



# A Comparison of Clustered and Dispersed Firms in the Small-Scale Clothing Industry of Lima

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**Summary.** — This study provides empirical evidence on the strength and type of clustering advantages, contrasting the performance of small clustered firms with several control groups of dispersed producers in the garment industry of Lima, Peru. Repeated measurement facilitates an evaluation of the ability of clustered firms to respond to pressures arising from the swift trade liberalization carried out in Peru after 1990. The evidence suggests that clustering advantages have been significant, particularly for the smallest firms. Cost reductions and information spillovers are the dominant type of advantages. These are however, passive advantages of clustering. They largely arise at the level of transactions in goods and services, and to a lesser extent in the transformation of inputs into output. While significant, these advantages are insufficient for sustaining competitiveness in the liberalized markets. The garment cluster runs the risk of entropic death if information spillovers remain limited in origin and diversity and if interfirm cooperation does not cross local borders. © 1999 Elsevier Science Ltd. All rights reserved.

## 1. INTRODUCTION

Spatial clustering within a specific subsector yields advantages for small and medium-sized enterprises (SMEs). This Marshallian insight is “old hat in economics” (Schmitz, 1992, p. 65). In current debates about “industrial districts” and similar concepts,<sup>1</sup> the question is what types of advantages drive on a clustering process and thereby enhance SME competitiveness. Some advantages accrue automatically to clustered firms, e.g., market and product information spillovers. Other advantages spring from purposeful and strategic actions of entrepreneurs, e.g., crossfirm cooperation in vertical or horizontal linkages with the goal to improve products and processes. The associated increase in innovative capability is important for sustaining competitiveness in liberalized internal and in external markets.

This article provides empirical evidence on the conduct and performance of both clustered and dispersed SMEs in a developing country context. A weakness in cluster studies has been the lack of detailed counterfactual analysis. This study seeks to fill this gap by comparing clustered firms with dispersed producers in the garment industry of Lima, Peru. The strength

and type of clustering advantages is determined by contrasting the conduct and performance of clustered firms with several control groups, while repeated measurement facilitates an evaluation of the ability of clustered firms to respond to pressures arising from the swift trade liberalization carried out in Peru after 1990.

We aim at answering two related sets of questions. First, are clustered producers performing better than dispersed producers and if so, what are the reasons behind this superior performance? Second, do clustered producers

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cope better with pressures of international competition than dispersed producers?

By posing these questions, the study allows for an assessment of the relevance of the observed clustering advantages in a changing competitive situation. The starting point for this assessment is twofold:

- (a) The increasingly challenging market environment of the Peruvian clothing industry *requires* strategic cooperation among clustered producers;
- (b) A change in the “mental model” of the expected payoffs to acquiring different kinds of knowledge is required to *enable* crossfirm cooperation, learning and innovation.

The ultimate question is thus whether spatial clustering contributes to the renewing of the mental model or, alternatively, provokes “entropic death” (Camagni, 1991, p. 140).

The article is structured as follows. Section 2 provides the conceptual framework for the empirical analysis, and discusses two main types of advantages that SMEs may derive from a situation of clustering. Section 3 describes the cluster under review. Section 4 contains a cross-section analysis of the conduct and performance of firms operating in the cluster and three control groups of dispersed producers. Section 5 reports on changes in the conduct and performance of clustered SMEs compared with one control group of dispersed producers, in an environment of enhanced foreign and domestic competition. The main conclusions are brought together in Section 6.

## 2. CONCEPTUAL FRAMEWORK

### (a) *Definition and classification*

I define spatial clustering as a process of geographical concentration of economic activities within a certain subsector<sup>2</sup> and at a location where industrial experience has been built up. This is a dynamic process. The advantages that SMEs derive from operating in a cluster are thus also subject to change. These advantages have to be measured by comparing clustered and dispersed producers, but Schmitz (1997), p. 20) rightly argues that “comparisons of current performance would probably miss the significance of clustering in the industrialization process”. Understanding this significance requires multiple observations of clustered and

dispersed producers, which facilitates an evaluation of the dynamic capabilities of clustered SMEs.

Another point springing from the definition of clustering is that there may be dissimilar driving forces behind a process of spatial clustering. They range from common denominators in the location decisions of entrepreneurs (who aim at reaping positive externalities) to some type of functional interdependence in a setting of purposeful cooperation between entrepreneurs. In line with this, we distinguish between two types of clustering processes:

- (i) Clustering mainly resulting from the one-time decisions of entrepreneurs to start operating their business in the cluster area. The principal goal is here to benefit passively from favorable location factors such as the presence and quality of transport and wholesale facilities, the availability of physical infrastructure, or the presence of a multitude of competitors implicitly orienting each other in investment and commercial decisions (and thus reducing short-term commercial risks as well as long-term dynamic uncertainty associated with investments in fixed capital);
- (ii) Clustering that is based on a more permanent process of strategy formulation. The principal goal here is to pursue actively solutions to problems of competition by developing complementary linkages with other SMEs. This could include process innovations on the basis of technical/commercial dialogue between users and producers of intermediary products (vertical linkages), or enhanced volumes and product quality through cooperation among producers making similar products (horizontal linkages).

The dividing line between the two clustering processes is the role of the entrepreneur in actively pursuing cooperation with other firms with the purpose of learning (technical, managerial and entrepreneurial) and innovation (with regard to products, processes and organization). Nadvi (1997) refers in this regard to “active collective efficiency”. The active behavior of entrepreneurs has its roots in competitive forces compelling them to upgrade their ties with suppliers, clients, competitors, banks and research centers with the aim to offset the resource disadvantages characterizing most SMEs, e.g., information and cognitive constraints to innovation. The benefits of cooperation take the form of cost reductions,

quality and design improvements, and innovations. They first arise at the level of networks of functionally interdependent producers, and then spread across the cluster.

In the situation without cooperation, clustered producers automatically enjoy the prevailing clustering advantages (technological externalities and pecuniary effects: see e.g., Mishan, 1971 and Scitovsky, 1954). These passive advantages of clustering are attainable to everyone who works in the cluster area. Some may even accrue to producers visiting the area, for example, to buy inputs.

The distinction between active and passive collective efficiency is important in the empirical analysis of SME clusters in developing countries. After observing a performance gap between clustered and dispersed firms, the question is whether this is (mainly) due to passive or (also) to active collective efficiency. The next question is in which of the following business processes do producers enjoy the two types of clustering advantages: transformation of inputs into output; transactions of goods and services; strategic management of resources and risks; and innovations regarding these three processes.

(b) *Shifting gears from passive to active collective efficiency*

In a dynamic perspective, Schmitz (1997, p. 10) argues that a cluster's capacity to respond to opportunity and crisis requires "shifting gears from passive to active collective efficiency" through the development of more cooperative relationships between firms. This means that cooperation among entrepreneurs needs to play an increasing role in the clustering process, enhancing the likelihood of crossfirm learning and innovation. Shifting gears depends however, on the tradeoff between the perceived benefits and costs of interfirm cooperation: market incentives and transaction costs respectively. A positive balance facilitates interfirm division of labor and cooperation in business networks; a negative balance prevents entrepreneurs from moving into this direction.

