

**FORMS OF GOVERNANCE,
LEARNING MECHANISMS AND UPGRADING
STRATEGIES IN THE TOBACCO CLUSTER IN
RIO PARDO VALLEY – BRAZIL**

IDS Working Paper 125

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SUMMARY

This paper analyses how the production and innovation activities in the tobacco cluster in Rio Pardo Valley are organised through a complex network linking local producers to MNCs and global markets. The relationship between global chain governance and local upgrading strategies has received growing attention in the recent literature. This paper aims to contribute to this debate by seeking answers to three questions: first, how is the cluster's organisation at the local level influenced by the global tobacco chain; second, how are the innovation paths and learning mechanisms in the cluster affected by the global chain governance; third, what are the long-term prospects of this cluster considering the power asymmetries associated with the cluster's production and knowledge systems. Although the cluster has a long tradition in production, processing and trade of tobacco and has given rise to a number of collective institutions, it has come to be governed by subsidiaries of MNCs which run the global tobacco chain. Even though local enterprises play a critical role in the global tobacco chain as raw material suppliers and service providers, most of the innovations adopted at the growing stage are developed through knowledge systems in which producers and other local actors play only a minor role.

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1 INTRODUCTION²

This paper is concerned with the tobacco cluster of the Rio Pardo Valley in the South of Brazil and its position in the global tobacco chain. It examines how the global governance of this chain has affected the production and innovation performance of local producers in the cluster. The tobacco cluster in Rio Pardo Valley consists of a set of actors that operate in the production, processing and trade of tobacco and cigarettes. Although the cluster has a long tradition in tobacco production and has given rise to a number of collective institutions, it has come to be governed by subsidiaries of the lead MNCs (multi-national corporations) running the global tobacco commodity chain.

The increasing globalisation of commodity markets, especially during the 1990s, has posed new challenges for developing countries (Gereffi 1999; Gibbon 2000; Kaplinsky 2000). Firstly, the liberalisation of trade and financial markets and the important developments in transport and communication technologies have brought profound changes to the organisation of productive and innovative activities across nations and localities. Secondly, global commodity chains have emerged as an organisational response to globalisation and have become one of the main spheres for the organisation of productive and innovative processes in different industries and sectors (Dolan, Humphrey and Harris-Pascal 1999; Ernst 1999; Schmitz and Knorringa 1999). As a consequence, in many cases the need to compete with a growing range of producers in foreign markets has forced local producers in developing countries to integrate into global commodity chains. On the one hand, despite globalisation, the literature on industrial clusters in developing countries has confirmed the importance of local synergies and inter-firm cooperation for competitiveness. On the other hand, it is also suggested that there is still an insufficient understanding of how globalisation affects the interaction of local and global forces (Schmitz 1999). In this sense, further research is necessary to explore the impacts of globalisation over the upgrading strategies within clusters integrated on global commodity chains.

This paper examines the forms of governance within the tobacco commodity chain and their effects on the organisation of the cluster in the Rio Pardo Valley. It also analyses the institutional designs supporting the productive and innovative activities within the cluster, and the role of local and external linkages in the upgrading strategies adopted. Therefore, three main questions are posed:

- How is the tobacco cluster organised at the local level and how has it been shaped by the needs of international tobacco oligopolists controlling the global commodity chain?
- How are the innovation paths and learning mechanisms within the tobacco cluster affected by those forms of governance and institutional designs, and what is the role of local actors in supporting innovation schemes in the cluster?
- Finally, considering the development trajectory of the tobacco cluster and power asymmetries in its production and knowledge systems, what are the long-terms prospects of the cluster?

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The material on which this paper is based was collected between October 1997 and July 1998, using a number of sources of information and methods: a survey of producers; in-depth interviews with selected firms, suppliers, business associations and research institutions and the use of secondary sources (e.g. newspapers, sectoral directories, etc).³ Research on the growing of tobacco, carried out by 70,000 small producers, was based mainly on secondary sources. The primary investigation focussed on the processing of tobacco. The agro-industrial cluster in Rio Pardo Valley comprises around 16 firms involved in industrial processing and sales of tobacco products both domestically and abroad. The fieldwork covered a sample of 10 firms segmented according to size and ownership. Six of the firms in the sample are large subsidiaries of MNEs and accounted for approximately 90 per cent of total production of Brazil. The remaining four firms are locally owned SMEs that operate mainly as suppliers of tobacco leaf to the largest tobacco processing companies in the region (Vargas *et al.* 1999).

The paper is structured as follows. The second section draws together those strands of literature which have a bearing on the issues analysed in this paper. It shows how industrial clusters, systems of innovation and commodity chains literature contribute to understanding governance modes and upgrading strategies in clusters; it also identifies the limitations of the existing studies. The third section gives the international context of the Brazilian tobacco cluster. The fourth section presents the development trajectory of the tobacco cluster from its origins to the 1990s. In the fifth section, the current governance of the cluster and of the chain is analysed. The sixth section analyses the impact of these governance modes on the learning and innovative strategies adopted by tobacco growers and processing firms. Finally, conclusions are presented in the seventh section. This last section brings together the main theoretical issues addressed in the second section and the main empirical results in order to explain the way that governance modes and asymmetries of power relations in the tobacco cluster have shaped the competitive and innovative strategies of local producers.

2 GOVERNANCE MODES, COMPETITIVE AND INNOVATIVE CAPABILITIES: SOME THEORETICAL ISSUES

The implications of global and local governance modes and the role of external linkages in the upgrading⁴ strategies of industrial clusters have received growing attention in the literature in recent years. In order to explore the main analytical issues of such a debate, this section draws on the contributions emerging from three theoretical approaches: industrial clusters, local systems of innovation and global commodity chain analysis. The main arguments and concerns developed in these contributions are useful to shed light on

³ The empirical investigation draws on ongoing research on Local Systems of Innovation in Mercosur Countries undertaken by a network of research institutions in Brazil, Argentina and Uruguay. For further information see <http://www.race.nuca.ie.ufrj.br/gei/gil.shtml>.

⁴ According to Tam and Gereffi (1999), industrial upgrading involves organisational learning to improve the position of firms or nations in international trade networks. At products or industry niche level, the pursuit of industrial upgrading can be defined as the addition of high value services and more sophisticated manufacturing capabilities. From a developing country's perspective – where the concentration in commodity sector have led local producers to be inserted in global chains – upgrading can be seen as the only way to avoid further reductions in incomes (Kaplinsky 2000).

different aspects of the competitive and innovative performance of industrial clusters. However, some key issues remain to be further explored. Firstly, it is still necessary to clarify how global and local governance modes interact. Secondly, a better understanding of the role of internal and external linkages in the upgrading strategies of local producers is crucial.

It is widely recognised that competitive pressures emerging from the globalisation of product markets have forced many local producers in developing countries to be integrated into global production networks (Gereffi 1999). Notwithstanding the relevance of clustering for competing in global markets, the integration into global commodity chains can affect the balance of local and external forces driving the clusters' development strategies. Therefore, the question of whether the power to affect the development of the production system lies in the hands of local or global actors has become a critical issue in explaining the innovative and competitive strategies adopted by firms within clusters (Schmitz and Knorringa 1999).

The global commodity chain analysis (Gereffi 1994; Gereffi 1999) provides some interesting insights for exploring the impact of external linkages in the upgrading processes of local producers. These chains may be seen as a set of interorganisational networks clustered around one commodity or product, linking firms in different regions and countries. In this respect, the analysis brings together an explicit international dimension of productive chains and the perception of governance modes within the chain as a key source of competitive advantage (Gereffi 1999: 3).

The basic idea behind the global commodity chain analysis is that these chains might offer a possibility for local producers to embark on a path of progressive upgrading through learning processes and new knowledge acquired from external buyers.⁵ In other words, the access to the chain's lead firms is seen as a necessary step for industrial upgrading because it puts firms and economies on potentially dynamic learning curves (Gereffi 1999). Gereffi also proposes a distinction according to the nature of the division of labour and capital intensity within commodity chains. Two main categories are considered: producer-driven and buyer-driven commodity chains.

