ARTIGO APRESENTADO NO SEMINÁRIO INTERNACIONAL
"Trajetórias de Desenvolvimento Local e Regional: uma comparação entre as Regiões do Nordeste Brasileiro e a Baixa Califórnia, México"
Fortaleza, 29-30 de outubro de 2008

THE CARIRI REGION OF CEARÁ AND THE FOOTWEAR CLUSTER

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Resumo

Estratégias de clusters estão baseadas em redes e inter-relações entre empresas, indústrias e instituições. Esse artigo trata do *cluster* de calçados da região do Cariri e inicia com uma análise de dados secundários para compreender o papel desse aglomerado produtivo na economia local do Cariri. Localizado em uma região pobre (Nordeste) e longe do centro industrial do Brasil, enfrentando dificuldades para acessar tecnologia e insumos, a indústria de calçados plásticos do Cariri tem tirado vantagem da abundância de mão de obra e baixos salários, focalizado em produtos populares, além de se apoiar na flexibilidade das empresas para rapidamente se adaptar aos padrões desenvolvidos pelos fabricantes do no Sul do País. Essa flexibilidade compreende habilidades para produzir e compartilhar encomendas, seguir tendências, copiar *design*, adaptar tecnologia e reduzir custos, inclusive com uso de materiais reciclados. Esse caso ilustra a importância do processo de organização do cluster, incluindo a concepção e implementação de estratégias baseadas em clusters. Através desse processo, os atores do cluster de calçados do Cariri tem sido capazes de identificar e convergir em passos importantes para planejar o desenvolvimento dos negócios, incluindo a visão de futuro, estratégias e ações.

Palavras-chave: cluster, calçados, Cariri, Ceará, análise estrutura industrial

Abstract

Cluster approach is about networks and interconnection among businesses, industries and institutions. This article focuses on the Cariri footwear cluster and starts with data analysis to understand the role it plays in the local Cariri economy. Located in the poor Northeast, far from Brazil´s industrial base, facing difficulties to access technology and inputs, Cariri plastic footwear industry has taken advantage of abundant labor force and low wages, and focused on low end market, in addition to drawing on firms´flexibility to quickly adapt to industry standards developed in the South. This flexibility consists of promptness and ability to fulfill and share orders, follow trends, copy design, adapt technology and reduce costs, including by using recycled materials. This case illustrates the importance of cluster organization process, including design and implementation of cluster-based economic strategies. Through this process, actors of

Cariri footwear cluster have been able to identify and agree on key steps to plan for business development, including vision, strategies and actions.

Key words: cluster, footwear, Cariri region, Ceará, Brazil, Structural Analysis

1. An Economic Analysis of the Cariri Economy

The first part of the report analyzes formal employment pictures of three Brazilian municipalities: Barbalha, Crato and Juazeiro do Norte. These three cities form the urban core of the so-called "Cariri region" in the Northeastern State of Ceará. In this report, the term "Cariri region" is used as a synonym for the aggregation of the three abovementioned municipalities.[1] Therefore, the other municipalities that comprise the "official" Cariri region are excluded.

This section shows the formal employment evolution and numbers from 1995 to 2005. The data used stem from RAIS (Relação Anual de Informações Sociais - Annual Records of Social Information) – MTE (Brazilian Ministry of Labor). Since it is a formal sector dataset, RAIS data tend to underestimate especially primary sector activities. Secondary sector activities tend to be more formal in Brazil and therefore RAIS pictures is an appropriate dataset for analyzing the latter sector. The tertiary sector is more heterogeneous, as some of its activities are mostly formal (for example, architect and engineering), whereas others, such as small-size retail sale, are not.

- **Employment structure**

Table 1 shows formal employment data at 2-digit sector for Barbalha, Crato and Juazeiro. The first important characteristic is that they present an overall similar employment structure. Manufacturing, commerce and the public sector are responsible for approximately two-thirds of all formal employment. Health and education-related services are rather important as well.

Manufacturing is the most important sector and represents a great amount of the formal employment in all three cities. Table 1 illustrates that manufacturing employment growth was especially high in Crato and Juazeiro. In the ten years period, *manufacturing employment increased almost four times in Crato and twice in Juazeiro*. *Barbalha showed a much less breathtaking growth of just 3% during the entire period*. Because of Barbalha weak performance, Crato not only surpassed Barbalha in the number of manufacturing employment, but in 2005 the former had virtually twice the manufacturing employment number of the latter.

Commerce has also experienced a high formal employment growth rate: roughly 80% in Crato, 260% in Barbalha and 160% in Juazeiro do Norte. While construction does not appear as an important sector, real estate activities presented an elevated employment growth pace in all three cities. Transportation sector growth is uneven: a positive one in Barbalha and Crato and a negative one in Juazeiro. Similarly, public sector employment has grown in Barbalha and Crato, but not in Juazeiro. Noteworthy is that there was a steady drop in finance activities employment in all three municipalities.

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[1] The three urban municipalities are locally known as the *Crajubar* region, with approximately 400.000 inhabitants (2000).

Table 1
1995-2005
Formal Employment Growth for Barbalha, Crato and Juazeiro do Norte

City:	Barbalha			Crato			Juazeiro		
	Formal Employment		Growth	Formal Employment		Growth	Formal Employment		Growth
2-digit sector	1995	2005	1995-2005	1995	2005	1995-2005	1995	2005	1995-2005
Agriculture and forestry	35	5	-86%	11	132	1100%	24	29	21%
Fishing	0	0	-	0	0	-	0	0	-
Mining	223	28	-87%	56	41	-27%	4	23	475%
Manufacturing	1802	1853	3%	763	3662	380%	1842	5844	217%
Utilities	13	2	-85%	85	60	-29%	0	189	-
Construction	78	85	9%	401	180	-55%	609	647	6%
Commerce	129	474	267%	1270	2236	76%	2879	7511	161%
Food and beverage retail sale	38	100	163%	87	291	234%	219	581	165%
Transportation, warehouses, communication	27	57	111%	332	154	-54%	567	966	70%
Finance service	44	30	-32%	135	107	-21%	745	223	-70%
Real estate service	3	17	467%	139	344	147%	156	598	283%
Public service	652	792	21%	1519	2334	54%	3834	2974	-22%
Education service	115	196	70%	413	1274	208%	500	1088	118%
Health service	401	752	88%	760	718	-6%	808	1051	30%
Other service	90	82	-9%	206	585	184%	279	706	153%
Domestic service	2	1	-50%	0	2	-	0	4	-
Multilateral Organizations	0	0	-	0	0	-	0	0	-
Total	**3652**	**4474**	**23%**	**6177**	**12120**	**96%**	**12466**	**22434**	**80%**

Source: Annual Records of Social Information (RAIS), Ministry of Labor (MTE)

Table 2 presents the same 2-digit employment sector data but now considering the unified Cariri job market. *Manufacturing, utilities, commerce, real estate and education were key sectors. Especial attention to manufacturing and commerce due to the meaningful number of people formally employed*.

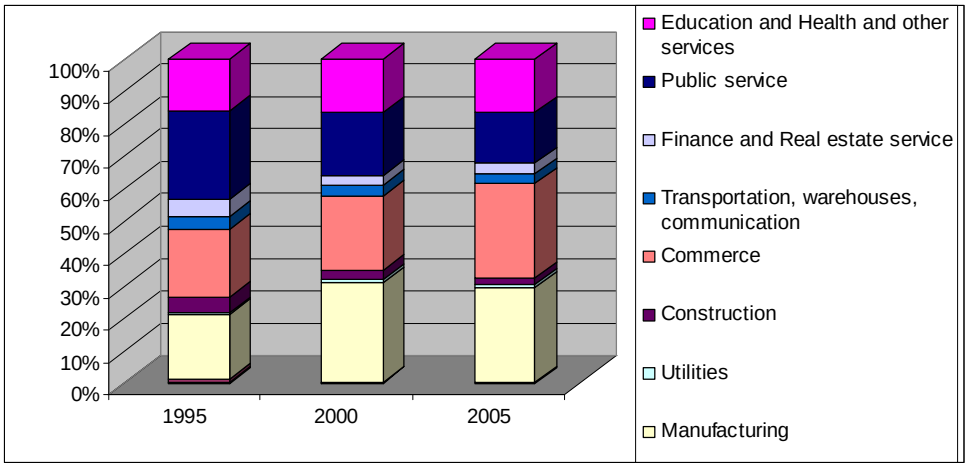
Table 2
1995-2005
Formal Employment Growth for Cariri Region

Total (Three municipalities)	**Formal Employment**		**Growth**
2-digit sector	*1995*	*2005*	*1995-2005*
Agriculture and forestry	70	166	137%
Fishing	0	0	-
Mining	283	92	-67%
Manufacturing	4407	11359	158%
Utilities	98	251	156%
Construction	1088	912	-16%
Commerce	4278	10221	139%
Food and beverage retail sale	344	972	183%
Transportation, warehouses, communication	926	1177	27%
Finance service	924	360	-61%
Real estate service	298	959	222%
Public service	6005	6100	2%
Education service	1028	2558	149%
Health service	1969	2521	28%
Other service	575	1373	139%
Domestic service	2	7	250%
Multilateral Organizations	0	0	-
Total	**22295**	**39028**	**75%**

Source: Annual Records of Social Information (RAIS), Ministry of Labor (MTE)

Figure 1 illustrates another perspective on the Cariri region employment data: the evolution of the employment share of each sector in total employment from 1995 to 2005. It is useful to note that activities related to the public sector lost part of its share in the total employment, whereas commerce and manufacturing gained relevant participation. *This information shows a clear tendency of a decrease in public sector importance and of a strengthening in private-based activities.*

Figure 1
Evolution of Employment Share - 1995-2005



Source: Annual Records of Social Information (RAIS), Ministry of Labor (MTE)

But within manufacturing and commerce, what are the most important sub-sectors? Table 3 pictures the most representative 4-digit sector for the whole Cariri region (with the matching value for each of the three municipalities). Twenty four sectors out of 600 are listed, which account for 64% of total formal employment. *Public services-related activities are the ones with bigger employment numbers. Within the manufacturing sector, manufacturing of rubber and plastics footwear, of rubber products and of footwear of other products are among the top 5. In addition, manufacturing of leather footwear appears as an important sector*. Services like Basic and College education and Hotels are in the list as well. Several activities related to retail sale (commerce) are included, such as retail sale of pharmaceutical and food products. This reflects the role of the Cariri as a regional sourcing center. [2]

[2] More on this below.