Spatial clustering promotes the development of networks by lowering transaction costs, in at least two ways:

(i) The high density of related economic activities facilitates the screening and selection of business partners on the basis of local information and established reputations;

(ii) Proximity between agents facilitates monitoring of behavior and enforcement of contracts.

A third dimension of spatial clustering is history. A local economic history is based on experience over a longer time period and on the collective lessons learnt on the basis of that experience. Learning is not a rational process, however. North (1994, p. 362) argues that "the direction of the learning process depends on the expected payoffs to acquiring different kinds of knowledge, [while] the mental models that the players develop shape their perceptions of the payoffs". I have discussed the concept of the mental model in detail elsewhere (see Visser, 1996, pp. 27–30). What is relevant here is that two factors are essential in triggering learning: willingness (to look for, select, process and use new information) and capability (of performing these activities). If either one or both factors fall short, a gap arises between perception and reality. The concept of the mental model is useful in dealing with this gap.

Returning to the relation between clustering and the perceived benefits and costs of interfirm cooperation, there is a risk that in a situation of predominantly passive clustering advantages, the local mental model works against interfirm cooperation in business networks. This is because over a longer time period, passive clustering advantages condition a certain common competitive behavior—what, where and how to buy inputs, produce and sell output—due to clustered producers solving strategic and daily questions on the basis of local information spillovers. This introduces a risk of lock-in and may cause the "entropic death" of the local milieu (Camagni, 1991, p. 140). In a situation of lock-in, market incentives are misunderstood and transaction costs overestimated, and hence the tradeoff between benefits and costs of interfirm cooperation is perceived to be negative. This prevents entrepreneurs from moving toward specialization and cooperation in business networks.

Before considering the empirical evidence for a Peruvian clothing cluster in sections 4 and 5, we provide a description of its location, size, composition and evolution.

### 3. THE GAMARRA CLUSTER

The Gamarra cluster is located in La Victoria, one of the 43 municipal districts of Lima.

The capital city of Lima has the largest market potential of all cities in Peru, implying a relatively large demand for consumer goods and supply of inputs. Another reason for the location of the cluster is that the municipal district of La Victoria has a long experience (ever since the 19th century) in various industrial activities: textiles and clothing, metalworking, automobile repair services, woodworking and several final consumer products. Finally, the cluster's location is close to a wholesale market for staple food crops, the first to be established in Lima. This has been crucial to the later development of the cluster, connecting the centralized supply of textiles and clothing products in Lima with a geographically dispersed demand in rural areas and intermediate cities.

Using the main roads surrounding the cluster to mark out its limits, the cluster comprises 60 housing blocks (Ponce, 1994, p. 100). The cluster is steadily expanding, through invasions by street sellers of virginal parts of the surrounding areas or the construction of new shopping centers. The cluster took 40 years to achieve its present size. According to an estimate for 1993, 6,800 firms were then active in the cluster: 50 medium-sized and 1950 small clothing firms; 4100 traders of cloth fabrics and accessories, 300 restaurants; and 150 companies selling equipment and components (Ponce, 1994, pp. 100–101). This excludes street sellers and informal micro businesses, whose numbers are unknown. Also for 1993, the Superintendence of Tax Administration (SUNAT) estimated that the total number of firms in the cluster was 8,000, generating a total annual turnover of US\$800 million. Although impressive, this last figure may still underestimate reality. An extrapolation of our survey data for 1993 suggests that the annual turnover of the 1950 small clothing firms alone already amounted to US\$280 million.

What fuelled this explosion in the number of firms and total turnover of clothing and textiles businesses in Gamarra? Four trends appear to have influenced the cluster's evolution:

- (a) The modernization of the Peruvian countryside and highlands during the past decades. This enhanced the demand for modern, cheap and fashionable garments (such as T-shirts, shirts and jeans) at the expense of artisanal products;
- (b) The widespread impoverishment of the Peruvian population during 1975–92, expanding the domestic market for cheap

garments with the population of intermediate cities and Lima (see also Section 5(a));

- (c) The negative impact of import-substitution policies on the efficiency and flexibility of established large clothing firms (Vega-Centeno, 1988) resulted in such firms losing two battles, one in the emerging, but dispersed, difficult-to-reach and variegated rural markets, and the other in the growing urban markets for cheap garments;

- (d) The persisting flow of migrants to the capital city of Lima, looking for safety, food, shelter, education, medical care, and of course work and income. The rudimentary equipment, production methods, organization, labor skills, management, and product information required to compete in the domestic apparel market allowed many migrants to enter into the clothing business.

To conclude, there were numerous business opportunities for *domestic* firms capable of producing cheap fashion goods for a variety of rural and urban markets. Migrant entrepreneurs have been most effective in seizing these opportunities, taking advantage of low barriers to entry. It is important to note, however, that the cluster's growth took place in a setting of protected domestic markets. The question is to what extent did this environment condition the type of clustering advantages that have been driving the development of the Gamarra cluster?

#### 4. COMPARING CLUSTERED AND DISPERSED SMES

This section contains a cross-section analysis of the performance of SMEs, comparing clustered firms with dispersed producers operating elsewhere in the city of Lima. It then explains the gap in performance according to the distinction between active and passive collective efficiency.

The data were collected through surveys undertaken in February/March 1994. The interview questions focused on the performance of firms, the external organization of business processes and the type of interfirm linkages.<sup>3</sup>

##### (a) *The sample*

While the estimated number of clothing SMEs in Lima is 32,500 (USAID and the Banco Central de Reservas, 1992, p. 83), there are 5,228 clothing SME firms registered with

the Ministry of Industry in the metropolitan area of Lima.<sup>4</sup> Of the latter, 1,156 firms are registered in the municipality of La Victoria which has within it the Gamarra cluster. From this a sample of 50 firms were randomly selected. The control group of dispersed firms were located in both high and low-income areas of the city. A random sample of 40 firms (from a total of 425 enterprises) was taken from high-income areas. Similarly, 40 firms were randomly selected from the total of 3,647 firms registered in various low income areas of Lima. Of the total sample of 130 firms, the response rate was 79% (equivalent to 103 firms).

At the stage of data analysis, firms within the borders of the Gamarra cluster were separated from firms operating in other areas of the municipality of La Victoria: near, but not in the cluster. The cluster group contains 24 cases, with the remaining 17 cases belonging to the La Victoria/EG group (acronym for La Victoria, excluding Gamarra). The La Victoria/EG group on the one hand lodges entrepreneurs with a relatively high level of education and many years of residence in the area. These entrepreneurs are eager to describe how much they differ from the cluster, e.g., in deciding where to buy which inputs, what to produce, and where and how to sell final output. Some may occasionally go to the cluster, e.g., to purchase fabrics at the last moment, but when asked they stress that they do not rely on the advantages that Gamarra offers, nor is it their intention to do so. On the other hand, there is an above average presence of migrant entrepreneurs in La Victoria/EG (particularly from the southern province of Puno). They operate a tiny business on the hills not far from the cluster—but certainly not within the cluster area. When asked, these people stress that their only goal is to move their business as soon as possible into the cluster area, so as to enjoy more intensely the advantages, such as (the speed of) information and technological spillovers.