Producer-driven commodity chains are those in which large, usually transnational, manufacturers play the central roles in coordinating production networks (including their backward and forward linkage) ... Buyer-driven commodity chains refer to those industries in which large retailers, marketers, and branded manufacturers play the pivotal roles in setting up decentralized production networks in a variety of exporting countries, typically located in the third world. Production is generally carried out by tiered networks of third world contractors that make finished goods for foreign buyers. The specifications are supplied by the large retailers or marketers that order the goods (Gereffi 1999: 41–43).

However, this framework shows a limited reach in the analysis of local governance structures and local producers' upgrading possibilities. Firstly, as emphasised by Humphrey and Oeter (1999: 12), the strong

⁵ The commodity chain perspective defines two paths to upgrading. The first is related to shifts in market niches through the production of goods which require higher value added per employee within the same range of activities. The second path of upgrading is achieved by extending producers' activities beyond production to activities like marketing and design (Humphrey and Oeter 1999: 13).

focus on the governance modes within the chain underestimates the role of other forms of governance, such as cooperation at local level, government regulation and international regulation. Secondly, recent empirical studies on clusters have shown that although working for global buyers may help local producers in developing countries to upgrade in the sphere of production, the same is not true as regarding upgrading beyond production; global firms can make it difficult for local producers to progress into marketing, (Schmitz and Knorringa 1999).

Another body of literature drawn upon in this study is that concerned with industrial clusters in developing countries. Cluster studies have made a major contribution to the study of inter-firm linkages and deliberate cooperation between local actors as a mean to improve competitive performance.⁶ The research on industrial clusters has shown that:

- 1 clusters matter in developing countries and are common in a wide range of countries and sectors
- 2 clustering has helped small firms to overcome growth constraints and to sell to distant markets
- 3 the collective efficiency approach helps to explain differences in cluster performance. (Nadvi 1999; Schmitz 1995).

However, as this literature has become increasingly concerned with the effects of globalisation of product markets for upgrading strategies and long-term competitiveness of clusters, a new research agenda has been proposed to improve the former conceptual framework. According to Schmitz and Nadvi (1999: 1510-11), a new major concern relates to the role of external linkages in the upgrading strategies of local producers. The former emphasis on local linkages in the industrial cluster literature has neglected the role of external actors like international buyers and/or suppliers. In order to deal with the technological aspects of cluster dynamism it is also necessary to shift the studies' focus from production systems to knowledge systems (Bell and Albu 1999). Usually, the main characteristics of industrial clusters are defined in terms of inputs and goods flows either through vertical linkages or horizontal linkages. However, technological changes in products or process are developed through knowledge systems. In this sense, knowledge systems are defined as a set of knowledge stocks and flows used in order to generate and sustain changes in products, processes and in the organisation of productive systems. Although knowledge systems and production systems interact with each other, key actors in one can be unimportant in the other and vice versa (Bell and Albu 1999: 1726).

The analysis of the tobacco cluster in Rio Pardo Valley provides a good distinction between those actors and channels associated with production flows and those associated with knowledge flows within and outside the cluster. For instance, even though local producers play a critical role in the global tobacco chain as raw

⁶ The basic idea that emerges from the collective efficiency concept is that local external economies, in the traditional Marshallian sense, are not enough to explain the cluster's development. Competitive advantages are derived not only from local external economies but also by a deliberated force – joint action, Schmitz (1995).

material suppliers and service providers, most of the innovations adopted at the growing stage are developed through knowledge systems in which producers and other local actors play a passive or minor role.⁷

Considering these limitations of the industrial cluster literature, an alternative way of approaching the sources of technological and innovative dynamism in clusters can be found in the local and regional systems of innovation literature. Although most of the insights on the systemic nature of innovation processes were originally developed in the national systems of innovation literature (Nelson and Winter 1982; Freeman 1987 and 1995; Lundvall 1988 and 1992; Edquist 1997), recently this approach has been extended to the analysis of local and regional innovation systems (Braczyk *et al.* 1998; De la Mothe and Paquet 1998; Cassiolato and Lastres 1999). The concept of regional systems of innovation also draws on many insights emerging from regional science (Cooke and Morgan 1998). The focus is on the region as a type of collective order, in which the systemic nature of innovation processes relies upon a combination of well-endowed organisational infrastructure and an associative superstructure composed of, and embedded in, civil society which is capable of activating social capital (Braczyk *et al.* 1998; Cooke *et al.* 1998).

Most of the studies on local and regional systems of innovation have shown some common features in the relationship between spatial agglomeration of firms, technological dynamism and competitive performance. Firstly, most of these studies have stressed that regional and sectoral agglomeration is critical for economic competitiveness (Cooke *et al.* 1998). Secondly, as much as interactive learning processes have become the key mechanism for technological development, geographical proximity has been taken as the best context for facilitating tacit-knowledge exchange. From this perspective, the region is seen as a cognitive space where shared values, trust and other intangible assets contribute to the success of interactive learning processes and minimise transaction costs between firms (Storper 1997; Larsson and Malmberg 1999; Maskell and Malmberg 1999). Thirdly, although remaining the primary unit of analysis for innovation processes, firms are now widely recognised as learning organisations embedded in a broader institutional context. In other words, learning processes do not occur in an institutional vacuum (De la Mothe and Paquet 1998). The institutional dimension – the norms and routines upon which the local industrial order is based – also plays a critical role in supporting both productive and knowledge flows.

To a great extent, the importance attributed to institutional frameworks in the systems of innovation approach is shared by the industrial cluster literature. Despite its focus on productive linkages, the literature on industrial clusters in developing countries shows important insights related to the importance of institutional frameworks and organisational arrangements supporting inter-firm co-operation. Some studies draw attention to underlying social, cultural and others elements that facilitate the achievement of collective efficiency (Schmitz 1995). In other words, these elements are ‘embedded’ in the cluster and might provide

⁷ This discussion is further developed in section 6 in this paper.

the conditions (rules, codes, and norms) for business practices in the clusters.⁸ Thus, from the analysis using the industrial cluster and the system of innovation approaches, it became clear that the local dynamic cannot be understood without taking into account the forms of governance and the institutional designs in which such agglomerations are embedded.⁹

Nevertheless, both the industrial cluster and the systems of innovation literature have only a limited reach in explaining the impact of external linkages in the upgrading strategies adopted by firms in clusters. As they focus mainly on the intra-cluster relationships and forms of interaction and cooperation, these approaches fail to unravel the influence of external contexts on the scope for local joint action.¹⁰ In particular, most of the studies on local systems of innovation have put a strong emphasis on the importance of R&D infrastructures – physical and human – for the development of innovative trajectories in cluster. In this respect, an interesting question emerging from the analysis of the tobacco cluster is why the existence of an elaborate local infrastructure aimed at research, development and training has not had a major local impact on innovation. The Rio Pardo Valley counts on a considerable infrastructure of R&D and training institutions. Despite this fact, the most important sources of knowledge for innovation in the cluster are located and/or coordinated outside the region.

In sum, the analysis of these different bodies of literature suggests that there are some important analytical issues that need to be further explored. Based on the empirical study on the tobacco cluster in Rio Pardo Valley, this paper intends to contribute to the theoretical debate by addressing three main analytical issues. The first regards the intersection between global governance and local action associated with the analysis of clusters integrated into global commodity chains. The second is related to the distinction between production flows and knowledge flows within cluster and the third addresses the role of institutional and organisational designs supporting both governance modes and learning mechanisms within these clusters. The empirical exploration of these issues is presented in the following sections.

3 THE INTERNATIONAL CONTEXT OF THE BRAZILIAN TOBACCO CLUSTER

The world tobacco industry represents a remarkable oligopoly: four firms control over 98 per cent of the international trade in tobacco products and an extensive network of related and supporting industries. Although production for export is concentrated in a few countries like China, USA, India and Brazil, the

⁸ Schmitz (1999) in his analysis on the upgrading strategies of footwear producers in Brazil has stressed the lack of capabilities of local institutions to foster joint action and co-operative behaviour between the different actors in the cluster in order to respond to the advance of external competence. According to him, although the cluster shows a high degree of ‘institutional thickness’ – represented in the number of business associations, research centres and other organisations, the co-operative behaviour collapsed as some conflicts have arisen. An interesting aspect of this analysis regards the influence of the institutional designs in fostering joint action and upgrading trajectories by local firms in order to respond to new global competitive pressures.

