Operarios calificados y especializados.....
Operarios no calificados....
Vigilancia y limpieza.....

5.4) ¿Cómo consiguen personal para trabajar en la empresa?

5.5) ¿Esto fue siempre así? Siempre se utilizó la misma modalidad para conseguir personal?

VI. EXPORTACIONES

6.1) ¿Ha realizado exportaciones?

SI ☐ NO ☐

6.2) En caso afirmativo, desde qué año?

6.3) ¿Cuáles han sido los años de mayor exportación desde 1970 y cuáles han sido los montos aproximados de las mismas?

Año U\$S

6.4) ¿Cuáles son sus principales mercados externos?

6.5) ¿Cuál es la modalidad utilizada para exportar?

- ☐ Directamente por la firma
- ☐ A través de empresas exportadoras
- ☐ Por contrato con importadores
- ☐ Licitaciones públicas o privadas internacionales
- ☐ Otras:.....

6.6) Identifique los principales factores (como máximo tres) que considera que más contribuyen a su competitividad en el mercado externo.

- ☐ Precios
- ☐ Condiciones de financiamiento
- ☐ Cumplimiento de los plazos de entrega
- ☐ Calidad de los productos
- ☐ Servicios técnicos posteriores a la compra
- ☐ Plazos y condiciones de garantía
- ☐ Especificaciones técnicas del producto
- ☐ Otros (especifique):....

6.7) ¿Qué factores considera usted que le impiden incrementar las exportaciones o iniciarlás?



OFICINA DEL DIRECTOR
ARGENTINA Y URUGUAY

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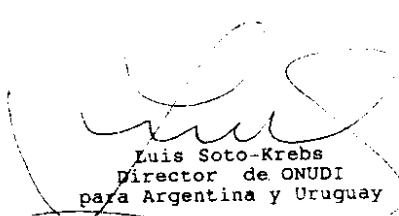
A QUIEN CORRESPONDA

Por medio de esta carta queremos manifestar nuestro apoyo a la investigación que está llevando a cabo el licenciado José Antonio Borello sobre la industria metalúrgica y de bienes de capital en la provincia de Mendoza.

El estudio del licenciado Borello sobre la historia y la situación actual de esa industria, que tiene como eje conceptual los encadenamientos productivos, nos parece sumamente valioso; los resultados permitirán planificar el mediano y largo plazo de ella con bases mucho más sólidas.

La Organización de las Naciones Unidas para el Desarrollo Industrial (ONUDI) ha realizado y realiza una diversidad de tareas relacionadas con la investigación sobre la industria de máquinas y equipos debido a la importancia de dicha industria en el conjunto fabril. Esto es particularmente cierto para los países menos industrializados donde este sector es crítico para el crecimiento del aparato industrial en general.


Creemos que el trabajo del licenciado Borello es un aporte útil al mejor conocimiento de esta industria en la Argentina. Asimismo, consideramos que su experiencia y capacidades como investigador le permitirán llevar a cabo un estudio también de utilidad para la discusión de políticas sectoriales.


Luis Soto-Krebs
Director de ONUDI
para Argentina y Uruguay

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Dirigido a: José Borello
Virginia Polytechnic Institute and State University
BLACKSBURG, Va. U.S.A.

FAX: 00(703) 231-9938

FAX N° 5541.05

Estimado Borello:

Hemos recibido su propuesta de investigación "Linkages and Industrial Governance Systems: The Development of Capital-goods firms in Mendoza, Argentina", que será financiado por el National Science Foundation (NSF). Los objetivos y la metodología propuesta para dicho estudio son sumamente interesantes, y por otra parte coinciden plenamente con nuestras preocupaciones sobre los cambios estructurales de la industria argentina y los aspectos particulares de crecimiento regional.

En este sentido será un gran placer que durante el desarrollo de su investigación podamos mantenernos en estrecho contacto, que considero será de mutuo beneficio. Asimismo, están a su disposición todos los antecedentes, bibliografía y material estadístico que poseemos en nuestro grupo de trabajo y en nuestra biblioteca. Por otra parte, esperamos poder contar con su presencia en el Taller Industrial y en las actividades y seminarios que se realizan en la Oficina. He conversado con el Dr. Francisco Catto al respecto, el que también me ha manifestado su interés por su investigación.