Firms in the Gamarra cluster are compared with a total of three control groups of dispersed producers—whose situation is characterized by relative isolation, with no competitors, suppliers, traders or any other relevant agent working close to their business. In turn, the three control groups are different from one another.<sup>5</sup> This is most markedly so for high-income areas, where the modal owner is a female entrepreneur, born in Lima, with a relatively high education, and who started a clothing business to complement

the decreasing income of her husband during the economic downturn of the 1970s and 1980s. Firms in high-income areas often have hired managers, which is almost never the case in other locations where firms are owner-managed. Low-income areas are relatively distant from the city center, from Gamarra, and from other industrial and commercial centers in Lima. Entrepreneurs operating a business in these areas do so without any relevant beneficial impact of the immediate environment, with the exception of the relatively low wages (due to high levels of underemployment). The level of education is also relatively low in this group.

The contrast between the Gamarra cluster and the control groups is perhaps greatest in the case of low-income areas, with regard to both the density of related economic activities and proximity between agents operating in the textile and clothing subsector. The low density of related economic activities in low-income areas prevents firms from reaping external and internal advantages of scale, scope and experience with regard to production, marketing and transaction costs, while also hindering effects of cross-firm learning. Long distances between the firms make it hard to monitor behavior and enforce contracts, and thus drive up transaction costs.

The differences between the three control groups justify the presentation of the data in an equally disaggregated manner.

(b) *Measuring the performance gap between clustered and dispersed SMEs*

This section contains empirical evidence on performance differences between clustered and dispersed producers. We use six indicators of performance (in order of presentation): employment size, employment growth, average monthly gross sales per worker in 1993, use of (unpaid) family labor, average monthly wage per worker in 1993, and real estate prices. The gross-sales-per-worker indicator is most important because it is a relative measure of business performance. Price effects may make it a second-best indicator of productivity, but it is the best one can get under the circumstances.<sup>6</sup> The other indicators are also considered reliable despite bookkeeping and other problems with data collection in SMEs in developing countries.

Regarding *employment size*, we first observe that 87% of the sample employ less than 15 workers. This is, among other factors, due to

the limited importance of scale economies at different levels of the production process.<sup>7</sup> Another reason is limited available workspace. This is also relevant for clustered firms operating in one of the shopping centers in Gamarra; space and physical constraints set an upper limit to the employment size of clustered firms (Visser and Távora, 1995, p. 75). For these reasons, Tables 1 and 2 include different size categories for firms with less than 20 workers.

Physical constraints do not prevent clustered firms from being on average larger than dispersed firms. This size difference is mainly due to two factors: forward integration into sales activities and relatively high production volumes (see the evidence below on sales per worker). In line with this, clustered firms have at least two establishments: a workshop and one or more shops. At other locations, nearly 50% of respondents state having only one establishment (a workshop).

The second performance indicator is *employment growth* (over the lifetime of firms). The growth pattern of 89 sample firms that started operations with less than five workers reveals that the vast majority of firms expand employment, no matter their location. Only a few micro firms in the control groups failed to grow. Most added one or two workers to the initial workforce although they continue to remain predominantly in the micro category. The majority of clustered producers, on the other hand, have expanded employment to such an extent that they become part of the five to nine employment-size category. Beyond this point, physical constraints start limiting further employment growth, pushing entrepreneurs to relocate production outside the cluster, although retaining distribution and marketing in Gamarra.

In terms of the *monthly average of gross sales per worker* in 1993 (Table 2), a major finding is

Table 1. *Employment size of firms by location (in % of row totals)* <sup>a,b</sup>

Location	Size			
	1-4 workers	5-9 workers	10-19 workers	20-99 workers
<i>Clustered</i>				
Gamarra	25	54	13	8
<i>Dispersed</i>				
La Victoria/EG	50	38	6	6
High-income areas	33	23	27	17
Low-income areas	45	35	17	3
<i>Sample</i>	38	37	16	9

<sup>a</sup> Figures printed in italics indicate the modal firm-size category in each group.

<sup>b</sup> Source: Survey February/March 1994.

Table 2. *Average monthly gross sales per worker in 1993 by location* <sup>a</sup>

Location	Number of observations	Mean (US dollars)	SD (US dollars)	Kruskal-Wallis $\chi^2$	P-value
<i>Clustered</i>					
Gamarra	23	1148	852	16.9	0.001
<i>Dispersed</i>					
High-income areas	28	510	354		
La Victoria/EG	17	380	346		
Low-income areas	31	660	777		
<i>Sample</i>	99	683	691		

<sup>a</sup> Source: Survey February/March 1994.

that the score for the cluster significantly exceeds that of control groups.

Apparently, firms in the cluster are more successful in satisfying the demand of consumers, achieving higher sales and production on the basis of: (i) enhanced productivity in volume terms (i.e., lower unit production costs); (ii) longer working days; and (iii) a relatively good market-fit of garments "made in Gamarra".

The first factor—of enhanced productivity—in turn comprises three firm-level effects, of scale (due to product specialization), scope (based on the complementarity of sales and finishing activities) and experience (the elimination of mistakes and enhancement of production routines). These firm-level effects are due however to the process of clustering and the associated advantages, e.g., the relatively good trade connections between the cluster and various Andean consumer markets, the favorable reputation of "Gamarra" within Lima, and the existence of a local pool of skilled labor.<sup>8</sup> This pulls producers into the cluster, which intensifies competition, puts a premium on the right choice of activities in the light of available information about inputs, services and output markets and fosters specialization in products that are common in the cluster, thus further intensifying competition. What is important to note is that internal effects do not act as a catalyst in this process, whereas external factors do enable producers to reach higher sales per worker.

Surprisingly, firms in La Victoria/EG display the worst performance of the four groups. The industrial background of La Victoria in general, and its experience in textiles and clothing in particular, appear to be insufficient to offset the negative effects of operating a business near but not in the cluster. Some of the more pecuniary advantages are attainable to businesses outside the cluster, but the more technological effects are not, particularly if speed is an important part of the advantage (e.g., of information spillovers). Another negative effect is that firms in La Victoria/EG are beyond the scope of attention of traders or service suppliers (both specialized production and business support services). This is particularly harmful for producers who model their strategy and conduct after their perception of what makes clustered firms successful. It is for this reason that the migrant entrepreneurs operating a tiny business on the hills not far from the cluster have but one goal: relocate their business toward the cluster—as soon as possible.

A series of other indicators also point in the direction of a gap in performance between clustered and dispersed SMEs. One relates to the *use of family labor*. Family labor tends to be least important in the cluster and in high-income areas. In high-income areas, however, unpaid family labor is common, whereas it is rare in the cluster.<sup>9</sup> In low-income areas, relatives make up half of the workforce and often receive payment. La Victoria/EG follows high-income areas in that family labor is relatively often unpaid. To sum up, clustered producers depend least on family labor, and if they do, these relatives receive payment for their services.