Table 3
2005
Formal Employment at 4-digit for Cariri Region, Barbalha, Crato and Juazeiro do Norte

4-digit sector	Total	Barbalha	Crato	Juazeiro
General (over-all) public service activities	6063	763	2330	2970
Manufacture of rubber and plastics footwear	3374	336	2327	711
Hospital activities for in-patients	1442	570	492	380
Manufacture of rubber products n.e.c.	1143	212	0	931
Manufacture of footwear from other materials (except athletic footwear)	1078	272	1	805
Basic Education	993	60	424	509
Retail sale of household goods, disks and similar products	963	0	77	886
Retail sale of products n.e.c.	836	15	105	716
Retail sale of pharmaceutical, medical and orthopedic products	722	48	197	477
Retail sale of food and beverages in stores smaller than 300 sq meters	718	82	276	360
Building of residential and business constructions	676	74	137	465
Retail sale of apparel and allied products	674	13	179	482
Retail sale of construction materials, tools and handtools	662	12	181	469
Retail sale of fabrics and allied products	640	16	117	507
Activities of other membership organizations n.e.c.	554	20	247	287
Manufacture of cut-and-sew apparel n.e.c.	550	156	132	262
Manufacture of leather footwear	536	0	0	536
College Education	515	0	515	0
Retail sale of footwear, leather products and luggage	497	24	109	364
Sale of motor vehicle parts and accessories	439	23	60	356
Retail sale of automotive fuel	406	65	145	196
Manufacture of pharmaceuticals for human use	403	402	0	1
Human health activities n.e.c.	401	87	12	302
Hotels	397	72	75	250

- **Labor force quality**

Cariri region has been an important base for education in Ceara interior, but as revealed by Table 4, much is needed to improve labor force skills. Virtually half of the formal workers in Cariri region have an education degree tantamount to “high-school” schooling. However, almost 88% have studied only up to a high-school degree, and only 13% of the labor force has a degree equivalent to college. Basic school workers are found mainly in manufacturing, commerce and public sector activities, whereas college degree (more skilled) workers are more present in public services, education and health sectors. Lack of skilled workers in manufacturing can present a severe restriction for the region to move to a more innovation-driven economy.

Table 4
Formal Employment and Schooling in Cariri Region, 2005

2-digit sector	Illiterate	Basic school	High School	College or higher	Total
Agriculture and forestry	19%	48%	29%	5%	166
Fishing					0
Mining	4%	45%	48%	3%	92
Manufacturing	1%	51%	46%	3%	11359
Utilities	1%	31%	47%	21%	251
Construction	2%	70%	25%	4%	912
Commerce	0%	30%	64%	5%	10221
Food and beverage retail sale	2%	48%	47%	3%	972
Transportation, warehouses, communication	0%	52%	41%	6%	1177
Finance service	0%	1%	29%	69%	360
Real estate service	2%	49%	37%	11%	959
Public service	3%	27%	44%	26%	6100
Education service	0%	7%	34%	59%	2558
Health service	1%	18%	67%	14%	2521
Other service	1%	34%	50%	15%	1373
Domestic service	0%	86%	14%	0%	7
Multilateral Organizations					0
Total	**426**	**13981**	**19483**	**5138**	**39028**
Percentage	1.09%	35.82%	49.92%	13.16%	100.00 %

Source: Annual Records of Social Information (RAIS), Ministry of Labor (MTE)

- **Location quotient analysis**

A widely used measure of economic activity concentration within urban areas is the location quotient (LQ). This indicator compares the share of local employment in a sector to the share of national employment in that sector. A LQ equals to zero means that there is no employment in the particular sector in the analyzed area. A LQ lower than 1 indicates that the area is less specialized than the nation in the particular sector. In contrast, if a sector is highly concentrated in the analyzed area, the correspondent LQ will show a value higher than 1. Location quotients are therefore useful as a primary tool to identify clusters and highly concentrated sectors.

In determining the dynamism of a particular sector in a region, a LQ is only one piece of information. In order to determine whether the sector can provide a stable or growing base for the future, it is also important to consider other measures, such as the total number of workers and employment growth.

Figure 2 illustrates the interaction between LQ and employment growth to determine the importance of a particular sector to the local economy. The first quadrant (upper-right) represents key sectors to the local economy, since they have high location quotient and growing employment. Local economic development strategies may choose those sectors to create and/or maintain an adequate business dynamism. The second quadrant (upper-left) shows sectors with

location quotients above 1 and declining employment growth. These sectors appear as opportunities to strengthen important areas of the local economy. The third quadrant (lower-left) presents sectors with low LQ and below-the-average employment growth. They are some of the least-promising targets for local cluster strategies. Finally, the forth quadrant (lower-right) shows sectors with LQ below 1, but with fast-growing employment. These sectors represent possibilities as growth generators in the local economy and potential emerging clusters.

In this analysis, *a sector is selected as having increasing employment if it presents a performance above the national employment growth*. Table 5 reveals sample results of the LQ vs. employment growth, at 4-digit sectors for the Cariri region. Broadly, sectors that appear in each quadrant are as follows:

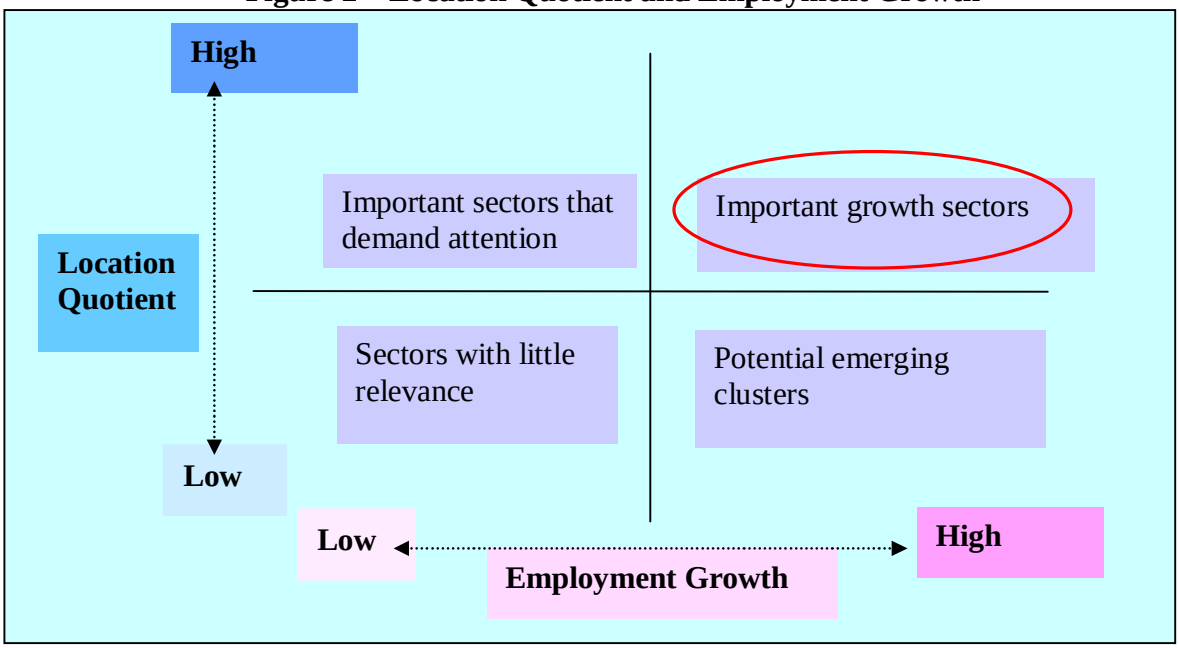
(a) **High Importance-High Growth:** Manufacturing (leather footwear, plastic products, furniture, underwear and nightwear, among others), some retail sale activities, radio activities, health and motor vehicle sale activities.

(b) **High Importance-Low Growth:** Manufacturing of leather, banking, cement manufacturing, legal and accounting services, and leisure and entertainment activities.

(c) **Low Importance-Low Growth**: Logging, mining, some manufacturing activities (paper, software), telecommunications, and some High-Tech related activities.

(d) **Low Importance-High Growth**: Transportation, some manufacturing activities (for instance, hardware), and real estate

Figure 2 – Location Quotient and Employment Growth



The presence of the (entire) footwear chain in the high-high category, from manufacturing) to sales (both wholesale and retail sale) comes out as a striking feature and *emphasizes the importance of the footwear sector to the local economy*. This is a leading cluster as the industries export the products to other regions. Some activities that provide foundation to the footwear chain are also visible: lending credit cooperatives (high-high), whereas the following related activities are considered to have growth potential (low-high): farming of cattle,

wholesale of textiles and fabrics, transport of freight by road, cargo warehousing handling, advertisement and cargo handling. Though a more detailed analysis is required to analyze the proper links among these dynamic sectors, it is clear that they are all parts of a single larger chain and must be considered altogether in a local economic development strategy. For instance, designing efficient public policies to transportation can improve directly the competitiveness of the footwear cluster.

The low-low category contains several high-tech activities. Innovation is one of the main components for a successful local-level growth path and high-tech industries are one of the most innovative ones. Therefore, it must be useful to pay greater attention to innovative sectors within the Cariri region footwear chain, e.g., design and computer-aided technologies.

Table 6 indicates the high-high sector for each municipality. In Barbalha, manufacturing and retail sales activities prevail, but health-based sector are also important.[3] In Crato, some farming and research activities arise, apart from the traditional sectors (manufacturing, commerce and health).[4] Juazeiro has a more extensive list of high-high sectors comprising a wider range of manufacturing and retail sale activities.[5]

Table 5
Cariri Region
LQ and Employment Growth: sample of sector in each quadrant

High-	Low	High-	High
Distillery, purification and bottling of liquor		Manufacture of bakery products, cakes	
Manufacture of leather products n.e.c.		Manufacture of soft drinks	
Printing services n.e.c.		Manufacture of cut-and-sew underwear and nightwear	
Manufacture of cement		Manufacture of cut-and-sew apparel n.e.c.	
Manufacture of brooms, brushes and mops		Manufacture of suitcases, bags, purses and luggage	
Building of residential and business constructions		Manufacture of leather footwear	
Wholesale of general merchandize		Manufacture of plastics products n.e.c.	
Transport of non-urban passengers by road		Manufacture of furniture from other materials	
Savings and loan banking		Sale of motor vehicle parts and accessories	
Legal activities		Sale of motorcycles and related parts	
Accounting, book-keeping and auditing activities		Wholesale of footwear	
Photographic activities		Retail sale of footwear, leather products and luggage	
Motion picture projection		Retail sale of office, computing equipment	

[3] Barbalha is the center of the Cariri health sector. It is home of the region´s largest hospital and concentrates the more complex health services in the region.
[4] Farming in Crato reflects the size of the municipality (1,009 km^2, nearly twice the size of Barbalha and more than four times the size of Juazeiro). Also, the importance of research activities relates to Crato being home for the Regional University of Cariri (URCA), a state-funded institution.
[5] As explained below, Juazeiro emerged in the early XX century as a regional commercial center, as well as manufacturing site for basic products.