⁹ The institutional and organisational characteristics associated with industrial clusters might entail not only the symmetry of the power relations between different segments in the production chain but also the degree of local governance over the different stages of such production chains.

¹⁰ This interaction between internal and external linkages is the focus of a recent paper by Humphrey and Schmitz (2000) which links the industrial cluster and global value chain research.

activities associated with the manufacturing and sale of tobacco products and cigarettes are spread over more than 100 countries.¹¹ The People's Republic of China is the world's largest single producer of tobacco. However, China mostly consumes its own production and hence does not yet pose any significant competitive threat to other tobacco producing countries. The tobacco exporting countries of Brazil, Turkey and Zimbabwe depend heavily on a small number of external customers related to tobacco processing and cigarettes manufacturing. The main companies are Phillip Morris, British American Tobacco – BAT, Universal Leaf, and Gallaher. These companies together have a key role in the decisions taken within the international tobacco commodity chain.

Brazil is the largest exporter of tobacco in the world and the fourth largest producer, see Table 1.

Table 1. World's leading unmanufactured tobacco producing and exporting countries

	1995	1996	1997	1998	1999*
<i>Production</i>					
World Total	5,541,950	6,564,732	7,721,377	5,928,336	6,048,295
China	2,082,600	2,910,600	3,613,350	2,010,250	2,108,000
India	528,390	506,475	561,330	572,200	587,600
United States	513,247	619,432	729,139	626,504	571,526
Brazil	323,500	365,900	485,100	373,150	498,400
Turkey	170,070	190,391	250,836	217,570	215,640
Indonesia	145,650	150,450	148,775	175,825	185,005
<i>Exports</i>					
World Total	1,759,121	1,982,098	2,005,138	1,914,456	1,948,185
Brazil	256,300	282,500	319,000	300,500	318,000
Zimbabwe	174,289	195,958	159,941	168,804	205,500
United States	209,482	222,316	221,512	211,917	189,379
Turkey	136,392	170,098	160,360	128,808	125,500
China	68,413	60,156	77,796	92,173	108,000
Malawi	99,057	95,555	111,449	135,300	107,600

Source: USDA/FAS/COTS, March, 2000; OBS: Metric Tons Dry Weight, Calendar Year; * Estimated

Three states in the South Region of Brazil (Rio Grande do Sul, Santa Catarina and Paraná) account at present for more than 90 per cent of the tobacco national output.¹² The main part of the remaining 10 per cent comes from the Northeastern states that produce mainly black tobacco for cigars. The country's greatest concentration of activities associated with the tobacco industry lies in the state of Rio Grande do Sul, particularly in the localities of Santa Cruz do Sul, Venancio Aires and Vera Cruz that belong to the Rio Pardo Valley region. The main activities performed by firms in Rio Pardo Valley are concerned with tobacco

¹¹ International Tobacco Growers Association: <http://www.tobaccoleaf.org>

¹² In the south region, Rio Grande do Sul is still the major producer despite the growth occurred in the production of tobacco leaf in the states of Santa Catarina and Paraná during the last years.

growing, processing and the export of unmanufactured tobacco and primary processed tobacco. During harvest time, this cluster employs more than 9,000 workers to process 380,000 tons of leaf tobacco.¹³

The economic relevance of the tobacco cluster at regional level is illustrated both in its participation in the state tax revenue and in its importance as a source of foreign exchange at regional level. In terms of tax revenue, the tobacco cluster accounts for more than 80 per cent of the gross income generated in the region and, in terms of exports, it is remarkable that four out of the ten largest exporter firms in Rio Grande do Sul State belong to the tobacco sector. The tobacco industry is responsible for more than 10 per cent of the total exports from Rio Grande do Sul.

About 60 per cent of the production in the agro-industrial cluster in the Rio Pardo Valley is aimed at the external market and exported to the USA, Germany, United Kingdom, Japan and other countries in Europe and Asia. The remaining 40 per cent is directed to cigarette production in the national market. The cluster nowadays comprises 16 firms involved in the production, industrial processing and sales of tobacco products. Although some of these firms are locally owned SMEs, the cluster is dominated by large subsidiaries of MNCs. These firms play a major role in organising both the production and knowledge flows within the cluster. The structure and the governance modes associated with the tobacco cluster in Rio Pardo Valley are discussed later in section five.

4 ORIGINS AND DEVELOPMENT OF THE TOBACCO CLUSTER IN RIO PARDO VALLEY

Tobacco growing activities in the Rio Pardo Valley region dates back to 1824 when the first German colonies were settled in Rio Grande do Sul. From the second half of 19th century, tobacco growing, based mainly on smallholders and family labour, became the main agricultural activity in the region. As the activities related to tobacco culture acquired economic importance in the region, a nucleus of locally-owned firms emerged and a physical and institutional infrastructure to support production and trading was created. The increase in tobacco growing activities contributed to the industrial development in the region and led to several improvements in the industrial processing activities. Until the early 1920s, most of the cluster exports were unmanufactured tobacco leaves. From the 1920s several local-owned processing plants were established in the region leading to a significant growth in the participation of the tobacco industry in the regional and national economy (Liedke 1977; Nardi 1985).

The initial development of the tobacco cluster in Rio Pardo Valley benefited from favourable regional conditions, notably:

- 1 the structure of land ownership based in smallholders and family labour;
- 2 the existence of local skilled labour in handling these activities and;
- 3 an incipient infra-structure for production and trading.

¹³ According to the Tobacco Growers Association in Brazil (AFUBRA 1998).

These factors facilitated the emergence of local firms and their subsequent growth up to the 1970s. The entry of MNCs in the 1970s reduced the importance of local actors in the organisation of activities connected to production and innovation. Two factors have been fundamental to determine the setting up of subsidiaries of tobacco MNCs in the Rio Pardo Valley region. Firstly, there were no requirements of any capital investment related to land purchasing or extensive labour hiring as the agricultural production structure in the region – based on small properties and family labour – assured low production costs. Secondly, in the 1970s there was a commercial blockade on Zimbabwe (Rhodesia) – at that time the major tobacco supplier for the European market. This historical accident allowed a significant rise in Brazil's export share in the world tobacco market (Montali 1979).

Thus, the great impulse for the consolidation of the tobacco cluster in the Rio Pardo Valley occurred during the 1970s, when the increasing demand in the international market led to the installation of the main tobacco MNCs in this region. This process happened in a gradual way. Initially, the MNCs injected resources into local firms. Subsequently, these MNCs took total or majority share control of these local firms, keeping the former owners in management (Vogt 1994: 105). Moreover, the denationalisation process was accompanied by substantial increases in production, upgrading of tobacco processing factories and the reorganisation of the agricultural production system. Therefore, the modernisation process resulted in deep transformations of the physical and institutional infrastructure in the region.¹⁴

Chart 1 shows the denationalisation and the industrial concentration of tobacco companies in Santa Cruz do Sul from the 1970s to the 1990s.

¹⁴ Humphrey (2000), presents a similar conclusion in his analysis on the denationalisation of the Brazilian auto industry during the 1990s. Although this industry was first developed within the broader context of import substitution in the 1950s, the trade liberalisation and changes in the governance structures of the auto industry commodity chain during the 1990s led to a major shift in the Brazilian auto industry structure. Following the changes of assembler-supplier relationships and the globalisation of auto design and production at international level, the components industry in Brazil have faced a high degree of penetration of transnational companies through large inflows of FDI. As assemblers and first-tier suppliers now form parallel global networks many foreign components companies are entering the Brazilian market in order to follow their major customers and the space for local-owned companies is drastically diminishing (Humphrey 2000: 12).