Producer estimates of the *average monthly pay per worker* in 1993 are, on average, 30% higher in the cluster than elsewhere in the city.<sup>10</sup> High standard deviations demand caution in interpreting the data.<sup>11</sup> The difference may also be due to longer (standard) working days, which was not controlled for in the survey.

A final indicator of the performance gap is the level of *real estate prices*. In August 1994, a square meter on the ground floor of a new shopping center sold at US\$5,000.<sup>12</sup> Such high prices have not been recorded elsewhere in Lima.

So far, firm size has not been taken into account. Returning to the indicator of the monthly average of gross sales per worker in 1993, an important finding is that in the smaller size categories, clustered firms have the highest scores. Micro firms in the cluster perform better than their dispersed colleagues elsewhere; clustered producers in the 5–9 size category also sell more than producers in the control groups (Table 3).

The standard deviations are generally high (more than 33% of the mean), making the size distribution statistically significant only for low- and high-income areas, and for the sample as a whole. Next, the number of observations in the upper size categories is small. This does not however, invalidate the following observations. The evidence in Table 3 suggests that for clustered firms size does not influence performance. The correlation coefficient between sales and size is low and not significant. Moreover, the means of the different size-categories are not significantly different from one another. The high averages together with high standard deviations indicate that clustering enables some micro and small firms to considerably enhance their sales performance. Clustering apparently

Table 3. Average monthly gross sales per worker in 1993, by size category and location (US dollars)<sup>a,b</sup>

Location	Size				$\chi^2$	P value	Sales/size correlation	P value
	Micro 1-4	Small 5-9	Scale 10-19	Medium 20-99				
<i>Clustered</i>								
Gamarra	949 (930) 6 obs	1286 (961) 12 obs	935 (473) 3 obs	1229 (641) 2 obs	0.98	(0.8)	0.12	(0.30)
<i>Dispersed</i>								
High-income areas	414 (243) 9 obs	301 (171) 7 obs	781 (495) 7 obs	596 (322) 5 obs	8.91	(0.07)	0.18	(0.19)
Low-income areas	359 (231) 14 obs	658 (657) 11 obs	1158 (1482) 5 obs	2427 0 1 obs	10.67	(0.06)	0.64	(0.00)
La Victoria/EG	210 (190) 9 obs	473 (314) 6 obs	1284 0 1 obs	455 0 1 obs	5.97	(0.13)	0.4	(0.06)
<i>Sample</i>	430 (462) 38 obs	767 (766) 36 obs	959 (805) 16 obs	925 (710) 9 obs	13.21	(0.02)	0.14	(0.08)

<sup>a</sup> Standard deviations are given between the brackets. Numbers of observations (obs) are below standard deviations.

<sup>b</sup> Source: Survey February/March 1994.

enables some small producers to start exploiting behavioral advantages and thus to overcome some resource disadvantages.

By contrast, "big is better" in the control groups, where the sales performance appears to improve with the size of firms. This is particularly so in low-income areas and in La Victoria/EG, where the size/sales correlation coefficient is high and significant. In high-income areas, the correlation coefficient between sales and size is low and statistically not significant. This is due, however, to the bad performance of five medium-sized enterprises, which were restructuring at the time of the survey. These firms are examples of Peruvian clothing firms losing market share to new entrants capable of making cheap fashion goods for a variety of rural and urban markets (see section 3), and were also the first to suffer the consequences of trade liberalization and increasing imports.

Comparing the results, it seems that in a clustered setting, location effects overrule the importance of size-related variables. Regression analysis confirms this point: several theoretically plausible firm-specific variables do not significantly contribute to the explanation of

performance, whereas three location dummy variables take on negative values with reference to the cluster (see the appendix).

The evidence supports the earlier conclusion that external factors (from the viewpoint of individual firms) drive the performance gap between the cluster and the control groups. These external factors are territorially constrained, i.e., specific for the cluster area. Their influence is such that *clustered firms on the average do better than dispersed producers. The performance gap is particularly large for the smallest firms.*

The task ahead is to determine the type of external factors that drive the performance gap. Can these be classified under active or passive clustering advantages? Next, we need to find out for which of the following two business processes they are relevant: the process of transforming inputs into output and of transacting inputs and output. The dynamic processes of strategic management and innovation are dealt with later, in section 5. The principal issue below is whether cooperative interactions between producers play a role in triggering (crossfirm) learning and innovation,



which is thought to make the difference between thriving and stagnant clusters.

(c) *Transformation behavior*

Cooperative interactions between firms are facilitated by vertical specialization. In Gamarra, division of labor is limited, however, compared with the control groups and also in the light of the "industrial district" model. The modal number of activities that clustered producers subcontract is one, usually a finishing operation. Pre-assembly activities are never subcontracted due to high risks of counterfeiting, robbery and poor quality. Subcontracting more than one activity to other firms, is unusual in the Gamarra subsample, whereas in the control groups some firms even subcontract all operations.<sup>13</sup> Regression analysis reveals that the difference in the incidence of subcontracting across locations is statistically significant comparing high-income areas with the Gamarra cluster.

The evidence on subcontracting mirrors the data concerning the number of operations a firm is unable to realize. Almost 50% of the producers in the cluster mention one operation. The operation that most clustered producers farm out is finishing (which is space-intensive and technologically distinct—e.g., the chemical process of coloring/bleaching is different from the mechanical assembly activities).

The enhanced demand for finishing services in the cluster adds to the demand of producers elsewhere in Lima. Hence, some specialization in finishing operations occurs in the cluster, mainly in buttonholing/fixing and printing. These specialized producers realize scale and scope economies. Case-study evidence suggests, however, that the associated linkage effects are limited to price reductions and greater variety for the users, and enhanced efficiency and turnover for the specialist suppliers.

A second area of interfirm cooperation is capacity contracting, in which contractors "invest internally in labor and machinery just below the level of minimum expected demand and subcontract any demand above this level" (Lazerson, 1990, p. 4). In the Gamarra cluster, the relevance of capacity contracting is limited despite problems of excess capacity at times of slack demand. This is due to risks of noncompliance (long lead times and poor quality) and increased tariffs exactly at times of peak demand. As a result, clustered producers direct their relatively large investments in

equipment to the expansion of assembly capacity.

Third, cooperation may take place in networks of entrepreneurs actively pursuing concrete business goals of enhancing production volumes and turnover, improving product quality and design. The February/March 1994 survey data, however, suggest that this type of multilateral and horizontal cooperation was relatively rare in the cluster. On the other hand, case-study evidence indicates that clustering allows for the quick development of cooperative networks once producers perceive the need to do so. Screening, selection and monitoring is facilitated through family and ethnic ties, proximity and local reputations. The case studies moreover suggest that the purposes of the few cooperative ventures in Gamarra are more sophisticated compared with task groups elsewhere in Lima. The former aim, for example, at simultaneously upgrading production and exporting, whereas the latter usually aim at solving problems of access to domestic markets that have already been mitigated in the cluster.