Con el deseo de recibirlo en julio en Buenos Aires y estando a su disposición para cualquier requerimiento lo saluda atentamente
Bernardo P. Kosacoff, Coordinador Área Desarrollo Industrial.



GOBIERNO DE MENDOZA

CARTA DE PRESENTACION

Por la presente se deja constancia que el relevamiento sobre la Industria Metalmeccánica en la Provincia de Mendoza, que realizará el Lic. José Antonio Borello, resulta de interés para el Gobierno de la Provincia y los datos finales quedarán a disposición de los organismos competentes.

Se extiende la presente al sólo efecto de facilitar el acceso a datos e información de dominio público e interés general, en Mendoza, a los cinco días del mes de Septiembre de 1991.


ROBERTO O. CUEVAS MOLINA
MINISTRO DE ECONOMIA



UNION COMERCIAL E INDUSTRIAL DE MENDOZA

PATRICIAS MENDOCINAS 1167/57
TELEF. 250362 Y 252162/63
5500 - MENDOZA

Mendoza, Octubre 21 de 1991.-

Señores:

A través de la presente, queremos manifestar que la Unión Comercial e Industrial de Mendoza entiende valioso el proyecto de investigación de carácter científico que lleva adelante el LIC. JOSE A. BORELLO en nuestra provincia.

El Lic. Borello está realizando un estudio sobre la historia y situación actual de la industria metal-mecánica en Mendoza. En particular, el proyecto apunta a construir una historia del sector productor de máquinas y equipos desde el punto de vista de lo que se denomina "encadenamientos productivos".

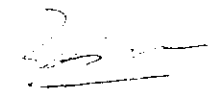
Entendemos que el trabajo del Lic. Borello será de interés y utilidad para la industria y el comercio de Mendoza pero también para otros sectores de la comunidad local y nacional; ya que permitirá conocer aspectos importantes del desarrollo económico provincial.

Por todo esto, rogamos a Ud. que, dentro de lo posible, asista al Lic. Borello en su trabajo.

Saluda muy atentamente

smo







VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY

COLLEGE OF ARCHITECTURE AND URBAN STUDIES

Blacksburg, Virginia 24061
Buenos Aires, 11 de enero de 1992.

Estimado Señor:

Por medio de esta carta quiero hacerle saber que le estoy profundamente agradecido por su participación en el trabajo de investigación que llevo adelante sobre la industria metalmeccánica mendocina. La información que me brindara hace unas semanas me será de suma utilidad para avanzar hacia un mejor conocimiento sobre el origen, desarrollo y realidad actual de esa industria en Mendoza.

En unos tres meses le haré llegar un resumen de los resultados preliminares del estudio. Es probable que antes o después de esa fecha me sea necesario ponerme en contacto con Ud. nuevamente para completar algún dato.

Creo que andará por Mendoza hacia fines de febrero. Si desea ponerse en contacto conmigo por favor hágamelo saber a la dirección o al teléfono que aparecen al pie de esta carta. Puede también dejarme un mensaje en Mendoza en el teléfono 240348.

Muchas gracias por el valioso tiempo que me ha dedicado. Aprovecho, además, para desearle un muy Feliz Año 1992. Muy atentamente,

Lic. José Antonio Borello
Master en Geografía Económica (Univ. de Ottawa, Canada)
Candidato al título de Doctor en Diseño del Medio
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Blacksburg, Virginia, 14 de enero de 1993.

ARGENTINA

Muy estimado Señor:

Le hago llegar esta carta para tenerlo informado acerca de la evolución de mis estudios sobre la industria metalmeccánica de Mendoza.