Dramatic arts, music and other arts activities	Lending by credit cooperatives
Other recreational activities n.e.c.	Medical and dental practice activities
Human health activities n.e.c.	Radio activities
Low- Low	**Low- High**
Logging	Farming of cattle
Mining of iron ore	Manufacture of hardware
Mining of aluminum	Road construction
Mining of manganese ore	Wholesale of textiles and fabrics
Slaughtering and processing of animals	Retail sale of food products n.e.c.
Manufacture of manioc and derivative products	Transport of urban passengers by road
Manufacture of carpets and rugs	Transport of freight by road
Manufacture of paper	Cargo warehousing, handling
Reproduction of software	Activities related to air transport n.e.c.
Manufacture of textile machinery	Data processing
Transport by interurban railways	Architectural and engineering activities and consultancy
Transport by air	Advertising
Telecommunications	Transport via pipelines
Commercial banking	Transport by air, scheduled
Computer hardware consultancy	Cargo handling
Computer related activities n.e.c.	Real estate activities

Table 6
LQ and Employment Growth: high-high sectors for Barbalha, Crato and Juazeiro

Barbalha		**Juazeiro**	
High-	**High**	**High-**	**High**
Manufacture of bakery products, cakes and other pastries		Manufacture of bakery products, cakes and other pastries	
Distillery, purification and bottling of liquor		Manufacture of soft drinks	
Manufacture of rubber and plastics footwear		Manufacture of cut-and-sew underwear and nightwear	
Manufacture of footwear from other materials (except athletic footwear)		Cutting, tanning and finishing of leather and hides	
Manufacture of pharmaceuticals for human use		Manufacture of suitcases, bags, purses and other luggage	
Manufacture of rubber products n.e.c.		Manufacture of leather footwear	
Manufacture of furniture from other materials		Manufacture of soap and synthetic detergents	
Retail sale of automotive fuel		Manufacture of rubber products n.e.c.	
Retail sale of footwear, leather products and luggage		Processing and manufacture of precious metals	
Retail sale of liquefied gas		Manufacture of prefabricated metal structures and components	
Hospital activities for in-patients		Manufacture of metal structures and plates	

Diagnostic and therapeutical human health activities	Etching and engraving of precious stones, metals and jewelry
Human health activities n.e.c.	Manufacture of musical instruments
Social work without accommodation	Manufacture of miscellaneous goods n.e.c.
Crato	
High-	**High**
Farming of animals n.e.c.	Recycling of non-metal waste and scrap
	Sale of motor vehicle parts and accessories
Processing and canning of fruit	Sale of motorcycles and related parts and accessories
	Wholesale of processed cereals, flour, corn
Manufacture of plastics products n.e.c.	oils and other cereals
Manufacture of non-refractory structural clay products	Wholesale of food products n.e.c.
Processing and manufacture of aluminum	Wholesale of footwear
Manufacture of domestic appliances	Retail sale of food and beverages
Wholesale of processed cereals, flour, corn oils and other cereals	Retail sale of cookies and crackers
Wholesale of beverages	Retail sale of beverages
Wholesale of fuels	Retail sale of fabrics and allied products
Retail sale of food, meat and beverages	Retail sale of apparel and allied products
	Retail sale of footwear, leather products and
Retail sale of cookies and crackers	luggage
Retail sale of footwear, leather products and luggage	Retail sale of pharmaceutical, medical and orthopedic products
Retail sale of books, newspapers, journals, and stationery	Retail sale of household goods, disks and similar products
Retail sale on streets and through mobile sales posts	Retail sale of contruction materials, tools and handtools
Catering	Retail sale of liquified gas
Research and experimental development on natural sciences	Retail sale of products n.e.c.
Diagnostic and therapeutical human health activities	Renting of personal and household goods n.e.c.
Social work without accommodation	Radio activities

- **Shift-share analysis**

Shift-share analysis is applied as an alternative method for identifying leading and lagging economic sectors. Shift-share disaggregates local employment growth into 3 components:

(a) National share (NS): changes in the local economy because of changes in the national economy;
(b) Industrial mix share (IS): changes in the local economy due to the mix of industries; and
(c) Local shift (LS) – changes in local employment due to local factors, or local/city/municipality competitiveness.

That is, shift-share disaggregates the total employment growth according to the following equation:

Total Employment Change = National Growth Share + Industrial Mix Share + Local Shift

The interpretation of the shift-share results is straightforward. National growth share tells what part of local job growth is simply because of growth in the national economy. Industry mix represents the effect on particular industry performance and trends on local employment. Local shift emphasizes local/city/municipality factors effects over local employment change. For instance, shift-share analysis shows how much of the total employment increase in the Cariri "Manufacture of leather footwear" sector was due to the Brazilian economy dynamics, how much to the national manufacturing leather footwear sector, and how much to the Cariri region economy competitiveness. In this case, as shown in Table 7, almost all employment creation was due to Cariri economy dynamics, which is consistent with its recent GDP growth.[6]

Table 7 shows the leading sectors in terms of employment growth as a consequence of the local economy competitiveness and dynamics. Once again, activities related to the footwear chain (footwear manufacturing, financial intermediation, transportation, etc.) are in spotlight: they have their employment growth mostly due to the local economy dynamics and competitiveness. This illustrates the key role played by the footwear cluster and its spill over effects, a fact that should be incorporated by policies aimed at fostering regional growth.

Table 7
Shift-Share - Leading 4-digit Sectors of Cariri Region (2000-2005)

	Employment			Shift-Share			
Top Sectors - local dynamics	**2000**	**2005**	**Growth**	**NS**	**IM**	**LS**	**Index***
Sporting activities	56	79	23	15	2	6	Dynamic
Manufacture of plastics products n.e.c.	140	206	66	37	0	28	Dynamic
Social work without accommodation	97	146	49	26	6	17	Dynamic
Retail sale of apparel and allied products	442	674	232	118	38	76	Dynamic
Manufacture of metal products n.e.c.	55	91	36	15	0	21	Dynamic
Manufacture of foods n.e.c.	15	25	10	4	1	5	Dynamic
Retail sale of construction materials, tools and hand tools	394	662	268	105	78	85	Dynamic
Transport of freight by road, general merchandize	188	328	140	50	45	45	Dynamic
Retail sale of books, newspapers, journals, and stationery	101	180	79	27	16	36	Dynamic
Retail sale of beverages	69	129	60	18	15	27	Dynamic
Luncheonettes and similar eateries	89	180	91	24	3	64	Dynamic
Manufacture of leather footwear	219	536	317	59	4	255	Dynamic
Renting of cars	5	13	8	1	1	5	Dynamic
Retail sale of food and beverages	249	718	469	67	104	298	Dynamic
Social work with accommodation	21	66	45	6	7	32	Dynamic
Data processing	5	16	11	1	0	10	Dynamic
Lending by credit cooperatives	8	26	18	2	5	11	Dynamic
Retail sale of food products n.e.c.	35	126	91	9	15	67	Dynamic

[6] During 2002-2005, average GDP growth for the three municipalities reached 43,85%, compared to 41,6% for the State of Ceara.

Printing services for didactic and commercial materials	8	29	21	2	2	17	Dynamic
Wholesale of meat and meat products	12	49	37	3	1	33	Dynamic
Retail sale of non-specialized commodities	25	113	88	7	11	70	Dynamic
Recycling of non-metal waste and scrap	19	94	75	5	28	42	Dynamic
Sale of motorcycles and related parts and accessories	42	208	166	11	45	110	Dynamic
Farming of cattle	3	15	12	1	2	9	Dynamic
Manufacture of furniture from other materials	17	91	74	5	0	69	Dynamic
Real estate activities related to titling, acquisitions and sales	11	60	49	3	4	42	Dynamic
Retail sale of household goods, disks and similar products	122	963	841	33	86	723	Dynamic
Farming of animals n.e.c.	5	42	37	1	1	35	Dynamic
Transport of passengers by road, non-scheduled	3	33	30	1	1	28	Dynamic
Retail sale on streets and through mobile sales posts	1	14	13	0	2	10	Dynamic
Architectural and engineering activities and consultancy	2	33	31	1	1	30	Dynamic
Cargo warehousing	1	17	16	0	0	15	Dynamic

*Index = “dynamic” means a positive contribution of the local economy for job creation at a higher rate then the national economy and the national sector.

- **What the Economic Structural Analysis Reveals**

The structure of the Cariri regional economy is relatively diversified, while manufacturing, commerce and services related to education and health sectors play an important role. Public services though still significant, has lost employment share in the last ten years (1995-2005). In contrasts to other regions in Ceara, agriculture does not seem to play a major role in driving the economy, despite the fact that the region is endowed with good soils and water resources.[7] Within manufacturing, footwear industry shows considerable dynamism in terms of job creation and capacity to drive (spill over effect) a number of other industries (wholesale, retail, transport etc). It is clear then that footwear industry should be considered in regional development strategies.[8]

The analysis suggests the potential for the footwear industry to develop as a vibrant cluster, fostering related businesses, investments and growth. Cluster however, is not just about industry concentration and proximity. It depends on relationships, connections and joint-initiatives. The next part of the study will attempt to understand how these assets function and how they have contributed to strengthen the Cariri footwear cluster.

2. The Cariri Footwear Cluster

[7] Employment numbers for agriculture are underestimated, as RAIS only captures formal employment, a less common case in Cariri where agriculture is mostly a family business, rather than a firm undertaking.
[8] Nogueira et al. (2008)

Footwear industry is a major economic activity in the Cariri region, second only to trade. As the most vibrant manufacturing industry in the region, associated employment has grown roughly 350% in the last 10 years, more than doubling performance of regional manufacturing. The industry encompasses nearly 45% of manufacturing jobs in the region. Though footwear production has started as a leather processing activity, the industry is currently dominated by synthetic products and produces, mostly, plastic injected women's sandals.

Regardless of these outstanding features, Cariri footwear cluster faces significant challenges to move from low cost base to innovation in a very competitive sector. First, it is urgent to enhance labor skills to allow for product quality improvements, value added expansion and labor productivity gains. Second, the industry must overcome technology bottlenecks (e.g., lack of laboratories, modern equipment) to improve quality standards and fulfill demands of more sophisticated markets. Third, also related to market, it is important that the industry reaches out to world markets to increase sales. Four, the industry needs to solve the sourcing issue, including attracting input suppliers and creating appropriate mechanism to finance input purchases. Finally, the cluster needs to expand social capital to allow for more collective initiatives to reach economies of scale, improve innovative capacity and boost competitiveness. In what follows, a discussion of these issues will attempt to throw some light on development challenges faced by the cluster.