Chart 1. Denationalisation of firms in the tobacco sector in Santa Cruz do Sul

FIRMS ESTABLISHED AS OF 1965 (BY CAPITAL ORIGIN)	CHANGINGS IN THE SHARE CONTROL BETWEEN 1966 AND 1974 (BY CAPITAL ORIGIN)
Fábrica de Cigarros Sudan S/A - (National) Cia. de Fumos Santa Cruz - 1918 (National) Cia. de Cigarros Souza Cruz - 1917 (Anglo-American) Cia. de Cigarros Sinimbu - 1948 (National) Exportadora Hennig S/A - 1890 (National) Tabacos Tatsch S/A - 1932 (National) Kliemann & Cia. - 1915 - (National) Boettcher e Wartchow - 1932 (National)	Fábrica de Cigarros Sudan S/A - (National) Grupo Remtsmann - 1970 (German) Cia. de Cigarros Souza Cruz - (Anglo-American) Grupo Brinkmann - 1970/72 - (German) Grupo Brinkmann - 1970/72 - (German) Tabacos Tatsch S/A - (National) Kliemann & Cia. - (National) Boettcher e Wartchow - (National) Armada S/A - Ind. e Com. - 1968 - (German) ¹⁵ Tabra - Exp. de Tabacos do Brasil Ltd - 1970 (American) ¹⁶ Cia. Meridional de Tabacos - 1974 - (French) ¹⁷
FIRMS OWNERSHIP - 1975/77 (BY CAPITAL ORIGIN)	PRESENT PROFILE OF FIRMS SHARE CONTROL 1990 DECADE
Fábrica de Cigarros Sudan S/A - (National) Phillip Morris Inc. - 1975 - (American) Cia. de Cigarros Souza Cruz - (Anglo-American) R.J. Reynolds Tab. do Brasi l- 1975 - (American) R.J. Reynolds Tab. do Brasi l- 197 5- (American) Tabacos Brasileiros Ltda. - 1976 - (American) Kliemann & Cia. - (National) Boettcher e Wartchow - (National) Armada S/A- Ind. e Com. (German) Tabra- Exp. de Tabacos do Brasil Ltda (American) Cia.Meridional de Tabacos – (French)	Phillip Morris Inc. - (American) Cia. de Cigarros Souza Cruz - (Anglo-American) Universal Leaf Tobacco Ltda.- 1991 - (American) Cia Meridional de Tabacos - (American) Dimon Incorporated - (American) Kanneneberg e Cia. Ltda. - 1953 (National) ¹⁸

Source: Vargas *et al.* (1994), Vogt (1994) and Silveira (1997), updated with author's own research.

As shown in Chart 1, Sudan S/A (Fábrica de Cigarros Sudan S/A) was the one that most resisted the pressure from international companies, though in 1991 was at last incorporated by the North-American tobacco company Dibrell Brothers Inc. Moreover, the process of denationalisation was also followed by a considerable concentration in the cluster's control. In 1991, R.J. Reynolds passed its cigarette factory to Phillip Morris and its Tobacco Department to Dobra Tabacos which was later purchased by Souza Cruz and subsequently passed to Dibrell. Universal Leaf appeared from the merger of Tabacos Brasileiros Ltd., Armada S.A. Ind. Com., Kliemann & Cia and Fumossul from Venâncio Aires. Dimon Incorporated was raised in 1994 from the merger of Monk Austin Inc. and Dibrell Brothers Inc. In 1991, this firm had already incorporated Tabasa Tabacos S.A., Verafumos Ltd. And Sudan whose headquarters were sited respectively in Venâncio Aires, Vera Cruz and Santa Cruz do Sul. In 1997, Dimon incorporated Intabex Worldwide S.A.¹⁹

¹⁵ Controlled by Gebrüder Kuhlentkamp Group

¹⁶ Controlled by The Monk Austin Co. Inc.

¹⁷ Created from the joining of part Boettcher Wartchow capital with the French state-owned S.E.I.T.A, where the latter has the majority control.

¹⁸ Despite existing since 1953, Kannenberg recently started an expansion process that led it to transfer its headquarters from the city of Sinimbu to the Industrial District of Santa Cruz do Sul.

¹⁹ Indeed, from 1971 to 1995, the number of firms working in the tobacco processing and trade and in the production of cigarettes in Santa Cruz do Sul experienced a reduction of about 62 per cent, changing from 16, in 1971, to 6 in 1995 (Silveira 1997: 139).

The next sections show how this concentration in the hands of transnational companies influences the organisation and upgrading of the cluster.

5 GOVERNING THE CHAIN; THE ROLE OF LOCAL ACTORS AND INSTITUTIONAL DESIGNS

An analysis of the tobacco chain reveals a high diversity in the nature of the linkages, actors and institutions involved in the phases of tobacco growing, processing and retailing activities. Moreover, each link in this chain entails a particular geographical reach as much as a specific form of governance and institutional designs.

A general overview of the tobacco chain is provided in Figure 1. The phases related to the growing, storage, primary processing and exports comprise the core activities performed in the tobacco cluster in Rio Pardo Valley.²⁰ A branch of Phillip Morris also performs the activities related to secondary tobacco processing and cigarette manufacturing. Although some of the intermediate goods and other related and supporting industries and institutions are located within the Rio Pardo Valley region, most of these goods and services are provided from sources located outside the cluster. Firstly, growing practices involve the use of fertilisers, herbicides, pesticides, seeds and several other inputs related to handling the crop. Most of these inputs are provided through the large tobacco companies and acquired from global suppliers. Secondly, the key activities related to marketing, export distribution, wholesale and R&D are under the control of the headquarters of large transnational conglomerates and/or specialised international exporter agents. The impact of this external control of the chain over the learning and innovative strategies within the cluster is detailed in the next section.

As shown in Figure 1, a network of more than 70,000 tobacco growers perform the tobacco growing activities in the cluster. This extensive network of smallholders comprises the first and most important linkage in the productive chain and is the basic source of raw material for the different market channels in the cluster.

In order to understand the way the linkages between the tobacco growing and the tobacco processing phases are developed it is necessary to explore the nature of the interactions between smallholders and the lead tobacco companies in the cluster. The relationship between tobacco growers and processing firms in the cluster is governed by the so-called *integrated production system*. In this system, the firms provide the seeds, the technical assistance, determine the use of inputs and agricultural pesticides and, at the same time, guarantee the purchasing of the tobacco leaves produced by their 'integrated' growers. The main features of the *integrated productive system* are explained in Box 1. According to the Brazilian Tobacco Growers Association (AFUBRA 1998), about 160 thousand families (with an average of five members each), and mainly comprised by smallholders are involved in growing tobacco in Brazil. More than 45 per cent of these

²⁰ This figure was produced according to the subsector approach. A subsector is defined as the network of firms that supply raw material, transform them, and distribute finished goods to a particular consumer market (Haggblade and Gamsler 1991). This representation of the tobacco cluster in Rio Pardo Valley entails three distinct market channels.

smallholders are located in the Rio Pardo Valley. The distribution of tobacco growers within the three States in the South of Brazil is shown in Table 2. The advisory extension work for producers is carried out through technical assistance teams who disseminate and supervise the use of new technologies related to planting and the use of new varieties of tobacco plants developed in the research centres of the firms. In this respect, the smallholders follow the technical guidelines of more than 1,500 technicians – as managers, supervisors and instructors – hired by the MNCs.

Table 2. Number of tobacco growers in the South of Brazil

State	Producers	%
Rio Grande do Sul	71.820	45,2
Santa Catarina	65.580	41,3
Paraná	21,580	13,5
TOTAL	158.980	100

Source: AFUBRA (1998)