En julio de 1992 publiqué un artículo en Ambito Financiero, que se lo adjunto a esta carta por si no lo vio. He completado un primer informe con el título de Organización industrial y competitividad externa: El caso de las PYMES metalmeccánicas mendocinas. En este momento está siendo revisado para ser editado por la Comisión Económica para América Latina (CEPAL, Naciones Unidas) en Buenos Aires. Oportunamente le haré llegar una copia.

Estoy terminando dos trabajos más. Uno es la tesis de doctorado que presentaré a esta universidad y el otro es una historia de la industria metalmeccánica mendocina que probablemente salga como suplemento de la revista Primera Fila, aunque aún no hay seguridad. Cuando estén listos enviaré copias a Mendoza.

Tengo en marcha dos estudios más que tienen que ver con la metalmeccánica mendocina. Uno es un trabajo comparativo sobre la creación de pequeñas empresas en Godoy Cruz y Avellaneda y el otro es una investigación sobre la competitividad de la metalmeccánica mendocina en el mercado norteamericano. Para el trabajo comparativo ya tengo hecha una propuesta de investigación y estoy buscando financiamiento; para el estudio sobre competitividad estoy solicitando dinero al Banco Interamericano de Desarrollo. Propongo hacer una serie de entrevistas a ejecutivos de empresas que son o podrían ser clientes de las firmas mendocinas.

Aprovecho la oportunidad para desearle un buen año. Sin más saludo a Usted atentamente y espero verlo en algún momento del año entrante, cuando vuelva a la Argentina.

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SRA. CECILIA SELVA	

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ING. GARDELLA

SR. SCUSSOLIN

SRA. CELIA DE

MASSOLIN-Cont. BLOTTA

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Dis. Ivo SALAMUNOVIC

Sres. VICTORIO y G. ALTIERI

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NIETO Y CIA.

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Revista Primera Fila

SABINO DOMIZIO SA

SALVADOR PORTE-METALUR.FOR-MAQ

SANCHEZ Y PANETTA - PASAN

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TERMET

TORNERIA TARABELLI

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UNC - FAC. FILOSOFIA Y LETRAS

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VITA

I was born in Mendoza, Argentina on July 13, 1957. I began studying Geography at the Universidad Nacional de Cuyo, in Mendoza in 1975. In 1976 the Armed Forces overthrew the civilian government in power. In 1977 I continued my studies at the University of Cincinnati. In 1978 our family moved to Canada. In 1980-81 I wandered through Europe, from Lisbon to Istanbul and from Venice to the North Sea. In 1982 I received a B.A. Honours and in 1984 an M.A. in Geography from the University of Ottawa.

At the end of 1984 I moved back to Argentina. In 1985 I did odd jobs and published two articles in Revista Geográfica. In 1986 I received a scholarship from the Consejo Nacional de Investigaciones Científicas y Técnicas. That same year I received a grant from the International Development Research Centre in Ottawa. I was a Visiting Fellow at the Centro de Estudios Urbanos y Regionales (CEUR) in Buenos Aires, 1986-88. I worked as Research Assistant and Consultant in the Economic Commission for Latin America and the Caribbean (ECLAC) office of Buenos Aires during 1988-89.

On January, 1990 I began my Ph.D. studies at Virginia Tech. Parallel to my studies I have worked as research assistant and instructor. In 1991, I received a grant from the National Science Foundation to carry out my field-work in Argentina. From March through May of 1992 I was hired as a consultant by the ECLAC office in Buenos Aires to draft a report on international competitiveness and small firms in the capital-goods industry of Mendoza.

I have published a monograph and a collection of essays. The titles are: La Rioja, 1980-1987. Evaluación de la política de promoción industrial. Decisiones de localización, costos de producción e impacto local. Buenos Aires, Informes de Investigación del CEUR 8, 1989; and Bulones, patillas y lugares. Cambios en la industria, el interior y las grandes ciudades de la Argentina contemporánea. Buenos Aires, Cuadernos del CEUR 31, 1992. I have also published several articles in journals and other outlets. I have read papers at conferences and seminars in Ottawa, Toronto, Mendoza, La Rioja, Buenos Aires, Montevideo, Miami, Atlanta, and Washington.

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