- **A Brief History of the Cariri Footwear Cluster**

The footwear cluster of Cariri has its origin dating back to the early 1900s, when the municipality of Juazeiro do Norte was established because of pilgrims to the region for the legendary catholic priest and the city's first mayor, Father Cicero. The priest encouraged new comers to engage in production activity, especially small manufacturing and handcraft, responding to rising local demand for goods and services and envisioning a self-sustained economy. A number of small workshops emerged specializing in processing wood, agriculture and animal products, metal and mineral materials, as Juazeiro saw its influence growing not only as a religious center, but also as a major regional commercial power.

One of the prominent incoming groups was the cowboys ("*vaqueiros*"), a common character in the Northeast hinterland and a symbol of the major role of cattle raising in the 19th – 20th century Ceara´s economy. The presence of *vaqueiros* and the numerous heads of cattle in the region allowed for availability of raw material (leather), while also creating demand for cowboy costumes and utensils for cattle ranchers. In particular, a simple and low cost type of sandals soon became popular among the poor pilgrims and low income rural Northeast population. Juazeiro shoemakers encouraged by Father Cicero became the major suppliers of such products in the entire country's northeast region.[9]

Production of footwear in Cariri went trough a significant change in the early 1960s, with the introduction of plastic (PVC) material in the footwear industry.[10] In 1962, a large firm located in Southern Brazil (São Paulo) bought from a Japanese company a license to produce plastic sandals. Supported by huge advertisement campaigns disseminated in the entire country, the then called "Japanese sandals" became popular and soon reached stores and vendors all over the

9 The Northeast region, located below the Equator, is made up of nine states, totaling 1,5 million km², equivalent to roughly 18% of Brazil´s territory.

10 PVC is the acronym of Polyvinyl chloride, a thermoplastic polymer. EVA stands for Ethylene-Vinyl Acetate, a polymer used to absorb physical shock used in athletic materials and shoe soles.

Northeast. In 1963, a local producer established in Juazeiro do Norte also bought the license and started local production of plastic sandals. Initially, the firm acquired parts from suppliers based in the South, and assembled the sandals in Juazeiro. Years later, the firm integrated production vertically by producing the plastic components on its own plant in Juazeiro. In addition, part of the plastic inputs was sold in the region to local assemblers.

The plastic sandals gradually replaced the leather-made ones then produced in the region. Consumers preferred the new products, moved by their exuberant colors, low cost and easy care, in addition to a taste of newness they encompassed. Mass produced new sandals soon swapped the traditional types and a number of small artisan shops went out of businesses. Only a fraction of them remained supplying goods to loyal regional consumers, mostly the ones involved in cattle raising activities and the ones convinced that the leather sandals were more appropriate to their pilgrimage worship.

- **Recent Developments**

Following the pioneer firm, a few others of local origin emerged to mass produce plastic sandals in the Cariri region. Supply of plastic inputs came originally from producers established in Southern states and later from a Northeastern state (Bahia), more than 1,000km away from the Cariri. Two decades later, a local firm initiated production of plastic inputs, especially laminated plaques, the most important components for plastic sandals. This event allowed for revitalization of micro and small footwear workshops, as they could then buy plastic inputs in retail amounts and produce similar and low cost products. Mostly because of this event, in the last two decades, the Cariri industry has experienced significant growth, both in jobs and number of firms (Table 8).

Since the introduction of plastic, Cariri footwear cluster went through a different trajectory, becoming more and more specialized in plastic and other synthetic material (e.g., fake leather). Today, the cluster produces a range of products, though more than 60% is female sandals, most of these made of synthetic leather (Costa 2007).

The region currently encompasses nearly 10% of Brazil's jobs in plastic and synthetic footwear, while the State of Ceara has nearly two-thirds of these jobs.[11] Specialization in footwear is a visible feature of Cariri, as confirmed by the Location Quotient explained below. Table 9 presents Location Quotients (LQ) for the three municipalities calculated with employment data produced by RAIS (2004) and in comparison with the state of Ceara and Brazil. LQ are calculated separately according to the main input (leather or plastic) used by the cluster.

Table 8
Footwear Industry in Cariri (1996-2006)

Municipality	1996		2006		% of Change	
	Number of firms	**Number of jobs**	**Number of firms**	**Number of jobs**	**Firms**	**Jobs**
Juazeiro	93	691	130	2,839	39.8%	310.9%
Crato	4	487	1	2,277	-75.0%	367.6%
Barbalha	1	77	9	503	800.0%	553.3%
Total Cariri	98	1,255	140	5,619	42.9%	347.7%
Ceara	298	10,755	361	51,095	21.1%	375.1%

11 RAIS 2005

Total Cariri / Ceara (%)	32.9%	11.7%	38.8%	11.0%		

Source: MTE-RAIS

Table 9
Cariri Footwear Location Quotient

Municipality	Location Quotient (Ceara)	Location Quotient (Brazil)
Leather footwear		
Crato	4.04	18.15
Barbalha	1.89	8.51
Juazeiro do Norte	1.75	7.86
Plastic footwear		
Juazeiro do Norte	6.41	2.98
Barbalha	5.82	2.71
Crato	2.27	1.05

Source: Amaral et al (2006)

Production of footwear is mostly concentrated in Juazeiro, but it is also significant in the two other neighboring municipalities. Official data indicates that a total of 140 formal footwear firms in Cariri are responsible for nearly 6,000 formal direct jobs, equivalent to 45% of regional manufacturing jobs (Table 10).[12] Unofficial data however, points out to 270 formal firms, responsible to nearly 12,000 direct jobs.[13] This greater magnitude is easily perceived as one visits the region, especially Juazeiro, where footwear workshops can be found in industrial zones, downtown area, backyards of family homes and even improvised tents set up under trees.

Table 10
Cariri Footwear and Manufacturing Industries (2006)

Municipality	Footwear Jobs	Manufacturing Jobs	% (Footwear/Manufacturing)
Juazeiro	2.839	7.294	38,9%
Crato	2.277	3.544	64,2%
Barbalha	503	1.762	28,5%
Total	5.619	12.600	44,6%
Ceara	51.095	195.288	26,2%

Source: RAIS 2006

Cariri is currently one of the largest producers of footwear in the country. Annual production amounts to of 70 million pairs, equivalent to 9% of Brazil´s estimated total.[14] Though exports are not predominant, shipments are on the rise and main markets include Latin American countries, Portugal, Spain, France, United Kingdom, Italy, Greece and United States (Table 11).

12 RAIS 2006.
13 Estimative made by the local SEBRAE (Agency for Small and Medium Enterprise Support) office accounts for an additional 200 informal firms.
14 Abicalçados (Brazilian Footwear Industry Association) estimates Brazilian footwear annual production amounts to 800 million pairs (2006). http://www.abicalcados.com.br/estatisticas.html

Table 11
Cariri Footwear Exports (2005-2007)

Municipality	Footwear Exports (US$ 1,000)		
	2005	2006	2007
Juazeiro do Norte	929	2,229	3,234
Crato	5,316	5,299	5,255
Barbalha	0	42.5	81.6
Total Cariri	6,245	7,640.5	8,570.6
Ceará	205,226	222,133	298,465
Cariri/ Ceará (%)	3.04%	3.44%	2.87%

Source: MDIC/SECEX. (in IPECE)

- **Cluster Features**

Agglomeration, proximity, specialization of a large number of firms operating the business and a certain level of interdependence among them allow the footwear business in Cariri to function as an emerging cluster, rather than a set of isolated firms (de Souza 2003, da Costa 2007). A total of 140 formal firms are engaged in footwear manufacturing, not including suppliers or service providers. Small and Micro Enterprises (SME) make up for the majority of manufacturing firms. RAIS data (2006) indicates that nearly 97% of firms have less than 100 workers (Table 12), while only 3% are medium and small.[15]

Agglomeration of specialized firms in the region enables them to often complement each other, a fact that facilitates production efforts. As production takes places both in industrial plants, but also in homes and in other open and improvised setting (e.g., sidewalks) locals learn different tasks involved in footwear production almost spontaneously. Basic skills get disseminated through community and family connection. It is common for an entire family be involved in the footwear business, often each member owning a shop. Likewise, an entire street can be predominantly occupied footwear workshops, often a result of neighbors influencing others to join the business.

Table 12
Cariri Footwear Firms, Firm Size

Size	No. of firms	%
Large	1	0,72
Medium	3	2,14
Small	3	2,14
Micro	133	95,00
Total	140	100,00

Source: RAIS 2006

Cariri footwear cluster is fairly dense and main players include footwear producers, input and equipment suppliers, providers of services, as well as a range of support agencies. Figure 3 illustrates how the cluster is organized. Geographic proximity encourages easy flow of

15 According to a criteria used by SEBRAE (National Service for Small and Medium Enterprises), firms with less than 20 workers are considered micro-enterprises; with less than 100 workers are considered small; with less than 500 workers are considered medium; and those with more than 500 workers are considered large.