On the whole, the evidence suggests that *interfirm cooperation at the level of the transformation process is limited*. Hence, learning and innovation effects at the level of production are too weak to contribute much to the explanation of the performance gap between clustered and dispersed firms. The observed clustering advantages are cost advantages at the level of finishing activities and enhanced labor productivity. Altogether, these passive advantages of clustering are insufficient to explain fully the performance gap between clustered firms and the control groups.

(d) *Transacting behavior*<sup>14</sup>

A further basis for interfirm cooperation is the business process of transacting inputs, services and output. The spotlight here is on upstream and downstream linkages. Hence, traders appear on stage as suppliers of inputs and buyers of output.

Transacting inputs first of all requires planning of what to produce, for whom and how much. This involves the collection and interpretation of data about the preferences of consumers and the exigencies of traders, the specification of product characteristics, and a decision about which type and what quantity of inputs, equipment and services to purchase. Here, clustered producers enjoy advantages in the form of information spillovers from several

sources, such as the products of competitors.<sup>15</sup> Nearness also facilitates the diffusion of still-tacit knowledge and work-in-progress through direct observation. New ideas, whether modest or important, thus quickly become public on a local scale. As a result, clustered producers are more confident regarding their chances of selling their products. More than elsewhere they hold stocks to be sold later, whereas dispersed producers more often wait for an order of a client before they move.

The availability of information at a stone's throw also means that it is obtained at low costs. Information costs are further reduced as a result of the internal subdivision—by product types—of the Gamarra area. Hence, clustered producers are not only able to come up with new products at relatively high speed but also at low costs. All this has made the Gamarra cluster a frame of reference for producers and traders elsewhere in Lima and Peru.

With regard to upstream transactions, especially the purchase of cloth fabrics, clustered producers generally rely upon price-coordinated linkages with suppliers. The producers enjoy low costs of search and matching, while the suppliers realize economies of scale in distributing their goods. The Coasian costs of using the market mechanism are thus lower on both sides of the linkage. A similar process unfolds in downstream transactions. Cost advantages are significant on the two sides of the linkage, involving this time producers and buyers. The local concentration of demand and the standard practice of forward integration of clustered firms (in turn due to scale and scope economies based on indivisibility's and complementary inputs) are largely responsible for the cost decrease.

Much of the cluster's competitiveness stems from these four cost advantages along the supply chain. Considering that clustering promotes fierce lateral competition at each level of the supply chain, cost savings are often passed on to the subsequent clients. The accumulating savings in the end accrue to traders of final products (wholesalers and retailers) and also to final consumers.

Reducing the costs of realizing up and downstream transactions is relatively important for small firms, which from an individual point of view face diseconomies of scale and scope. Taking into account that scale economies are not as relevant in clothing as in other industries, the conclusion is that clustering advantages at the level of transacting activities

are largely responsible for the earlier observed performance gap—in the smallest size categories—between clustered and dispersed producers. These observed advantages fall into the category of passive collective efficiency.

## 5. PASSIVE CLUSTERING ADVANTAGES AND THE NEW COMPETITION

This section addresses the question of whether the observed mix of passive clustering advantages enables producers in Gamarra to continue to compete effectively in a setting of trade liberalization. How relevant are such advantages in changing competitive situations? What is their influence on strategic decision-making? To what extent are producers moving to active collective efficiency? In particular, are they starting to cooperate with the purpose of learning (technical, managerial and entrepreneurial) and innovation (with regard to products, processes and organization)?

Three examples illustrate the importance of more cooperative interactions between clothing producers (and other agents). Until 1994, clustered producers relied on cost advantages in purchasing fabrics from traders located in the cluster area. Yet, cooperation with textile suppliers elsewhere in the city could lead to an increase in the quality and the exclusiveness of this crucial input, thus considerably enhancing the competitiveness of supplier-dependent clothing producers. Likewise, cooperation was not observed before 1994 between clustered producers and their buyers. Yet, such cooperation could help producers lower the daily pressures of marketing and free time to devote to the core problems of the businesses, to assimilate more effectively trends in consumer markets, and to incorporate novelties not yet known to competitors. Finally, clustered producers often subcontract one finishing activity. Another option would be to separate the knowledge-intensive part of the production process (mainly preparatory activities) from the labor-intensive, routine and predictable activities (especially sewing and some finishing operations).

In order to observe how clustered and dispersed producers were faring in a setting of trade liberalization, a second survey was undertaken in September/October 1995. While the short time period between the two surveys (18 months) limits their explanatory strength, they do provide an indication of shifting trends

in Lima's garment market. In 1995, clustered firms were compared with the high-income control group only on the grounds that this control group came second in terms of performance and was more active than clustered firms in activities such as subcontracting. The two groups contained the same firms as in the February/March 1994 survey. But some enterprise deaths together with nonresponse reduce the size of the subsamples from 24 to 21 (the cluster group) and from 30 to 21 (the control group).

(a) *Changes in the market context*

Peru has passed through a long period of economic stagnation and instability in recent decades. During 1975–92, income per capita fell by 32%. In 1992, per capita income was equal to the 1960 level (BCR, 1995, p. 135). Inflation had been above 10% since 1974, reaching an all time high of 7,650% in 1990: the year that Alberto Fujimori was elected president. This was a year of drastic changes in economic policy-making (Visser, 1996). Foreign trade was liberalized, mainly by the lowering of import tariffs from an average of 63% in 1985 to 16% in 1994 (BCR, 1994, p. 175). Strict tax policies increased revenues from about 1% in 1989 to 11.1% of GDP in 1994 (BCR, 1994, p. 88). Other changes were a drastic reduction of the public sector and the elimination of direct and indirect subsidies.

Until 1990, the Gamarra cluster's development had been marked by the construction of shopping centers and the gradual growth of the cluster in terms of the number of firms and domestic sales. The cluster enjoyed a short period of improved business conditions during 1986–87, when the then president Alan Garcia applied protectionist, populist and demand-led growth policies. From 1990, however, the macroeconomic policy environment required that producers reduce their dependence on domestic markets and start competing with foreign competitors. Firms in the Gamarra cluster, for instance, have to compete with Los Angeles's garment cluster, which has grown into

“the biggest in the US, easily surpassing New York's (...). The city's clothes makers have developed a system of flexible production that allows them to respond to subtle changes in fashion faster than their Latin American competitors. They also have easy access to a squadron of trend-setting Californian designers” (*The Economist*, 9 August 1997, p. 19).

The challenge is thus to enhance quality, speed, flexibility, design and sensitivity to fashion requirements elsewhere, besides making products at low unit costs. The Peruvian clothing industry in general has not yet met these requirements.<sup>16</sup> A small part of this industry is internationally competitive, and a large group of firms have major problems competing with foreign producers. Firms in the Gamarra cluster generally belong to this last category: some clustered producers exported to countries other than Bolivia or Ecuador, none of them with success (Visser, 1996).

Meanwhile, apparel imports have been rising especially from 1994 onward.<sup>17</sup> This is also felt in the Gamarra cluster, where producers point at the increasing sales and trade in imported garments. These are relatively cheap, and despite the fact that imported garments do not use the superior Pyma or Tanguis cotton varieties (only produced in Peru), they are causing domestic firms to lose ground in their home countries.