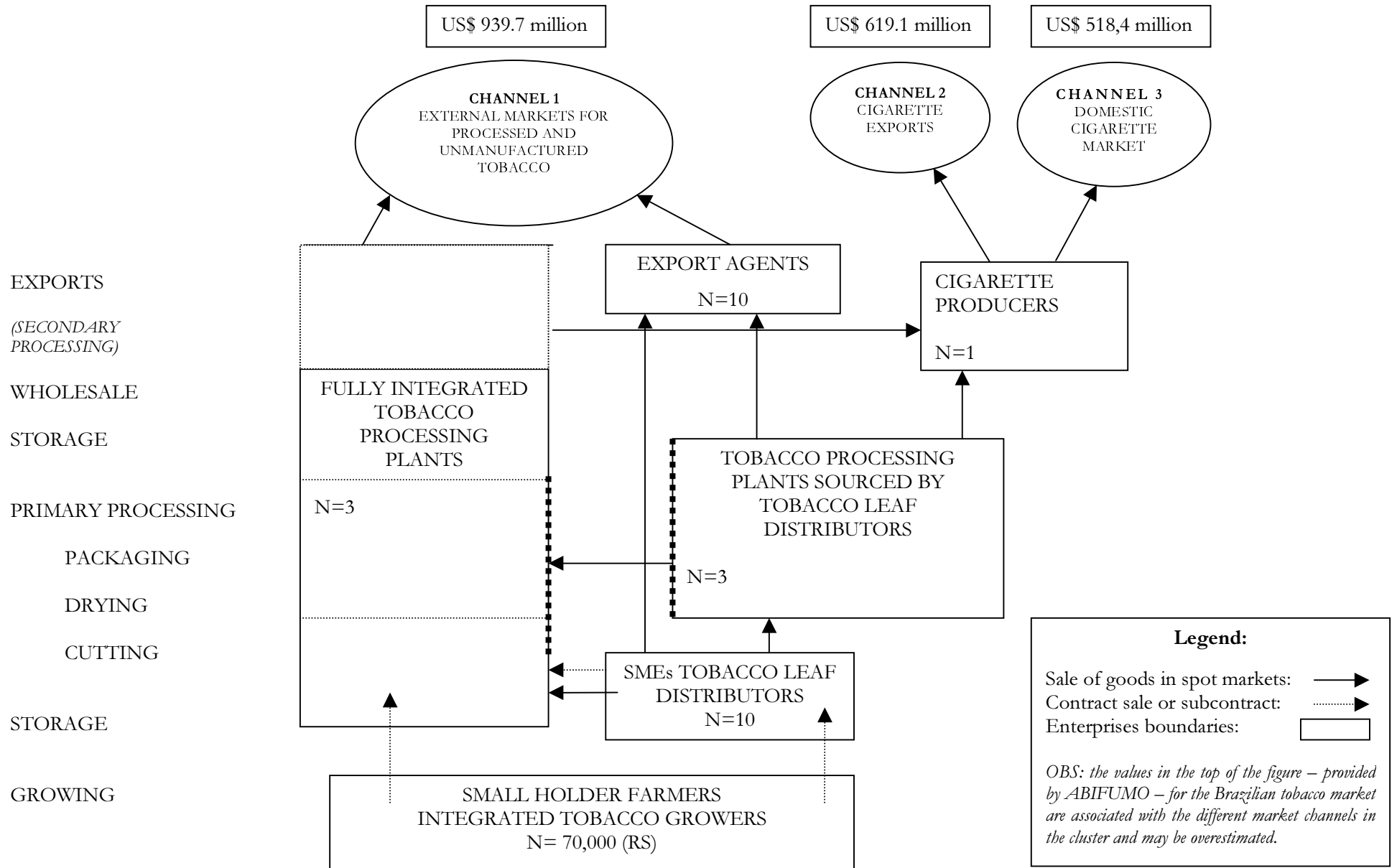
Box 1

Integrated Production System

The integrated production system involves the establishment of contractual obligations between smallholders and tobacco processing or retailing firms. Once participating in this supply agreement, smallholders are committed to provide the firms with all their tobacco leaf production and to follow the technical guidance and price classification schemes from these firms. On one hand, the firms are responsible for providing the integrated smallholders with seeds, sell the main agricultural inputs like fertilisers and authorised defensives, give technical advice through the firms' supervisor and instructors teams, control and intermediate smallholder loans with official banks, provide the transport from the fields to the tobacco warehouses and processing plants, and buy the entire crops from the smallholders (AFUBRA 1998). On the other hand, integrated smallholders are bound to volume, quality and production costs defined by the firms. Thus, through the establishment of such kind of linkages, and in order to reach the competitive standards defined by the international markets, the tobacco firms get to control both the tobacco varieties produced at local level and the quality and costs of such production.

Although the integrated production system has been adopted in the cluster since the 1920s, it was in the 1970s that this system became critical in the reorganisation and modernisation of the tobacco cluster. Before the consolidation of the integrated production system, the tobacco growing activities were mostly based on the use of organic fertilisers; smallholders determined the quantity produced and they were not bounded to the technical guidance of the tobacco firms. As the lead MNCs in the international tobacco industry started establishing branches in the cluster, the smallholders' autonomy was abolished through the adoption of new tobacco growing practices (Vogt 1994). The linkages between growers and processing firms in the tobacco cluster in Rio Pardo Valley not only play a fundamental role in the dynamics of innovations at the stage of agricultural production but also shape the core institutional designs in this cluster. Through the *integrated system* the firms get to determine which technological pattern will be put into practice by the tobacco producers and assure exclusive rights in supplying. On one hand, the continuance of this model imposes a series of costs to the firms: they require departments for input purchasing and teams of agricultural technicians and agronomists to supervise the harvest. On the other hand, the firms not only keep total control over the quality and cost of their main input, but also determine the volume of production through signalling to the producers their estimated demand.

Figure 1. Tobacco cluster subsector map



The collective local organisations in the in Rio Pardo Valley are concerned with the coordination of labour relations and mediation between producers of tobacco leaf and processing firms. Even if such organisations carry out an important role in the maintenance of the integrated production system and in the organisation of labour relations, they have a very limited reach for engaging local actors in interactive learning processes. The main local organisations that regulate inter-firm relations in the tobacco cluster are depicted in Box 2.

Box 2

Main institutions for coordination of inter-firms relations in the Tobacco Cluster

Associação dos Fumicultores do Brasil (AFUBRA), the Brazilian tobacco growers association. Created in 1995, numbers about 150.000 associated producers today in the three southern States. The foundation of AFUBRA was just related to the need for mediation in the prices paid by the industry to producers through the consolidation of the system of integrated production.

Sindicato das Industrias do Fumo (Sindifumo), the Brazilian tobacco manufacturers union. Created in 1942, its representative function acquired major importance only from 1980 when the sector underwent substantial growth. At present, it numbers about 20 associates which corresponds to the total number of firms related to the purchase, process and trade of tobacco in the region.

Associação Brasileira de Fumo (ABIFUMO), the Brazilian tobacco manufacturers association numbers 26 associated firms in the whole country, though it represents the specific interests of the sector's greater firms, specially respecting matters related to tax legislation.

Sindicato dos Trabalhadores Rurais (STR's), the tobacco growers union has active participation in the process of negotiation related to the production costs and prices paid for tobacco leaf to the agricultural producers. Despite the process of negotiation of prices paid to the rural producers counting on the support of AFUBRA, Sindifumo and STR's, it has always involved an asymmetric bargaining power that favours the firms.

As mentioned above, the largest MNCs in the cluster dominate the industrial processing phase. There are presently three conglomerates connected with the tobacco leaf processing and one connected with the cigarette production. Operating in the region in the processing of tobacco leaf is Souza Cruz, linked to the group British American Tobacco – BAT (Anglo-American capital), Universal Leaf Tobacco and Dimon Incorporated (American capital). Philip Morris (American capital) operates in the region exclusively in the cigarette production. As stated earlier, altogether, this cluster congregates about 16 firms.²¹ Besides the big conglomerates mentioned, there are also medium and small sized firms which buy and sort tobacco leaves from the growers; some are also engaged in processing tobacco. Their output goes in part to the MNCs and in part to independent export agents. However, only a small share of the product flow goes through the local firms.

The organisation of the productive system within the tobacco clusters entails different phases beginning with the transport of tobacco leaves from the field to centrally located warehouses, primary processing, packing and sales in domestic and external markets. In the case of the lead firms, like Souza Cruz and Phillip Morris, these activities might involve higher complexity and spatial reach as they also operated in cigarette manufacturing and control a widespread network of retailers all over the country (Silveira 1997: 115). The small locally owned firms also feed into a network but their ability to govern this network and geographical reach is much smaller.

²¹ According to Sindifumo registers.

The existence of distinct segments according to markets size and dimension led to the establishment of an implicit division of labour between the firms of the cluster. The small and medium sized firms are linked to the productive process of the main MNCs' processing plants in the region (like Souza Cruz and Universal Leaf) either as suppliers of tobacco leaves (in the case of the small ones) or manufactured tobacco (in the case of the medium ones). The main features of both segments are illustrated in Table 3 which shows a characterisation of the sample of firms analysed in the case study. From the analysis of the forms of interaction between firms in this cluster, it becomes evident that these linkages involve a flow of raw materials based on standards and specifications originated from international market demands and that are signalled by the largest firms in the cluster. In other words, it does not originate from collective learning processes among the firms that integrate the cluster.