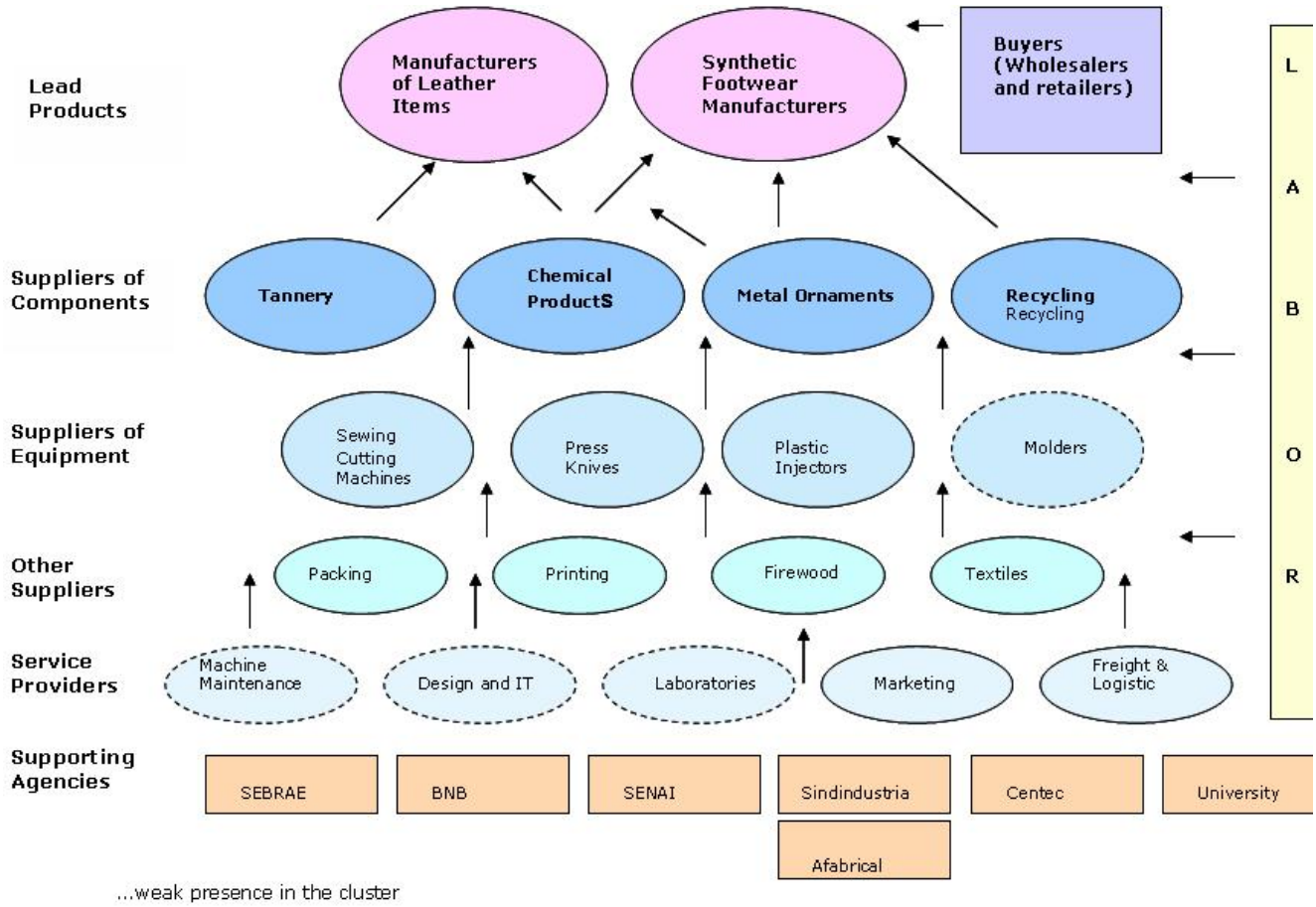
information which becomes collective good, as they circulate at no cost from one firm to another.[16] In many circumstances, proximity and networking enable managers to quickly learn which firm is replacing old equipment for new ones — hence creating a secondary market for equipment — or which firm is hiring which professional at which cost among other relevant issues.

The presence of supply and demand players in the cluster makes the region a conducive site for footwear production. On the one hand, availability of inputs, information, machinery—including used ones—and a pool of low cost labor, though mostly unskilled, reduce entrance barriers. On the other hand, both local and outside buyers have been important elements ensuring business, especially to SMEs who cannot afford to have sale representatives outside the region or to travel to distant markets to sell products.

Informality plays an important role in the cluster. It is often the entrance door to the business. Availability of raw material, components and, especially, used equipment, make it relatively easy to open a footwear business in the area. Access to markets usually is through subcontracting. Established firms often hire informal business to manufacture orders, as strategy to both reduce costs and to meet seasonal peak demand without investing in plant capacity. Alternatively, informal shops sell production in local fairs or to also informal merchants who have specialized in traveling to other states to market low cost footwear and garments.

16 Prochnik (2005)

Figure 3 - CARIRI FOOTWEAR CLUSTER



- **Leading Firms and Followers**

Firm operations differ according to their sizes, and bottlenecks affect larger and smaller firms in distinct ways. Large and medium firms lead the cluster, as they drive production volumes, control sourcing and define product style. They manufacture synthetic leather footwear and are organized as mass production vertical plants, producing most components, including the injected plastic soles, the most expensive footwear part used in the cluster.[17] Subcontracting does not prevail, but may occasionally take place for more labor intensive tasks. As more capital-intensive operations, these firms produce the more expensive products, which are often imitated by other firms, as soon as they are disclosed to local vendors. Average prices for typical products are in the range of US$10-20 per unit, though some firms also produce cheaper products, including some made of recycled plastic. Most of these firms have developed prestigious brand names and sell their production to larger and more distant markets, such as the entire Northern and Northeastern regions and some states in the Southern part of the country.

Large firms have their own machine tool section, as well as design staff. They complain about lack of specialized laboratories in the region, which forces them to depend on facilities

17 Cost of this equipment is approximately US$ 560k

located either in the state of Paraiba (350km) or in the Southern Brazil. Medium and large firms suffer from low skill profile of local labor force, in addition to limited training and other skill enhancing activities for workers. Specific skill areas include sewing, product assembly, operation and maintenance of machinery, design and computer use (e.g., CAD, CAM), in addition to production supervision. At firm level, needs for training include environmental management, quality and cost control.

SMEs also produce synthetic footwear items, but use low cost and low quality components, such as less expensive soles and cheaper metallic parts etc. Production depends heavily on local supply of raw material and shoe components. Products prices are typically equivalent to US$4-15 per piece. These firms tend to lag behind the more sophisticated and larger ones, producing copies of items created by the latter. In general, SMEs are more labor-intensive operations, mix mass production methods with handcraft procedures and use obsolete equipment. Some of these firms are located in family homes, though recently several of them have moved into more appropriate productive facilities. A significant part of this segment is informal, hence its real size is not reflected in the data above.

The real challenge faced by SMEs relates to having working capital to acquire inputs and produce independently from input financing by suppliers. They have difficulties purchasing supplies in bulk, and rely on input retailers to grant provision of necessary components, paying higher unit prices as volumes are small. Buyers take advantage of this financial limitation and offer footwear firms to anticipate part of the payment in kind, that is, inputs, though paying lower prices for manufactured footwear products. A centralized procurement system has for long been the SMEs demand, but is still an unfulfilled need.[18]

As long as financial constraints are resolved, SMEs have significant flexibility to manufacture orders, change product style and expand product volume. They have often got together to share orders, especially because a number of them have family connections or neighborhood ties. Likewise, equipment sharing or exchanging are common procedures among these firms. Over the last two decades, SMEs developed a network of firms which has allowed many of them to expand production, reach new markets and improve quality standards, as section on social capital will explain.

- **Inputs and Suppliers**

Inputs (plastic components and other synthetic items, metallic parts, textiles, chemical ingredients etc) are supplied by a few local plants and a significant number of input retailers.19 A local tannery provides part of the leather. Also locally available are merchants of plant equipment, such as sewing machines and press knives. Two independent firms have specialized in producing molders for plastic shoes and serve some local medium-size footwear plants. Other businesses provide packing material, such as paper box, cardboards and other heavy duty paper-based products. A number of printing shops supply labels, tags, stickers and other similar items. Firewood, supplied locally, is used as the basic fuel by firms that process plastic material.

Synthetic plastic inputs come from as far as 1,500km away. Despite this limitation, Cariri footwear firms have specialized in processing plastic inputs and became one of Brazil's most

18 In the early 90s, the SMEs association (AFABRICAL) established a centralized supply facility which ended up closing down after a short period of operation, due to poor management and individual defaults.

19 Retailers of inputs are locally known as "casas coureiras".

important plastic footwear producers, exceeding regions which do produce chemical inputs and have a well developed footwear industry, such as Rio Grande do Sul and Bahia.[20]

Access to plastic raw material has improved due to recycling. A number of firms have recently created a special line of equipment to recycle plastic material. They both produce footwear made of recycled plastic and sell surplus of recycled plastic plates to other footwear firms.[21] Availability of recycled material has cut down production costs and reduced entrance barriers to the industry, especially to informal firms. Products made of recycled material are cheaper and less attractive given their color limitation, as most of them are black.

Though in an emerging stage, a few workshops have specialized in providing maintenance service to shop-floor machinery. Additional services, such as freight and logistic, as well as marketing are present in the cluster. Other specialized services, such as design creation, product branding, quality enhancement systems, and specialized laboratories are key missing ingredients. Only few design professionals serve the low-rank medium and small firms, on a contract base. The larger firms and the top medium firms have their own permanent designers.

SMEs face difficulties having access to key and more expensive equipment to perform tasks such as cutting and folding, as well as to create the different sizes for each product design. Lacking this type of equipment, firms either use manual techniques or pay other better equipped firms to perform the tasks. Either of these alternatives entails different limitations. In the first case, quality reaches low standards, especially due to poor finishing. In the second case, difficulties in synchronizing operations with the firm which owns the equipment has been a major problem that has affected MSFs promptness in fulfilling orders. This is because the better equipped firms will only perform those operations for SMEs, after having met their own needs and when the equipment is facing idle capacity.

Cariri footwear cluster enjoys high supply of low cost labor, though the majority of workers is low skilled or unskilled. They lack training on manufacturing procedures, such as equipment maintenance, machinery operation, quality control, waste prevention etc. Skills are often acquired in the shop floor ("learn by doing") using informal procedures. A number of workers are hired with no previous experience in industrial facilities, having only been exposed to agriculture production. Hence, they lack ability to perform more complex tasks, operate specialized machinery and some of them have difficulties even adjusting to work environment, e.g., concentrating on tasks, keeping up with work pace, following instructions and relating to supervisors.

Though labor cost in Brazilian footwear production may represent only 15% of total production cost, low labor cost stands out as a significant advantage of Cariri footwear cluster.[22] Majority of workers earn one minimum wage, roughly US$ 240, per month.[23] The ones with specialized skills working in the shopfloor (ex.: equipment maintenance) may earn twice as much. Indeed, low cost of labor in the Northeast has been one of the main reasons for the intense migration of Southern (Rio Grande do Sul and Sao Paulo) footwear firms during the 1990s, as labor cost in that region are nearly three times higher.[24]

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20 Rio Grande do Sul is Brazil´s largest footwear manufacturer and is specialized on leather items.

21 Volume of plastic material recycled by local footwear firms reaches approximately 600t per month and material come as far as Belém, 1,600km away from the Cariri region.

22 Brandão and Rosa (1997); Une (1999).

23 Not including mandatory fringe benefits, which is on average 85% of wage amount.

24 Santos (2002).

- **Demand and Buyers**

Demand for Cariri footwear is mostly from the Northern and Northeastern regions and include footwear retail stores, department stores and individual merchants operating in regional trade fairs or door-to-door sales. Given the low prices of products, focus is on medium and low income consumers, though a few firms have recently been successful in reaching higher markets, as they managed to improve product design, quality control and developed prestigious brand names.