(b) *Performance in a dynamic perspective*

The principal measure of performance is again the monthly average of gross sales per worker, this time for 1994. The group of clustered producers displays an erosion of sales of 9% in local currency, 17% in current US dollars (Table 4), and 27% after adjusting for inflation and the appreciation of the Peruvian Sol against the dollar.<sup>18</sup> This last figure best captures the worsening sales performance of clustered firms. In contrast to 1993, the gap in performance between clustered SMEs and the control group is no longer significant in 1994.

The improving sales performance of the control group is due to several factors. First of all, the 1993 sales average of the high-income group had been depressed by the then restructuring of medium-sized firms. These firms indeed tripled the value of sales-per-worker during 1993–94. The high standard deviation in the value of sales per worker in small firms in high-income areas in 1994 (Table 4, third column) suggests a second reason: some are doing relatively well. For example, one owner of a small firm takes charge of planning, coordination and marketing functions, while subcontracting all transformation operations. In 1994, he realized the highest sales average of all firms in the two subsamples: US\$3,645 per worker. Taking this firm out of the calculations (fourth column of Table 4), we obtain the more

Table 4. Average monthly gross sales per worker in 1994 by location (US dollars) <sup>a,b</sup>

Location	1993 sales (all firms)	1994 sales (all firms)	1994 sales <20 workers (incl. outlier)	1994 sales <20 workers (excl. outlier)
<i>Clustered</i>				
Gamarra (N = 24, 20, 19, 19)	1,148 (852)	950 (653)	837 (428)	837 (428)
<i>Dispersed</i>				
High-income areas (N = 30, 21, 18, 17)	510 (354)	834 (851)	702 (834)	529 (406)
<i>P</i> value	0.001	0.63	0.53	0.03

<sup>a</sup> Standard deviations are given between brackets. *N* = the number of firms in the subsample in the four columns respectively.

<sup>b</sup> Source: Survey February/March 1994 and September 1995.

familiar result that small firms in the cluster (employing less than 20 workers) perform better than dispersed producers in the control group. The gap in performance is statistically significant. Considering firms employing less than 15 workers, the picture is sharpest, with the sales-per-worker score being US\$824 (SD 437) in the cluster against US\$415 (SD 180) in high-income areas. The *P*-value is 0.003.

The figures in Table 4 are averages, which hide differences in the trend in sales performance between clustered firms. In fact, some producers doubled, tripled or even quadrupled their 1993 score, whereas others saw their sales faltering. Most clustered producers, however, reported increasing competitive pressure from new low-cost producers of both domestic and foreign origin. Traders demanded compensation from existing firms in the form of improved product quality and design. A few producers accordingly invested in new equipment. Most clustered producers took refuge in more routine responses to uphold sales. These included, in order of importance:

- (i) Purchasing one or more new sales outlets at a "hot" and thus expensive location within the cluster area (nearly 50% of clustered producers had acquired one or more establishments during the 18-month period);
- (ii) Undertaking time-intensive promotion trips to regional markets;
- (iii) Cutting costs and prices by firing personnel and/or stripping products of any decoration, relocating workshops in a cheaper location within unsafe areas just outside the cluster.

Dispersed producers barely invest in forward integration, nor in promotion trips to regional markets. They tried to cut down costs, but found it hard to do so. With sale prices falling, the profitability of their clothing business decreased. Some dispersed producers opted to exit, including some that were relatively successful. Only one medium-sized firm invested heavily in new technology with the goal to augment production capacity, productivity, flexibility and product quality, before starting to export to Latin American markets and beyond.

The above-mentioned responses of most clustered producers do not match the competitive challenge of improving product quality and design, and enhancing efficiency. Instead, purchasing new sales outlets implies that scarce financial resources are invested in "bricks and cement" (hardware), at the expense of improving technical, management and entrepreneurial skills (brainware) or internal and external organizational development (orgware). Undertaking journeys to the regional markets means that producers abandon their business for several weeks, implying high opportunity costs. This also indicates that clustered producers emphasize self-reliance instead of cooperation with specialized traders. Finally, cost-cutting responses lead to poverty: workers lose jobs, household incomes fall and children's access to schooling declines.

Empirically, there is no sign of the development of more cooperative linkages with specialized marketing agents, capable of finding and exploiting new markets. Clustered producers continue to rely on price-coordinated

transactions to acquire fabrics. There is no sign of a deepening division of labor in the cluster, although some producers contemplate the possibility of subcontracting the fashion and quality-intensive preparatory activities so as to improve quality or obtain novel designs. Yet, high transaction costs<sup>19</sup> and the still insufficiently coercive market environment prevents clustered producers from dividing work. Demand for specialized business services remains similarly sluggish in the cluster.<sup>20</sup> Only capacity contracting is increasingly used as a cost-saving mechanism at times of a seasonal downturn in demand. The control group's behavior is equally stable: subcontracting still involves a relatively large number of operations compared to the cluster, while it is still more common to find producers working on the basis of subcontracting.

With regard to horizontal cooperation involving a larger number of producers, 1995 was a special year. A total of five initiatives were recorded in the cluster. Case-study evidence shows that the cluster's potential to reduce Williamsonian transaction costs was helpful in establishing the task groups. With this surge in horizontal cooperation, Gamarra made up arrears with the control group. Evidently, this new development requires time to crystallize and produce effects. The question of whether it produces more active forms of collective efficiency requires additional research.

(c) *Strategic decision-making and innovation capabilities of clustered producers*

The responses to the worsening sales performance of clustered firms during 1993–94 suggest that producers do not turn to vertical cooperation at the level of the transformation and transacting processes. In the absence of this feature that made other clusters strong, the Gamarra cluster is unable to move in the direction of producing differentiated quality and fashion products. The task ahead is to analyze what prevents clustered firms, which had previously fared well in domestic markets, from responding more effectively to international competition.

We start out by observing that passive clustering advantages uphold the competitiveness of the cluster (see also Table 51217). The reduction of Coasian costs of transacting inputs and output at various levels of the supply chain may be important for small producers, but this type of clustering advantages is mostly helpful to outcompete domestic competitors, and not necessarily foreign firms. Besides lower factor prices, foreign firms also compete on the basis of technologies that lower unit costs, improve quality or enhance flexibility and innovation.

A second factor upholding the competitiveness of the cluster is the low cost and high velocity of exchanging information, including tacit knowledge and competence. Albeit important for small firms, the problem with this

Table 5. *Sources of competitive advantages of clustered producers*

Business process	Passive collective efficiency		Active collective efficiency
	Type of effect		
	Technological	Pecuniary	Learning & innovation
<i>Transformation</i>	Initial learning of basic technical and commercial techniques	Limited to finishing operations	Not observed
<i>Transacting</i>	Information at low costs and high speed. Negative features: – Outdated – Public – Limited relevance (Andean markets) – Local, insufficiently diverse (lock-in)	For producers and traders, in upstream and downstream transactions	Not observed
<i>Strategic decision-making</i>	Passive information advantages strengthen the local mental model of what it takes to successfully run a clothing business. Risk of 'entropic death'	Not applicable	Not observed

advantage is that the information spinning around is attainable to everyone, is embodied in competitor's products, and is often outdated or limited in geographical origin.