Table 3. Tobacco Cluster in Rio Pardo Valley – Sample Profile

Firm size	Year of start	Capital Nationality	Main product	Employees		Supplying tobacco growers	Processing capacity p.a.
				effective	temporary		
Large	1973	USA	Cigarette	4.600		-	42 billions
Large	1903	UK	Manufactured Tobacco	1.916	1.800	55.000	220,000 ton.
Large	1993	USA	Manufactured Tobacco	850	4.200	35.000	91,150 ton
Large	1996	USA	Manufactured Tobacco	680	3.500	6.825	124,000 ton
Medium	1974	USA ⁽³⁾	Manufactured Tobacco	216	1.100	7.800	25,000 ton
Medium	1994	USA	Manufactured Tobacco	185	1.430	33.500	30,000 ton
Small	1953	National	Manufactured Tobacco	96	-	-	25,300 ton
Small	1987	National	Tobacco leaves	32	10	920	1.300 ton
Small	1967	National	Tobacco leaves	18	10	700	3.000 ton
Small	1995	National	Tobacco leaves	16	-	900	2.400 ton

Sources: Author's Survey

The first segment of firms is comprised of a group of local owned SMEs that operate as secondary tobacco leaf suppliers for the lead processing firms in the cluster. The firms in this segment do not have tobacco-processing lines and operate in a small-scale trade that does not allow them to achieve external markets channels. Usually, they are functionally integrated into the large processing plants in the cluster in a way that is not particularly different from the linkages these large firms have with tobacco growers. It is interesting to highlight that this segment of SMEs also works with smallholder tobacco growers through the integrated production system even though in a reduced scale as compared with the lead firms in the cluster since, on average, a firm in this segment has around 900 integrated tobacco growers. The volume of tobacco produced and traded by this segment still remains a small proportion of the total cluster output.

The branches of MNCs that were established in the region mainly during the 1970s comprise a second segment of firms in the cluster. Most of these firms account for more than 500 employees and have other industrial units located in the states of Santa Catarina and Parana. Such units are mainly aimed at the storage of the tobacco produced in these States and account for almost 50 per cent of the tobacco processed by the lead firms in the Rio Pardo Valley. Souza Cruz, Universal Leaf and Dimon are the lead firms in the cluster associated with tobacco processing activities. Altogether, these three firms are responsible for a processing capacity of more than 400 million tonnes of tobacco and work with more than 110 thousand smallholders. Souza Cruz is the main tobacco-processing firm in the cluster. Although holding other industrial processing units in the State of Santa Catarina, Souza Cruz have been investing heavily in order to improve its storage and processing capacity in the Rio Pardo Valley. In the second half of the 1980s, this firm invested in a sophisticated storage system to safeguard unmanufactured tobacco from deterioration. This new storage system comprises a 24.000 square metre refrigerated warehouse that has allowed considerable flexibility in tobacco processing activities. Souza Cruz has also invested US\$ 81 million to construct the world's largest tobacco processing plant in Santa Cruz do Sul. This new industrial plant was completed in 1997 and has a processing capacity of 120 tons/year. Around 60 per cent of the manufactured tobacco processed by this company is aimed at cigarette production for the domestic market in Brazil and the remaining 40 per cent are exported.²²

Most of the large firms in the tobacco cluster also held commercial and storage units in Santa Catarina and Parana to secure the supply of unmanufactured tobacco from these states in the South of Brazil.

Table 4. Other productive units held by the large tobacco firms outside the cluster

Firm	Units outside the region
Souza Cruz	Rio negro (PR); Blumenau (SC)
Dimon	Rio do Sul (SC); Araranguá (SC); Palmitos (SC); União da Vitória (PR)
CTA	Araranguá (SC); Ituporanga (SC)
Meridional	São Miguel do Oeste (SC); Sombrio (SC); Agronômica (SC); Rio Azul (PR)
Kannenberg	Apiúna (SC); Palmitos (SC)

Source: Author's survey

The only firm that operates in the cluster exclusively as a cigarette manufacturer is Phillip Morris. Although most of the primary manufactured tobacco used by Phillip Morris is acquired from selected processing plants in the cluster, this firm also has international suppliers for its main raw material. Phillip Morris has a cigarette manufacturing capacity of 42 billion/year and accounts for 4,600 employees. It also accounts for 15 per cent of the cigarette domestic market in Brazil with brands like Marlboro, L&M, Galaxy and Parliament, and it is a major exporter to Latin America, Europe and Asia. Recently, as a result of the economic crisis in Eastern Europe Phillip Morris has closed its second industrial unit in Curitiba (Parana) which used to export 90 per cent of its production to Russia and other Eastern European countries.

²² This company accounts for 80 per cent of the domestic market for cigarettes and has started recently to build a new cigarette manufacturing plant in Cachoeirinha (Rio Grande do Sul).

6 IMPACTS ON THE LEARNING AND INNOVATIVE STRATEGIES

The previous section has focused on the structure of the tobacco value-chain and the forms of governance emerging from the links between different actors within the tobacco cluster in Rio Pardo Valley. In this section, the upgrading strategies adopted by local producers are analysed, focusing in particular on the effects of the governance modes and institutional designs on learning mechanisms and knowledge flows in the cluster.

The upgrading process in the tobacco cluster comprises two distinct innovative circuits according to the phase of the productive chain. The first one refers to the development of new plant varieties and to improvements in handling the crop. The second is associated with the tobacco industrial processing activities at primary or secondary level. The main innovations adopted by the firms in the tobacco cluster in the last five years, related both to the growing and industrial processing phases, are shown in Table 5. From the seven firms that agreed to answer this question, five operated tobacco processing plants, one had a cigarette manufacturing facility and the small firm was a tobacco retailer that worked for a large firm as a specialised supplier.

Table 5. Product and process innovations adopted in Tobacco Cluster in Rio Pardo Valley*

Firm's size	Innovations introduced	Type of innovation	Impact of innovation				
			IPC	CR	EMR	RMR	PQI
'A' Large	Upgrading in processing plant layout	Process			X		X
	New storage system for tobacco leaves	Process				X	X
'B' Large	New genetic engineering tobacco seeds varieties	product	X				X
	Improvements in tobacco cultural practices	product					
'C' Large	Not informed	product	X	X			X
	Not informed	process		X			X
'D' Large	New genetic engineering tobacco seeds varieties	product		X			X
	Improvements in tobacco cultural practices	process	X	X			X
	Upgrading of machinery	process	X	X	X	X	
'E' Medium	Machinery upgrading (striper/separator line)	process					X
	Machinery upgrading (dryers line)	process					X
	Machinery upgrading (packing/compressor line)	process					X
'F' Medium	Acquisition of new machinery		X	X			X
	New processing controls			X	X		
	New raw material controls		X	X			X
'G' Small	Changes in the technical assistance to farmers	process	X	X	X		X
	Changes in the storage systems	process	X	X	X		X

Legend: IPC = increase in production capacity; CR = cost reductions; EMR = employees reduction; RMR = raw material inventory reductions; PQI = products quality improvements. *Source:* Author's survey

Tobacco leaf production involves an intensive R&D effort by the largest MNCs in biotechnology for the development of new hybrid or genetically modified tobacco varieties, as well as a rigid control of tobacco

growing practices. The analysis of the main innovations adopted by firms in the cluster in the last five years shows that most of the improvements in the tobacco growing phase are related to the introduction of new tobacco varieties. In this way, the primary focus of most of the research work performed by the large transnational tobacco companies in the cluster is the development of hybrids and/or conventional varieties resistant to diseases such as Bacterial Wilt, Yellowing, Tobacco Mosaic and other viruses. Besides the R&D efforts carried out for the improvement of varieties, the lead firms seek to introduce changes in the agricultural techniques. The change from seedlings planting in plots to the float system (where the seedlings are cultivated in trays), direct plantation, the segmented harvest and the adoption of lower and automated stoves for drying tobacco are some examples of these changes.