Buyers have a strong presence in the cluster. They operate continuously during the year, are clearly visible and accessible in the region, in addition to playing an important role in spurring production and opening markets for small firms. As a small entrepreneur who has operated in Cariri for more than a decade explains, “marketing production is relatively easy in the cluster, as buyers are seen everywhere and knock on firm´s door constantly”. The region attracts buyers from different parts of the country, given its reputation as a low cost footwear production site.

There are basically two types of buyers. The first type is a local agent, who usually run an input retail business. They perform a dual role, simultaneously ensuring supply of footwear inputs, as well as enlarging market for footwear products. These buyers place orders with footwear firms and anticipate part of the payment supplying the necessary inputs to enable production. Prices paid for products in this case are lower than the usual levels when inputs are not anticipated as part of production payment. Manufacturing firms complain about this commercial arrangement, as they see their profit margins compressed. Given their ordinary financial constraints, MSFs are often the target of these transaction.

Other type of buyer is an outside agent who comes to Cariri to do business on a regularly base. These buyers circulate constantly in the region to negotiate orders, buy in bulk, observe producers and identify business opportunities. They are either purchasing agents of footwear retail stores and hence operate under their policies or are independent agents who purchase footwear product to re-sell to retailers. In this case, prices paid can reach higher levels as production finance is not part of the deal made between producers and buyers. Payments, however, are often made in two or three installments, a situation that again requires manufacturing firms to draw on considerable amounts of working capital.

- **Support Agencies**

The cluster is connected to key private and public institutions, which provide some technical, managerial and financial assistance. Services provided, however, are often limited or inadequate.

Training for the footwear cluster is mostly provided by SENAI, a national agency partially funded by industry association. Over the last 20 years, SENAI has made an important contribution in improving workers´ skills and firms´ productivity. The agency organizes courses, performs some basic laboratory tests and for a limited period of time, carried out some on site consultancy on production organization (e.g., shopfloor layout, quality control procedures). There is no direct charge for training, as SENAI uses its own budget money to fund it. However, due to obsolete and limited number of equipment, courses do not fulfill industry current needs, neither in quality, nor in quantity terms. For example, in 2007, SENAI trained only 30 workers, while demand reached at least ten times more. In addition, existing training is also limited to a 200-hour

program schedule, an arrangement that does not go well with cluster reality. Although firms are aware of workers training needs, they complain that this is too long a period for workers to be absent of production activity. This is even more of a problem for MSFs than for larger firms, as the latter has more flexibility to reallocate workers to make up for these eventual leaves. As a consequence of this mismatch, most trainees are unemployed workers who can afford to bear the cost of staying out of work for almost three months to attend SENAI training program. Short term training on a continuous base is a missing ingredient in the cluster and such initiative would help to improve cluster productivity and competitiveness.

SEBRAE is the most active institutional actor in the cluster and has contributed to improve cluster organization while strengthening cluster cohesion. The agency has supported firms to organize in associations, to expand markets by taking part in industry events and by organizing important ones in the region, in addition to assisting firms to enhance management and innovation capacity. For example, the agency has brought nationally renowned consultants to Cariri in order to disseminate state-of-the-art industry information on product style, trends, markets and business strategies. These events, notwithstanding their importance, are isolated and discontinuous initiatives, as they take place only in specific dates, whereas firms need to have such support on a continuous and permanent base. This is a major problem as footwear industry needs to be constantly aware of elements such as fashion trends, market profiles, consumers´ needs and preferences, new technologies, machinery and inputs.

The Northeast Development Bank (BNB) is the main credit agency for productive activities in Cariri.[25] It has branches in Crato and Juazeiro do Norte. The Bank concentrates nearly 80% of long-term credit benefiting the region. Out of the amount committed to manufacturing, 60% of total goes to footwear firms. In 2007, nearly 67% of BNB long-term credit targeted MSFs, while large and medium accounted for 33%.[26] However, BNB credit lines seem to fit more large and medium firms than MSEs. While the former has recently built new production facilities, bought modern equipment and improved management and marketing strategies, as a result of access to credit provided by BNB, MSFs face difficulties in accessing BNB money, due to their lack of collateral to support eventual loans.[27]

In addition to the agencies above, CENTEC and the regional university (URCA) have implemented incipient initiatives aimed at fostering technology improvement of footwear cluster. However, they both lack specialized equipment and have not been able to provide individual prompt on-demand assistance to firms as they have limited staff and give priority to teaching and other academic activities.

25 The government–funded Bank of Brazil (Banco do Brasil-BB) is also an important financial agency in the region, but focus mostly on providing short term credit and banking services to municipal governments, management of public transfers (e.g., pension funds, federal government transfers to municipalities), commercial businesses and individual accounts.

26 BNB criteria for firm sizes is different from the ones used in this paper, as it relates to annual gross revenue. For micro, small, medium and large firms correspondent values are, respectively: less than US$ 141k, US$ 1.4 million, US$ 20.5 million, and greater than US$20.5 million.

27 MSFs representatives report that collateral requirements may reach 150% of loans, and in addition, firms have difficulty in providing the mandatory legal papers certifying property. BNB argues that it is forbidden by law to lend money without requiring legal property documents of assets offered as collateral.

- **Organization and Social Capital**

The cluster's environment has often stimulated firms to cooperate, share information, often orders, and occasionally equipment, in addition to organize themselves as a group. This behavior however is not standard, as many firms prefer not to engage in cooperative arrangements, but rather produce in isolated way, hence refraining from taking advantage of the cluster production setting. Initiatives to promote social capital hence emerge as an opportunity to promote cluster competitiveness, due to economies of scale and more efficient operations due to collective actions.

Cooperation and rivalry occur simultaneous in the cluster. While firms may cooperate with one another, including engaging in practices of subcontracting, they may as well act as rivals. Illustrations of this attitude include: stealing best workers from each other, copying design created by others, disputing scarce inputs (e.g., injected plastic soles, molders) and spying competitors´ production plans. As much as cooperation, rivalry has played an important role in driving product quality, and in cluster learning, as firms make effort to keep best workers, imitate best practices, introduce new more efficient technologies and components, and replicate innovative design produced by competitors, while also learning how to upgrade their style (learning by imitating). For example, a number of firms, including small ones, have built new and appropriate production facilities in order to improve working condition in the shopfloor and preserve workers´ health and well being.

Ability to gather and engage in collective projects has been a strong feature in the cluster evolution. Cariri footwear firms are organized in three entities: Sindindustria, Afabrical and Sindicalc.

AFABRICAL is the oldest one (created in 1986) and encompasses basically artisans and micro-enterprises, the majority of them informal. In the beginning of this decade, AFABRICAL had more than 180 members and was for many years the most important regional footwear business association. After a period of dynamic involvement in the footwear cluster, the entity is now facing a severe crisis due to a failure to payback a loan contracted with BNB (state-owned Northeast Development Bank) to members of the association, when AFABRICAL equipment was given as collateral. Out of 70 members involved in this credit operation, 3 failed to payback the Bank which was then forced to take action against AFABRICAL.

AFABRICAL had a major role in strengthening the footwear cluster, especially in facilitating opening and operation of new micro and small businesses. For example, for more than a decade, AFABRICAL operated a service center containing key equipment (e.g., cutting and finishing machinery) which associates could use and pay by the hour. This was an important initiative because it enabled beneficiaries to have access to specialized service and hence improve quality of their products, without having to mobilize substantial financial resources to purchase necessary equipment, in addition to incurring in idle capacity and inefficiency. As most of these equipment are more appropriate with large production scale, hence incompatible with operations of small firms, having a service center that allowed possibility of sharing time and cost of machinery according to firms´ actual need was an important endeavor to improve small firms´ competitiveness and reduce entrance barriers to industry.

AFABRICAL is actually considered the sponsor of today´s several medium firms that initiated operation as a micro-enterprises. During the initial phase of their business, these firms counted on AFABRICAL´s support to expand production, improve quality and increase

competitiveness. Access to machinery, loans and business events facilitated by AFABRICAL were important elements in their graduation from micro-enterprises to medium firms.

SINDINDUSTRIA was created in 1997 and is now the largest and most active footwear business association in Cariri. It has succeeded in expanding membership base from less than 50 two years ago to current total of 72 members, all of them formal, and predominantly medium and small firms (see table below). Affiliated to the powerful state industry association (FIEC, headquartered in Fortaleza, the state capital) SINDINDUSTRIA represents this entity in the Cariri region. Its office is strategically located inside FIEC complex in the Cariri region.

SINDINDUSTRIA is quite active in encouraging business development, reaching out to support agencies and in mobilizing local footwear firms to act collectively. Among other initiatives, during the last 10 years, it has, together with SEBRAE, successfully organized a major footwear annual trade fair (FETECC- Ceara Footwear Technology Trade Fair) in the region. SINDINDUSTRIA has put a strong emphasis on improving quality of footwear items made in Cariri. Some of these initiatives include organization of lectures, seminars and production of printed material to disseminate knowledge and information on key elements such as quality control and lean production, new materials, innovative design and technologies, ergonomics etc. In addition, SINDINDUSTRIA organizes missions to major footwear centers in the country, and coordinates participation of Cariri footwear firms in the most important Brazilian specialized trade fairs (Couromodas and FRANCAL in Sao Paulo and FENAC and FIMEC in Rio Grande do Sul). More recently, given closedown of AFABRICAL, SINDINDUSTRIA is encouraging firms previously associated with that association to join SINDINDUSTRIA. So far, only three have done so, but other five are in the process of entering the larger association. In order to facilitate this process, SINDINDUSTRIA has created a special category of membership with a reduced fee, more suitable to these new comers (micro-enterprises).

Table 6
SINDINDUSTRIA Members (by size, 2008)

Size of Members	No. of members	%
Large	5	7
Medium	36	50
Small	28	39
Micro-enterprise	3	4
Total	72	100

Source: calculation based on SINDINDUSTRIA data

SINDCALC is the newest organization. It is limited to a small group of firms operating in Crato and has only 3 members, The association is led by the second largest firm (more than 1,100 workers) in the cluster and which relocated to Cariri in the 1990s, encouraged by low wages, fiscal incentives and other favors granted by the Ceara state government.

- **Innovation**

Though the number of Cariri footwear production is impressive, cluster innovation capacity is limited. The majority of firms do not have capacity to create original design. Only the larger and some medium firms have a design unit, with specialized professionals and equipment. As

plastic soles are an important element of product design innovation, large firms are in privileged position as they tend to possess both plastic injectors and the machine tools to manufacture the plastic molders for soles. Hence, these firms are the ones leading product style, and produce from four to six lines of products per year.