Another, more important argument is that over time local information spillovers result in clustered producers being "locked in" a local mental model of how to successfully operate a clothing business.<sup>21</sup> This model stood the test of time and a lot of hardship, and therefore merits some defense. It also however developed in a situation of insufficiently diverse sources of information, which hinders creativity (Visser, 1996, pp. 19–22). This is all the more true in the sense that information is acquired in incidental ways (for example, by copying), as this enhances the tacitness of knowledge and obstructs self-reflection and criticism. Camagni's risk of "entropic death" is thus applicable, and casts doubt over the direction of the future development of the cluster.

Curiosity is one way-out of a situation of lock-in, and may lead producers to find new ways to deal with crises. Lack of curiosity, however, is not the major problem of clustered producers. The missing inflow of external, initially alien views and data about events and trends in the worldwide clothing business is a major weakness. This is in turn due to:

- (i) The *underdevelopment of cooperative linkages* between producers and traders seeking complementary views and know-how and exchanging information in order to deal more effectively with the challenge to adapt innovations-in-progress to continuous change in product markets and technology;
- (ii) A *lack of external institutions* involved in the cluster's development (e.g., the municipality of La Victoria, banks, research institutes);
- (iii) The *absence of linkages with foreign agents*, particularly foreign traders and producers.

The lack of external data in the cluster's reference frame negatively influences the quality of strategic decision-making and the development of new competence (learning and innovation, see Table 5). While the Gamarra cluster served as an incubator of small businesses, it also allowed unimaginative firms to be kept alive. Low initial capital requirements for starting up a clothing business and rudimentary product differentiation appear to drive up the number of firms both in and outside the cluster, and foster

lateral competition based on cutting costs and prices. Under these circumstances, the profit rate falls, income depends on a higher production volume, and labor conditions are unlikely to improve.

Case-study evidence suggests that only producers who make the strategic decision (at the moment of starting up their business in the cluster) to draw only temporarily and selectively on the passive advantages of clustering, escape from this trap. Most producers, however, continue to rely entirely on passive advantages after making the one-time decision to locate in the cluster.

## 6. CONCLUSION

This paper reports on the type, magnitude and sustainability of competitive advantages arising from the clustering of SMEs in the clothing industry in Lima. A comparison of clustered firms with several control groups of dispersed producers operating elsewhere in the city of Lima yields the conclusion that clustering indeed makes a difference for SME competitiveness. In 1993, the sales performance of clustered firms was significantly superior compared with several control groups. Clustered firms do better especially in the smallest firm-size categories. Other performance indicators also point in the direction of a superior performance of clustered firms.

Analyzing the reasons behind the performance gap, the following clustering advantages have been identified:

- (a) Fast local diffusion of (tacit) knowledge and competence through direct observation of market trends and analysis of competitor's products. Technical and commercial information externalities reduce static uncertainty and increase the level of production efficiency and product flexibility. The main beneficiaries are garment producers.
- (b) Reductions in the price of a few intermediary products (especially finishing services), and in the costs of transacting inputs and output along the supply chain (including suppliers of inputs, garment producers and traders of output). Fierce competition means that cost savings translate into the lowest possible sale prices for traders and consumers.

Hence passive clustering advantages uphold the competitiveness of the Gamarra cluster. A

problem with local information spillovers, however, is that they accrue to everyone working in the cluster or (albeit with some delay) visiting the area, while the information spinning around is often outdated and of limited market relevance. A problem with cost advantages is that they are helpful to outcompete domestic competitors, but not necessarily foreign firms who often compete not only on the basis of lower factor prices but also through superior technology that lowers unit costs, improves quality or enhances flexibility.

Purposeful cooperative interactions among clustered producers are notably absent, both in production and transacting activities. This also implies that clustered producers do not maintain cooperative linkages beyond local borders, i.e. with external agents in the city, region, country or abroad. The principal problem with these weaknesses is that external information and experience are not assimilated. This has negative effects for the quality of strategic decision-making and innovative capacity of clustered firms.

This raises the question of how clustered producers cope with greater international competition. 1990 was a year of great changes in macroeconomic policies in Peru, marking the end of a long period during which domestic markets were largely closed to foreign competition. During 1993–94, clustered firms surveyed experienced an average sales erosion of 27%. By 1995, clustered small firms still display a significantly better sales performance than dispersed producers, but the difference has become smaller.

The growth prospects of the clustered producers seem to be impaired by a local and powerful mental model of how to run a cloth-

ing business. The evidence indicates that the transformation and transacting behavior of clustered producers continue to be characterized by self-reliance, individualism and quick but standard reactions—attitudes that have long been sponsored by the passive advantages of clustering. Clustered producers faced with the new situation tend to rely on proven, but outdated local business reflexes.

After the trade liberalization of 1990, the passive advantages of clustering seem to be losing strength and relevance. The Gamarra cluster grew in a setting of domestic markets that were permissive with regard to quality, demanding with respect to price, and spread across the largely inaccessible country. In the new context, however, clustered producers run the risk of being locked in a local mental model of best business practices that only stood the test of domestic competition, not of foreign influences and threats. While dispersed producers also have problems competing in an internationalizing market context, clustering may produce a problem by counteracting the much-needed renewal of best business practices. Clustered producers seem unable to make sense of new and alien market information in a setting where local information spillovers are limited in origin and diversity, and where cooperative interactions crossing the borders of local experience are little developed.

The risk of entropic death is thus real in the case of the Gamarra cluster. The growth prospects of clustered producers depend on the extent to which they manage to change the course of the local learning path. Until then, the gap between local competence and new market requirements continues to be wide.

## NOTES

1. For example, “technopoles” (Storper and Scott, 1992), “innovation networks” (Camagni, 1991; DeBreson and Amesse, 1991), “flexible specialization” (Piore and Sabel, 1984).
2. A subsector encompasses a branch of industry, suppliers of intermediate products, traders of material inputs, machines, equipment, components and output, as well as providers of business support services.
3. For a full description of the semi-closed questionnaire and survey methodology, see Visser (1996), pp. 243–254).
4. USAID and the Central Bank define SMEs as firms employing less than 50 workers, while the Ministry of Industry uses a threshold of 100 workers.
5. Entrepreneurs in the cluster however are not markedly different from the sample mean with regard to sex, education, age and ethnic background. This last is as diverse as it is for the sample, with three-quarters of the respondents reporting a birthplace in one of the Peruvian provinces.
6. The first-best solution is to collect data on the volume of production, taking into account:

(a) subcontracts and capacity contracting; (b) sales volumes by product type and size, assigning sale prices and discounts; and (c) unit costs of material inputs, (part-time and full-time) labor, depreciation, taxes, finance and other services. This would allow an analysis of performance based on estimates of net value-added, or on volume-productivity per worker. Small firms however, do not keep books. Hence, the collection of such data through a survey is difficult and the quality of data is likely to be poor. In past studies, this problem caused considerable nonsampling measurement errors (Liedholm, 1992).