Most of the firms keep staff at local level for research into new species of tobacco and for technical assistance to their tobacco growers. An average of 3.6 per cent of the tobacco firms staff are involved in R&D activities concerned with the development of new species and the production of seedlings, as well as quality control in the processing tobacco lines. However, the major part of the personnel with technical qualifications employed in the firms are linked to technical assistance/support departments. These departments employ, on average, about 40 per cent of the total effective staff of the firms and play a fundamental role in the organisation of the integrated production system. All the subsidiaries of large transnational tobacco companies involved with tobacco growing activities maintain agronomic research facilities like research labs and green houses at local level in order to perform their R&D efforts. In most cases, these agronomic facilities are also used to produce the tobacco seeds that are distributed to the smallholder tobacco growers associated to the companies.

Therefore, the incorporation of innovations in the tobacco-growing phase is driven and controlled by the subsidiaries of MNCs. Local actors play only a marginal role in the innovation process (be it the local-owned SMEs, the tobacco growers – who strictly follow the advice of the largest firms technical assistance departments – or the research institutions at local or regional level). The development of new species better adapted to the local climatic conditions and the production of hybrid seeds is restricted to the laboratories of R&D of firms like Universal Leaf, Dimon and Souza Cruz. Nevertheless, it worth highlighting that recently the production of seeds has also been carried out by a specialised supplier settled in the region. The role of this supplier, Profigen, in supporting the cluster's innovative performance is depicted in Box 3.

A second innovative circuit in the tobacco cluster in Rio Pardo Valley is made up by the industrial processing of tobacco leaves. In this phase, the incorporation of technological innovations happens predominantly through incremental improvements at specific stages of the productive process as the processed tobacco is drying and compressing. The adoption of compact process lines has also been regarded as an important innovation, as it allows a significant reduction in the processing area. Hence, most of the innovations adopted at the tobacco-processing phase happen mainly through user-producer relations established with machinery suppliers. The largest firms keep in regular contact with their machinery suppliers, both through the training of staff and the exchange of technical information.

Box 3

Specialised supplier: The role of Profigen in the cluster

Profigen, a specialised supplier for tobacco seeds in the cluster, began operations in Santa Cruz do Sul in 1995 with a group of technicians and engineers that were previously employed in the R&D labs of one of the lead MNCs in the cluster. However, the technological capability of this firm cannot be considered exactly as a 'technological spillover' that has emerged from the MNCs R&D activities in the cluster. Instead, Profigen was launched as a branch of Profigen Inc, an American company that is linked to the American conglomerate U.S. Tobacco and operates at an international level through subsidiaries or joint ventures. In this respect, although this Brazilian subsidiary has some degree of autonomy, most of the know-how and innovative capabilities are acquired through technological license agreements and all the new tobacco seeds varieties developed are patented in USA.

Despite the fact that seed production is still considered as a strategic niche for many of the large tobacco firms, in the last few years Profigen has been acquiring increasing importance as a specialised supplier in the cluster. According to the information gathered through the interviews, Profigen is already registered at CTNbio (Brazilian National Technical Commission for Biotechnology) to produce genetically modified tobacco seeds. The use of genetically modified tobacco seeds is only allowed in China and Argentina and there is a considerable resistance to accept them in commercial crops in the tobacco international market. However, Profigen has developed a strategy to launch the commercial production of new genetically modified varieties of tobacco in the next five years.²³

The company now supplies local producers with hybrid varieties of tobacco seeds and develops experiments with other genetically modified varieties. In this respect, although the tobacco MNCs in the cluster are partially supplied by Profigen, they still keep lab and agronomic research facilities in order to produce the seeds that are delivered for their integrated growers.

Most of the machinery used in the tobacco industrial process has its own suppliers in the region and country, though all national producers work with foreign licensed technologies. This is, for instance, the case for suppliers such as Thor, from Santa Maria, licensed by Evans (USA), or Bernannuer, licensed by Mac Tavish (USA) and JG Engineering licensed by Cardwell (USA), both from Santa Cruz do Sul. However, the tobacco processing firms also import machinery directly from foreign suppliers in the USA, Germany and England. Some components have specialised suppliers, as for instance, the electronic control panels produced by Siemens. Finally, most of the firms interviewed agree that there is still a considerable difference at the technological level of processing plants with countries like the USA that uses advanced robotic technology in the automation of the productive process.

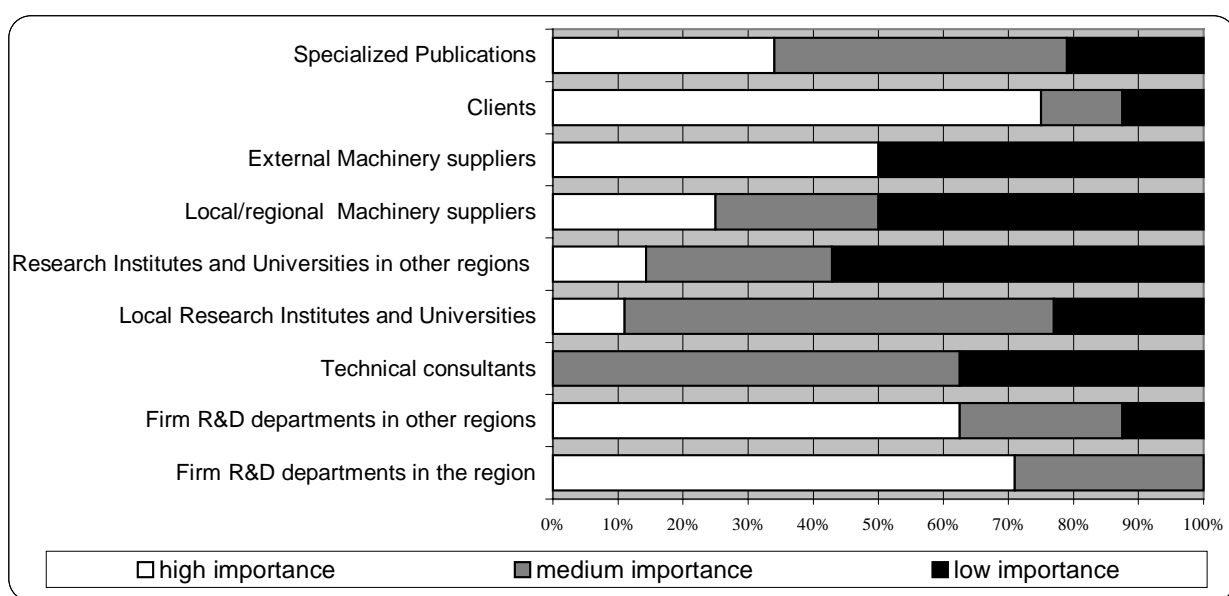
The analysis of the main information sources for adopting innovations allows further exploration of the role of different actors, within and outside the cluster (Figure 2). Firstly, it is evident that the firms' R&D departments are of importance to the firms in this cluster. According to the survey, more than 70 per cent of the firms consider their R&D labs and/or departments as a very important source for the adoption of innovations in products and processes. In the same way, information flows originating from head offices of the MNCs are also considered very important by more than 60 per cent of the firms.

Customers are considered a very important information source by 75 per cent of the tobacco processing firms. In respect of the machinery suppliers, half of the surveyed firms consider the machinery purchasing from outside suppliers as a very important information source, while the local machinery suppliers are considered a very important technological information source by only 25 per cent of the sample. Yet, international customers impose rigid controls over the blends produced and over a firm's productive process. For instance, from November to July during the tobacco leaf harvest period the tobacco processing

companies receive international customers' committees to monitor and inspect production and processing activities. These supervising committees play a very important role in determining quality parameters of the loads exported.

Reduced importance is given to research centres and universities as sources of information for the adoption of innovation considering that only 11 per cent of the surveyed firms consider the local research centres and universities as sources in their process of technological learning. This finding is supported by the analysis of the innovative linkages and forms of interaction that the tobacco processing firms in Rio Pardo Valley maintain with universities and research centres at regional and local level. Even though all firms declare some kind of links with research institutions in the region, the analysis of the character and intensity of such links demonstrates a restricted level of interaction between these actors in the cluster.