In terms of product design, SMEs function as followers, and produce items imitating products originally created by the leading firms. Copying hence is a predominant phenomenon in the cluster. SMEs have become skilled in quickly reproducing design created by larger firms and adapting it to low-end markets, utilizing cheaper and lower quality components. Also, footwear design shown on television, magazines and publicity material have served as a source of inspiration to small firms as they easily copy these models of products and produce similar items making them available in the local market.

Independent professional designers are not easily available in the cluster, a fact that has prevented firms to create their original design and hence enhance value-added of their products. A design school is still an unmet cluster demand. Existent institutions (e.g., SEBRAE, SININDUSTRIA and SENAI) have tried to help bringing in professional designers from other regions to give lectures and short training sessions, but these initiatives are fragmented and have not been enough to create a solid design capacity in the region.

In plastic footwear production, molds are key elements for sole manufacture, one of the most important components of footwear items. Easy access to production of molds tends to facilitate innovation as these pieces are the ones responsible for the shape of plastic injected items. Together with design capabilities, molding allows for creation of innovative product styles. Cariri production of molders is far from satisfactory. Only one independent firm is able to perform this work for the footwear cluster. A few large and medium firms have appropriate equipment to make molders, but only do this for their own product lines. Support agencies such as SENAI or CENTEC do not have such capability. As a consequence, majority of firms face strong difficulties to accomplish more comprehensive innovation and create new product styles. The ones that manage to do so, order molds from firms located in the State capital city, Fortaleza (600km) or in the South.

In terms of product quality, Cariri footwear cluster faces significant challenges. Improvement in product and in production process depends heavily on specialized laboratorial facilities which are rare in the region. Most firms face difficulties to perform laboratorial tests (e.g., input resistance, rigidity, stability and other physic and mechanical tests) as they attempt to improve and to monitor quality of their products. These analyses are also important to enhance firms´ bargaining power vis-à-vis input suppliers, as well as to enable footwear firms to sell to more demanding markets which often require product quality certification. Laboratorial support, including equipment, personnel and footwear industry related research, is a major missing ingredient for the cluster competitiveness enhancement. Responding to this demand, SENAI has recently acquired a mobile mechanic laboratory which will serve cluster firms on subsidized fee base.

Branding is another strategy firms may use to innovate and to reap product value-added gains. It is intended to encourage market acceptance of specific business or product brand names. Effective branding strategy needs to be linked to product excellence, hence the interdependence of this strategy with laboratorial improvements. A limited number of Cariri footwear firms have succeeded in developing a quality-related brand name. As a result, market value of their products

have expanded reaching twice as much as apparently similar items produced by less sophisticated firms. As some local footwear brand names have gained reputation, they tend to be imitated by other MSFs. It is hence common for MSFs to have rather similar names resembling a more successful firm.

- **Vision of the Future: The Cluster Road Map**

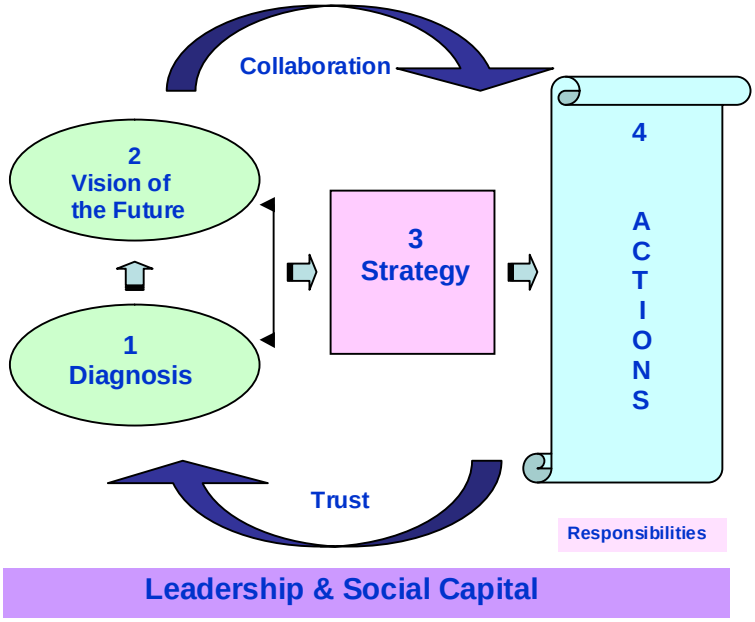
Cluster organization involves encouraging actors to interact and join efforts to continuously advance cluster agenda. Aware of the importance of the footwear cluster and its potential to strengthen regional economy, Ceara State Government initiated in-depth discussions with local actors on the design and implementation alternatives of a series of complementary interventions to foster cluster competitiveness. Getting cluster actors together and creating opportunities for them to discuss common issues proved to be a fruitful starting point to devise cluster development strategy. The necessary step in formulating this strategy included a cluster organization process which started by getting actors together to produce a cluster diagnosis, followed by forging a cluster vision of the future. Considering these two elements, actors moved on to formulate a strategy to achieve the envisioned future. Further discussion then intended to identify necessary measures to reach desired goals. During the process, leadership, collaboration and trust are important elements to bind mutual interest, ensure stakeholder continuous mobilization and maximize results. Figure 4 illustrates main stages and products of the cluster organization strategy, as well as key needed elements for strategy success.

- **Process**

Cluster organization relates to a process of developing genuine relationships within actors aiming at ensuring participation, uniting voices, promoting synergies and fostering continuous steps forwards to achieve cluster goals. The process may involve informative meetings and seminars, hands-on and participatory events, networking and information-sharing activities, training, hands-on participatory events, identification and engagements on group activities opportunities (e.g., joint purchases) and other forms of dialogues and relationship building. In this process, two cluster actors play strategic roles: the champion and the facilitator. They carry the greatest amount of responsibilities to ensure that shared plans are transformed into actions and subsequently into concrete and positive results to ensure cluster competitiveness gains, business expansion and enlargement of cluster employment base.

The champion has the role of leading the cluster, encouraging group cohesion, keeping focus on agreed upon cluster vision of the future, while also focusing on quick gains, in order to reinforce actors´ confidence on the strategy. The champion should ensure continuous connection within actors and make sure collective actions are geared to fulfill cluster needs. In Cariri footwear cluster, this function is fulfilled by a private sector representative, the president of SINDINDUSTRIA. The cluster facilitator has the role of mobilizing actors, motivating participation, and conducting activities defined as essential to achieve short and medium run goals. In Cariri case, this role will be fulfilled by an experienced professional, hired by the cluster.

Figure 4 – Cluster Organization Process



Prior to the discussions, the State Government team made a series of visits to cluster firms, including shop floor facilities, as well as carried out individual interviews with managers of footwear firms, suppliers and buyers, in addition to officials of support agencies. These initiatives were followed by small group meetings with cluster actors aiming at identifying cluster specific bottlenecks, growth opportunities and concrete proposals for a cluster development joint-action plan. Contributing to this effort, a selected group of actors had previously visited other Brazilian footwear clusters (Sinos Valley in the state of Rio Grande do Sul and Campina Grande in state of Paraiba) in order to have a broader view of how other footwear clusters operate. In parallel, a team comprised of Ceara State Government officials and a representative of Cariri footwear cluster took part on a study tour to Peru, jointly organized with the World Bank, with the purpose of assessing the experience of industry-specific technology innovation centers, known as CITEs, including one focused on leather and footwear, CITEccal (*Centro de Innovación Tecnológica del Cuero, Calzado e Industrias Conexas*), located in Lima, Peru.

After this background examination and dialogue engagement with the cluster, which is now on its third year, a more formal and comprehensive consultation event took place with cluster actors with the purpose of settling on a consensus agenda focused on enhancing cluster competitiveness. Key footwear cluster actors participated in the workshop, including representatives of public and private sectors. Initial activities during the workshop included presentations by private sector actors on their perception of the business. During the workshop, a cluster facilitator took charge of fostering discussions, combining and clarifying participants´ ideas, bringing in outside additional knowledge and catalyzing collective thinking aiming at producing concrete and focused ideas for intervention. Actors got together to produce a chart representing the functioning of the cluster, including the different businesses and activities it involved, as well as the key ones still missing in the region. (Figure 3 presents a stylized representation of the chart then produced). Based on the chart, actors then engaged on thorough

discussions about challenges faced by cluster and shared perceptions about desired image of its future (vision of the future). The event was essential to illuminate how cluster actors analyze their business and envision its future.

- **Vision of the Future**

In Strategic planning, a vision defines a target in the future, where the organization wants to be in a certain time horizon. It conveys an optimistic prospect for the organization. In cluster organization strategy, a vision portrays some form of achievement, if successful and functions as a source of inspiration, enabling effective decision-making criteria and enhancing coordination.

In the Cariri footwear cluster, elaboration on the vision of the future energized actors and gave rise to optimistic prospects. Having experienced a number of group meetings before, actors were quick and assertive to point out clear directions and future status for the cluster. They have agreed to work together to improve cluster competitiveness and transform the Cariri footwear cluster into the ***"World's leading producer of synthetic footwear"***. Envisioned time to reach this goal corresponds to a period of ten years.

Accomplishing such an ambitious goal will require cluster cohesion, strong leadership, clear strategy, capacity to act continuously without losing focus and to foster private-public collaboration.

- **Strategy and Actions**

On the basis of the cluster diagnosis and with the vision of the future in mind, Cariri footwear actors identified four key axles around which the footwear cluster would be strengthened: *cluster organization, technology upgrading, marketing initiatives and enlargement of cluster sourcing base*. For each one of these, actors agreed on a series of initiatives to which both private and public sectors needed to cooperate. Figure 5 (*Cluster Road Map*) presents improvements actors are committed to pursue over the next years.

Cluster organization process has started from identifying the cluster champion who will lead the actors and ensure continuous progress toward planned vision. Also significant is the awareness cluster actors have reached about the need for a facilitator to encourage collaboration, effective joint-action, and promote synergy. Also part of the process are initiatives to promote cluster social capital aiming at encouraging synergies and joint initiatives (promotional activities, shared industry infrastructure, buyer-supplier relationships etc) to facilitate economies of scale and other efficiency gains.[28]

Cariri cluster organization process and the proposed interventions have been incorporated by the State Government regional development agenda. The aim of the State is to promote key drivers of Cariri regional productive system, with initial priority given to footwear and tourism.[29] The interventions will complement private sector initiatives, as well as others implemented by support agencies (e.g., SENAI and SEBRAE). The key issues to be addressed: innovation and continual upgrading of design and technology; enhancement of human resources, especially labor skills; strengthen collective actions; business environment streamlining; marketing outreach; environmental protection; and infrastructure improvement. Specifically, focus will be on improving the functioning of value chains, facilitate access to domestic and international markets, strengthen social capital and promote collaborative activities, as well as stakeholders´

28 Examples of similar activities are detailed in Oregon Business Plan (2003).

29 Ceara Regional Development Project ("Cidades do Ceará"), partially funded by the World Bank.

implementation capacity, meaning ability to move from ideas to actions and to concrete results (Hansen 2008).