7. For a review of the relevance of scale economies in the Peruvian clothing industry, see Visser (1996, pp. 100–112). This study takes into account the following stages in production: pre-assembly (design, fabric preparation, pattern making and cutting), assembly (materials handling, sewing, and specialized operations like fusing, overlock stitching, and plating/coating) and finishing activities (pressing, garment dyeing—washing, coloration or bleaching, buttonholing/fixing, printing and embroidery).

8. The good reputation of the cluster is in turn a result of the intergenerational experience of workers and producers in the cluster as a whole, thus producing a concentration of demand for apparel and textile products in Gamarra.

9. The difference between the cluster and the control groups is significant (Mann–Whitney,  $P=0.05$ ).

10. Data about the wage rate are preferable, but could not be collected for the same reasons as mentioned in the case of the monthly sales per worker.

11. Firm size also proved to be a significant variable explaining the value of monthly pay per worker (Visser, 1996, pp. 138–139).

12. This also implies that the relatively good sales performance of clustered firms in part spills over to real estate investors, including successful migrant-entrepreneurs in the neighborhood.

13. These findings are not unambiguous. For instance, the behavior of those firms in the control groups with relatively high scores raises the question of what type of subcontracting linkages they develop. Case-study evidence suggests that these are rather dependent subcontracting linkages, with remote workshops run by producers perceiving no other option than to keep on working for the contractor. This is barely possible in a setting of clustering, where producers usually have

alternative work opportunities. Next, a technological perspective is pertinent to any discussion on the extent of division of labor among firms and mutual subcontracting in a particular industry. The finding that firms in the cluster rarely subcontract more than one operation should be considered in the light of the most likely configuration of the external organization of small-scale clothing in Peru (Visser, 1996, pp. 108–109) and the limited prospects of mechanization of the clothing process (and hence the similarly limited role of indivisibility of investments).

14. This section is also based on empirical work done in September and October 1994. Some of the data were collected in a separate survey, undertaken by Mieke Labots and Rosa Morales under my guidance.

15. It is common practice in the cluster to purchase and disassemble competitor's products, analyzing and assimilating the strong points. Sometimes, this boils down to straightforward copying of goods, especially with regard to the model. Most producers lack formal technical knowledge of pattern making, standard sizes, and other basic clothing skills, hence the products of competitors are their technical guide. Designers are rarely hired, while producers only sometimes attend a training course. It is more common to see them walking around the neighborhood, scanning fashion trends and the market penetration of new products. If a novelty appears to sell well, it is purchased and copied.

16. Peru is not an important player in the world textiles and clothing market. Its share in world trade has been in a downward trend since 1978 and oscillates around 0.10%. Garment exports may have been on the rise from US\$14.6 million in 1983 to US\$172 million in 1994, but so has the denominator—the value of world trade in apparel products. Next, 15 large firms account for the bulk of garment exports (Visser, 1996, pp. 91–92).

17. The trade liberalization program carried out since 1990 produced delayed effects in terms of rising imports. Negative growth and decreasing purchasing power during 1990–92 can be held responsible for this. The first year of solid economic growth (5.9%) was 1993. Growth accelerated up to 12.8% in 1994, returning to a more moderate 6.9% in 1995. Under these macroeconomic circumstances, imports also started to rise (Visser, 1996, pp. 103–104).

18. For 1993, the exchange rate used was 1.90 Soles for one US dollar; in 1994, it had risen to 2.10 Soles per US dollar. Furthermore, inflation during the 18-month period is estimated to be 25%.



19. The risks of a poor quality of the services and of counterfeiting and robbery are especially susceptible to improvement.
20. The only service regularly outsourced is bookkeeping and accounting, albeit that only about one-third of total turnover is registered in this way. In both samples, only one producer reports hiring a marketing specialist during the past two years. Three firms in Gamarra had obtained advice on new equipment, against one in the control group. Assistance in enhancing technical efficiency or the design of goods was given only once to a firm in Gamarra and twice in the control group.
21. This model comprises relying on local spillovers of information and know-how as well as price-coordinated (market) linkages with traders; a preference for technically simple mass products (T-shirts, track-suits, underwear); forward integration (the purchase of more sales outlets in the cluster area, and the construction of shopping centers in cooperation with other producers); vertical integration (the expansion of sewing capacity beyond the point necessary to satisfy the minimum demand for garments, and the integration of preparatory, assembly and finishing activities); and the use of kinship ties in case there is a need to cooperate (avoidance of contacts with third parties). Self-reliance and individualism are key words in describing this mental model.

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## APPENDIX A

For the Gamarra cluster, the following theoretically plausible firm-specific variables do not significantly contribute to an explanation of sales performance: the employment size (a) and age (b) of firms; the extent to

which they involve in capacity contracting (c) and in subcontracting (d); and the degree of market diversification (e) measured by the share of total production of the two principal product lines sold outside Lima. A few other firm-specific variables were significant however:

(i) An increase in the monthly pay per worker (*W*) enhances productivity. Theoretically, there are two ways to explain this result. High wages induce substitution of capital for labor and enhance labor productivity, which is then rewarded accordingly. Alternatively, high wages reflect enhanced labor skills (and perhaps a longer standard working day). The first option is not likely in the light of limited prospects for mechanization in the clothing industry. The second is more feasible;

(ii) A rise in sales to rural and regional markets outside Lima (*MD1*) reduces the monthly average of gross sales per worker, and vice versa. These apparently are low-end market segments;

(iii) The positive influence of a proxy for capital intensity, i.e., the number of machines per worker (*CAP*) is also significant.

Three dummies were used to measure location effects (low-income areas: *D1*; high-income areas: *D2*; and La Victoria/*EG*: *D3*). The reference location is the Gamarra cluster. Hence the coefficients of the dummy variables give estimates of the change in productivity due to the location of firms in the respective areas. The dummies are significant for all three locations.

Another possibility is that location effects do not occur through a change in the constant of the equation, but by a change in the coefficient of one of the explanatory variables. This measures interaction effects between two explanatory variables, which on their own need not be significant. Several tests were carried out with

the combination of the degree of forward integration and firm-size. In Gamarra however, there is a lack of variance with respect to the forward integration because all firms in the cluster have a sales outlet. This complicates the use of slope dummies to measure interaction effects between location and forward integration. By contrast, the slope dummy proved to be significant for low-income areas (*DSIZE<sub>low-income</sub>*). In the following regression, the dependent variable is the average monthly gross sales per worker (*GS*):

$$GS = 1014 + 2.26 W + 386 CAP - 7.26 MD1 + 187 DSIZE_{low-income} - 2334 D1 - 1447 D2 - 1263 D3.$$

<i>t</i>	(2.97)	(4.34)	(1.78)	(-1.96)
<i>P</i>	*	*	0.09	0.07
<i>t</i>	(4.13)	(-5.11)	(-4.25)	(-3.81)
<i>P</i>	*	*	*	*

*F* = 8.46 with a *P* of \* (which means that *P* < 0.01).

The adjusted *R*<sup>2</sup> is 0.69, indicating that the above equation accounts for 69% of the variance of the dependent variable. This is considerable, taking into account that entrepreneurial talent and personal attributes also contribute to business performance.