Figure 2. Most important sources of information for innovation in the Tobacco cluster in Rio Pardo Valley



Source: Author's Survey (N=07)

The forms of interaction between tobacco companies and universities and technological centres in the region are, in the majority, limited to lab-analysis and certification. Nevertheless, this lack of linkages is not in any way due to the lack of a training infrastructure and R&D in Rio Pardo Valley. The region counts on two universities, the technological centres of Embrapa, Emater, besides the technical school of SENAI that offers technical courses in different areas. The University of Santa Cruz do Sul is the main research and human resources formation institution in the region.²³ The Federal University of Santa Maria (UFSM), which is another institution of research and teaching in the region, presents a greater level of interaction with the firms of the tobacco cluster in staff formation and in the accomplishment of tests and product certification. In 1997, the tobacco firms signed an agreement with UFSM that foresees financial support of US\$250,000 to

²³ This statement was made by one of Profigen's Directors, Mr Sergio Brem during an interview in July/98.

²⁴ This university bases the Pole of Technological Modernisation of Rio Pardo Valley, created in the scope of a programme for decentralisation of the actions aimed to State Science and Technology.

build a special lab for the elaboration of tests and analysis aimed at identifying residues of agricultural pesticides in the tobacco. The creation of more rigorous laws respecting environmental matters in the developed countries resulted in the creation of this niche for new interactions between UFSM and the firms. The objective is that, within the next few years, Brazilian tobacco can be exported with a seal of environment quality.

Both universities play an important role in the formation of human resources in the region, even if there is no concrete demand from tobacco firms to employ technical personnel at bachelor degree level. The SENAI Training Center in Santa Cruz do Sul maintains some courses exclusively for tobacco firms in machines and installation maintenance. Finally, other institutions aimed at research and human resources formation, which operate in the agricultural sector in the region, such as Embrapa and Emater, do not offer significant linkages to tobacco firms. Linking these findings to the literature discussed in Section 2 immediately reveals a disjuncture between expected and actual findings. The industrial cluster and the local systems of innovation approaches lead us to focus on the intra-cluster sources of innovation. Indeed, the tobacco cluster hosts an impressive infrastructure aimed at research, development and training at local level. However, the most significant innovations in growing and processing activities come from other knowledge sources.

As emphasised earlier, the R&D labs and technical assistance departments of MNCs control the main innovations adopted in the growing stage while local research centres and training institutes have only a minor role in the improvement of tobacco varieties and growing practices. This is explained both by the nature of the R&D activities associated with the tobacco chain and by the institutional designs in the cluster. The main R&D efforts in the tobacco chain are focused on the development of new hybrid and genetically modified tobacco varieties. Representing a strategic stage in the global tobacco chain, the adoption of innovations in tobacco growing is governed by the MNCs operating in the cluster. In contrast, in the tobacco processing stage, the incorporation of technological innovations happens predominantly through incremental improvements at specific points of the industrial processing. In this stage many innovations are developed and diffused through user-producer relations with machinery suppliers.

Some studies focused on the analysis of subsectors within clusters (e.g. Knorringa 1999) have suggested that technologies, governance modes and value-added can vary considerably according to different market channels. In the tobacco cluster, it is possible to distinguish three different market channels related to exports of manufactured tobacco and cigarette manufacturing for domestic and external markets. However, the organisation of the activities within these channels does not suggest remarkable differences either in governance modes or in the technological complexity associated with each channel. Notwithstanding the existence of different market channels and the slight differences between the actors involved in such channels, the key decisions are governed by the lead firms – subsidiaries of MNCs.

7 CONCLUSION

This paper has analysed how the main activities associated with production and innovation in the tobacco cluster in Rio Pardo Valley are organised through a complex network linking local producers to MNCs and global markets. It has given particular emphasis to the way in which the organisation of the global tobacco chain has affected the role of local actors in the organisation of production activities and in the development of innovative strategies in the cluster. In doing so, it has aimed to contribute to the debate by seeking answers to three questions: first, how is the cluster's organisation at local level influenced by governance modes which are associated with the needs of international tobacco oligopolists; second, how are the innovation paths and learning mechanisms in the cluster affected by those governance modes; third, what are the long-term prospects of this cluster considering the power asymmetries in the cluster's production and knowledge systems.

In order to explore these questions, the paper has drawn on the literature concerned with industrial clusters, local systems of innovation and global commodity chains. Although the analytical elements emerging from these three approaches are useful to shed light on different aspects of the competitive and innovative performance of clusters, they only provide a limited insight into the interaction of global and local governance modes, and into local and external knowledge sources for upgrading strategies.

The global commodity chain approach helps both to understand the role of key actors in driving the tobacco chain and to explain the global dynamics of the linkages between local producers and global buyers within the chain. However, in stressing global governance modes through vertical linkages between local producers and global buyers, this approach tends to neglect the role of local institutional frameworks and other forms of local governance that might influence the clusters' upgrading strategies. In other words, the institutional context in which productive and innovative activities are embedded at the local level seems to be critical to explain how global chain governance is exercised. The paper shows that the interaction between local and global governance modes have enhanced the control of MNCs over the tobacco cluster. This enables a number of conclusions concerning the first question addressed in the paper:

- While, until the 1960s, the cluster was governed and organised mainly by local-owned processing plants, the entry of MNCs in the 1970s reduced the importance of local actors in the organisation of activities connected to production and innovation. The denationalisation process was followed by MNC control over material and knowledge flows and by the establishment of new governance structures.
- Local firms are mainly involved in tobacco growing and processing activities which are concentrated in the Rio Pardo Valley region. However, the most important phases of the tobacco value-chain, namely R&D activities, marketing and international trading, are organised outside the region at the international level. Therefore, the competition conditions faced by the subsidiaries of large MNCs in global markets determine the role played by local actors in the international division of labour.

Concerning the second question, in order to explore the influence of governance modes on the cluster's upgrading strategies the paper has analysed the main innovative paths related to tobacco growing and

processing activities. Although the industrial cluster and the systems of innovation literature provide useful insights through their focus on intra-cluster relationships and on technological infrastructures, both approaches fail to explain the impact of external linkages on cluster development. In this respect, the distinction between production and knowledge systems (Carlsson and Stankiewicz 1991; Bell and Albu 1999) helps to unravel the differences associated with actors and channels related to production and knowledge flows in the tobacco cluster. The main findings are as follows:

- The local business associations in the cluster carry out an important role in supporting the control of the production system specially through the maintenance of the ‘integrated production system’ and the regulation of inter-firm and labour relations. However, these organisations have a very limited role in engaging local actors in collective learning processes and in shaping innovation strategies.
- Although the cluster also counts on a set of organisations concerned with technological development and training, these local actors play only a marginal role in innovation processes. The key innovations in growing and processing activities are either introduced into the cluster by the MNCs (based on their own R&D capabilities) or through user-producer relations established with machinery suppliers and other external knowledge sources.
- The MNCs play a central role in the cluster both through the ownership of the processing plants and through the control of an extensive network of smallholders at the growing stage. Therefore, both the innovative paths associated with the development of plants varieties and with the tobacco industrial processing activities are controlled by the subsidiaries of MNCs.

Concerning the third question, the analysis proposed in this paper raises a fundamental issue on the types of upgrading strategies for local industrial agglomerations inserted in global commodity chains. In this respect, the analysis of the tobacco cluster seems to show very limited options for the upgrading of local producers. The conclusions are as follows:

- Moving into new stages of the value chain cannot be really considered as a feasible option for local producers considering the high scale economies associated with upstream stages of the chain like marketing, retailing and branding.
- Upgrading strategies associated with the tobacco growing stage can be seen as an alternative for the cluster. However, such upgrading is a very complex task for local producers since it would require considerable changes in institutional designs and in the participation of local actors in R&D and training efforts related to the tobacco growing activities.

Finally, it is suggested that the role of institutional frameworks is particularly relevant to discuss the production and innovation performance of industrial agglomerations in a developing country context. Many of the innovative efforts undertaken by industrial agglomerations in developing countries still suffer from a remarkable instability in the institutional designs supporting interactive learning and innovation activities (Cassiolato and Lastres 1998; Arocena and Sutz 2000; Vargas *et al.* 1999 and 2000).

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