Technology upgrading will include the establishment of a public-private Technology and Design Innovation Center focused on the footwear industry, which is based on the successful Technology Center model developed in Spain (CITEs) and replicated in Peru.

The main functions of the facility will incorporate: a) assistance in design developing, with special focus on enhancing product value-added and productivity gains; b) production and diffusion of information on market trends in reference to style, fashion and consumer preference, including international markets; c) introduction, dissemination, and leasing of modern equipment to small footwear firms; d) demand-driven training and capacity enhancement activities to allow for product improvement, including short-term courses;
e) laboratory support for input and product analysis; f) branding strategies.

Figure 5 - CARIRI FOOTWEAR CLUSTER ROAD MAP

Phase/Axles	**Cluster Organization**	**Innovation and Technology Center**	**Marketing Initiatives**	**Sourcing Base**
1st year (concept and alliance)	- Define cluster champion - Define cluster vision - Construct a work program for short, medium and long run - Hire a cluster facilitator	- Design and Plan the facility (government agency and cluster productive actors)	- Strengthening of FETECC - Organization of Technical Missions to competing states/countries - Promote visit to key Trade Fairs - Promotion of information-sharing workshops	- Work with government agencies to define incentives to attract manufacturing plants of suppliers
2nd year (setting up)	- Implement a cluster work program and calendar of activities - Private actors work together with government agency to strengthen cluster	- Construction, establishment and organization of facility - Define financial arrangement	- Bring in buyers (national and international) - Train sale agents (to visit strategic markets to promote Cariri footwear) - Organize and disseminate information gathered in each event/mission	- Attract plants of thermoplastic resins, pigments, adhesives, footwear soles, insoles, souls, metal ornaments, molders and packing items - Attract specialized services (equipment maintenance, style, fashion bureaus etc)
3rd year (operation)	- Promote cooperation, collective actions and trust - Creation of specialized working groups to face specific challenges	Initial Activities: - design support - CAD/CAM service center - laboratorial tests and analyses - short-run training - subsidized services	- Organize information on industry trends and competitors´ strategies (Industry observatory) - Develop certification of origin (e.g., “Cariri Footwear”) - Set up internet sales	- Have local representatives or production facility of all suppliers of footwear components - Focus on expanding cluster value added
Medium Run (5-7 years)	- Private actors lead the	- Market price services	- Consolidate the Cariri	- Attract makers of footwear

	work (encourage local suppliers, facilitate production, attract private investments, including FDI; stimulates R&D, technology transfers, link university to firms, promote regional growth) - Encourage organization of other clusters	- Establish the Information Bureau - Prospect new materials - Develop new equipment - Establish a product development facility - Initiate high-level course on new materials and industrial design - Become sustainable	Footwear brand, as a monitored production - Attract major footwear traders - FETECC consolidated as an international footwear event - Organize major specialized events during the year focusing on technology, design, marketing, seasonal collection)	equipment - Become a polarized center for suppliers - Suppliers develop research facilities in the region - University create college level courses on footwear production and graduate courses on quality control and product development
Long Run (7-10 years)	Cluster acts as a regional developing agency	Be recognized as a Center of Excellence in Synthetic Footwear	Become *World's leading producer of synthetic footwear*.	Sourcing base consolidated

The design and implementation of the footwear innovation center will be done in close consultation with cluster stakeholders, especially the Cariri Footwear Industry Association (SINDINDUSTRIA). The CITE will be governed by a board comprising representatives of the State Government and members of private sector of the cluster. Service will be charged according to cost, though initially some subsidy will be included. The idea is that this benefit will be gradually phased out, after which services proceeds are expected to cover full operational costs.

Marketing initiatives entails actions to consolidate FETECC, both nationally and internationally, benchmarking studies, organization of missions to world vanguard footwear centers and trade fairs. Cluster actors plan on developing a certification of origin ("Cariri Footwear") which will be associated quality and sustainability. Also part of this axle is the establishing of a matching fund to co-finance participation of cluster private sector members to take part on missions, trade fairs and other promotional events.[30]

Enlargement of cluster source base stands as key to cluster competitiveness. Cluster actors intend to work with State Government to boost input production in the region. This may include attracting suppliers currently based in the South. Local sourcing is particularly challenging for inputs such as thermoplastic resins, pigments, adhesives, soles, insoles, souls, metal ornaments, molders and more sophisticated packing items. Also targets are sourcing improvement related to specialized services, such as machine maintenance, computer aided operations, style and fashion bureaus. In the long run, cluster actors intend to attract footwear equipment plants.

Cariri Footwear cluster organization initiative is an innovative experience in the state of Ceara. The initiative relies heavily on private sector actors to ensure successful implementation and accomplishment of final objectives. Despite the fact that the State Government will fund most of the investment, the demand-driven approach and the private-public partnership adopted early on are important elements contributing to greater impacts. In this context, an important challenge lies in ensuring enhancement of cluster social capital. This ingredient will influence how effective actors will be in organizing themselves to face tasks, join forces, share responsibilities and work collectively in pursuing agreed goals (Cluster "Road Map"). However, Cariri footwear cluster does not start from scratches in this regard. The strength shown by SINDINDUSTRIA recent history, in mobilizing actors, expanding membership base, implementing events such as FETECC, and in particular, taking the initiative to reach out to small firms are all significant evidences that the cluster has accumulated considerable stock of social capital. Though current status does not allow for accommodation, it may as well inspire confidence on further enhancement of cluster social capital and its impacts on cluster growth.

Final Remarks

The Cariri footwear cluster reveals important lessons for development planning, in particular related to cases where the challenge is to move from simple low cost base to innovation in a very competitive sector. At first, the emergence of Cariri footwear cluster surprises as local development case. Local development strategies are often natural resource-based. Processing existent local raw materials emerges as a natural step as regions attempts to enhance local productive base and promote local economies. Building on what is already available may reduce risk, cost and barriers related to starting a business or building a regional industry. In addition, this minimalist approach tends to require less efforts and resources to produce economic impacts,

30 Resources for the fund will come out of a World Bank loan to the State of Ceara (Cidades do Ceara).

as opposed to strategies that entail starting from scratches. The story of Cariri footwear cluster differs from this trajectory, as it emerged and developed processing synthetic inputs produced far from the region. It was able to do so by drawing on their previous experience as traders. Located in a valley, one of the of the few humid areas of the state of Ceará, where more than 90% of territory is semi-arid, the Cariri region emerged as an important agricultural center, in the 21st century. Generous harvests attracted population and enabled the region to establish the largest state permanent trade fair. As population continued to grow, the Catholic church encouraged locals to initiate production of basic items (e.g., hammocks, pans, cutlery, agriculture tools, leather products, guns, and even clocks watches) to supply the local market. The region soon became an influential commercial center, attracting traders from different parts of Ceara and other states in Brazil´s Northeast.[31] Dealing with traders on a daily basis enabled locals to learn how to access sourcing centers, how to market production, and hence develop a network of strategic contacts in commercial activities. That skill was key for locals to develop manufacturing businesses in a later stage.

Cariri footwear business is a remarkable story also because it developed spontaneously as a cluster, rather than a scattered business. As dissemination of skills and business contacts took place in Cariri, a number of shops emerged, production boomed and the region acquired reputation as a footwear pole. Footwear buyers and brokers emerged to do business with local shops and the industry later attracted suppliers of inputs and equipment and service providers. This array of actors contributed to further expand the industry making it relatively easy for locals to open a footwear workshop as both supply and demand were at hand. Currently, the Cariri footwear cluster constitutes an inter-weaved network of actors that, though still facing some important weakness (e.g., coordination, technology support, innovation capability, skill enhancement), has been an important element expanding businesses and driving cluster competitiveness.

Cluster approach is about networks and interconnection among businesses, industries and institutions. Hence the importance of a thorough data analysis to understand how the trend, potential and connections they experience, as well as the role they play in the local economy. Part I of this articled attempted to throw some light on how the Cariri footwear industry sits in reference to these aspects. Locations quotients, shift-share analysis, input-output tables, in addition to investigation on basic economic variables (e.g., employment, value-added, exports, tax collection) reveals important information on cluster growth potential.

A cluster approach is mostly about coordination of ongoing efforts. In designing a cluster development strategy, it is important to bear in mind that each case is a different one, hence there is not a uniform solution approach. Relationships are important features of industry clusters, and the nature and intensity of the links between different cluster actors determine how effective they can be in promoting their common interests. The structure of the cluster networks differs from one to another and each case needs to be assessed and properly addressed. Cluster approach hence demands a customized solution. In the case of the Cariri footwear cluster, the cluster road map reflects the how actors perceive the business vis-a-vis competitors, as well as cluster asset in terms of social capital.

It is also striking that Cariri footwear cluster managed to establish itself as a major national player in a highly competitive business dominated by some of the most industrialized

31 Construction of a railroad linking the region to the State capital and other states in the Northeast also played an important role in expanding Cariri influence as a commercial center.

Brazilian states (e.g., Rio Grande do Sul and Sao Paulo). Located in the poor Northeast, far from Brazil´s industrial base, facing difficulties to access technology and inputs, Cariri plastic footwear industry has taken advantage of abundant labor force and low wages, and focused on low end market, in addition to drawing on firms´ flexibility to quickly adapt to industry standards developed in the South.[32] This flexibility includes promptness and ability to fulfill and share orders, follow trends, copy design, adapt technology and reduce costs, including by using recycled materials.

Moreover, Cariri footwear cluster stands out as an initiative driven initially by the private sector and market incentives, and less by public policy. Only recently, encouraged by state fiscal incentives, a few Southern firms have opened industrial footwear plants in the region. Despite the region scarcity of capital, the industry was built and developed by locals, rather than by outsiders.[33] A significant number of firms now considered medium size (less than 500 workers) firstly opened as a workshop in the backyard of the family home. Ability to draw on local factors (local demand, business network, pool of workers, secondary market of equipment) was an important ingredient for industry growth.

Finally, this case illustrates the importance of cluster organization process, including design and implementation of cluster-based economic strategies. Through this process, actors of Cariri footwear cluster have been able to identify and agree on key steps to plan for business development, including vision, strategies and actions. The process also revealed the importance of cluster facilitator role in ensuring continuous cluster mobilization aimed at pursuing agreed upon development strategy.

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