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Enterprise clusters in developing countries: mechanisms of transition and stagnation

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This paper analyses the dynamics of clustered enterprise development in developing countries. It is focused on the different types of clusters that can be identified in these contexts. After a brief introduction, the cluster concept is explained and the need to understand clusters as an expression of social connectivity rather than mere spatial agglomerations is established. Next, a typology of clusters is presented. This typology is discussed on the basis of recent research on small and medium-sized enterprise clusters in different countries and continents. The types of linkages prevailing in different types of clusters are analysed, as well as their implications for technological change. It is argued that the mechanisms of enterprise growth and innovative activity are different in each type of cluster and hence the opportunity structures that entrepreneurs face are variable across cluster types. Therefore, the mechanisms of transition from one type to another are different, and these are discussed next, as well as mechanisms of stagnation and continuity. In conclusion, the implications for development research and policy are outlined and it is emphasized that support must be tailored to the actual state of existing clusters and cannot be deduced from general theory.

Keywords: clusters; developing countries; networks; innovation; growth.

1. Introduction: enterprise clusters in developing countries

In this paper we discuss clusters of small and medium-sized enterprises in the South and their performance, locating ourselves clearly within the development discourse. It is now generally acknowledged that clustering of enterprises can contribute to regional and urban economic growth in developing countries, or what is commonly called *the South*. They can in particular facilitate private sector development among broad strata of the population, resulting in more employment, higher incomes and more generally, dynamic development in the concerned regions or cities. However, the countries of the South present the scholar with many and varied social environments. Clusters in say Northern Italy and Southern Sweden are obviously not identical. However, they operate at roughly the same levels of technological sophistication, worker qualifications and management competence. In contrast, clusters in the South and individual enterprises within each cluster diverge widely from each other on these and other relevant variables. The phenomena in the South which have been subsumed under the cluster concept range, for instance, from temporary gatherings of hand-tool wield-

ing carpenters in ramshackle sheds around rural marketplaces (Rasmussen 1992, Sverrisson 1992) to the vigorous agglomerations of information technology outlets found in Chinese cities counting millions of inhabitants (van Dijk 2002). Thus, types of clusters that came into being successively in the heartlands of industrial capitalism are found side-by-side in developing countries and enterprises held to be typical of modern industrial districts are found next door to enterprises that remind us of the putting-out systems of the European past.

It is necessary to distinguish more systematically between the different cluster types that can be found in developing countries otherwise confusion will prevail. As a first step towards a cluster concept that is more adequate to the study of development processes we present and explicate a typology of clusters, derived from studies conducted in such countries. We then pose the question of how cluster formation can be facilitated and enterprise growth and development within clusters enhanced in these particular contexts.

2. Networks and clusters in different contexts

Research on clusters and networks in the South as well as policy proposals aiming at facilitating their development during the 1990s have been influenced by the flexible specialization theory (Piore and Sabel 1984, Sabel and Zeitlin 1997) and studies of industrial districts (Pyke *et al.* 1990). This paper is no exception, and the cluster concept presented here presents an attempt to retain and improve elements of these theories which have been shown to be relevant and useful in the many case studies in developing countries that these approaches have inspired. In this effort we also draw on what has been called the New Institutional Economics and Advances in Economic Sociology (Smelser and Swedberg 1994).

2.1 Theories and definitions

In the ideal cluster, according to Pyke and Sengenberger (1992), economies of scale and scope are achieved that are similar to those enjoyed by large-scale corporations. Ideally, a cluster facilitates an inter-firm division of labour and vertical specialization of individual firms. Usually, local institutions play an important role and relationships of competition and co-operation develop between the enterprises in the cluster, and such clusters of enterprises or small firm communities also facilitate exchange of ideas. Physical nearness also makes the development of institutions and their interventions easier (Morrisson *et al.* 1994). Hence, clusters are seen to be operative both at the level of economic transactions and in the exchange of ideas and diffusion of business and technical knowledge.

Clustering of enterprises is commonly held to mean that enterprises are physically close to each other and that this proximity creates opportunities for collaboration, other externalities, etc. However, this colloquial use of the term is somewhat problematic. Exactly how proximate firms need to be in order to constitute a cluster depends, for instance, on the context. In the literature we find clusters that are identified with quite specific locations within cities, such as the Timber Market in Accra (Sverrisson 1997), the Gamarra cluster in Lima (Visser 1997, 2000) and the tile-making cluster analysed by Sandee and Rietveld (2000). In other cases, clusters

are coterminous with a branch of industry within a town, e.g. building (Rasmussen 1992), furniture making (Sverrisson 1990, 1992), shoe-making (Rabellotti 1994, Knorrninga 1995), although sub-agglomerations of similar activities can be found in the cities concerned. Some studies even have a regional focus (Schmitz 1996, Meyer-Stamer 2000). Hence, we must conclude that the spatial connotations of the cluster concept are rather ambiguous.

An alternative approach is to define clusters as features of social network topographies. If the economy is seen as a complicated network of economic and other transactions, clusters can be seen as the parts of this network where connections are particularly dense *and* economic transactions are overlaid by (or embedded in) other types of relationships (Granovetter 1993, 1995, Johannisson *et al.* 1994). Physical proximity is only one among possible relationships, others being, for example, technological co-operation, long-term subcontracting, common ethnic, linguistic, class, caste, tribal, school, etc., background, that is, social proximity, or shared educational characteristics and modes of constructing knowledge (as among scientists), division of labour, etc. There are for instance software development clusters that are manifested mainly on the internet. The spatial connotations some writers attach to the concept are therefore somewhat unfortunate.³

This leads to the following approximation of a definition: clusters are relatively dense networks of enterprises and organizations, the value chains of which are connected but not necessarily through what we usually understand by economic transactions (cf. Steiner 1998). In the following, we explore the implications of this definition for the study of economic development in the South, on the basis of a large number of case studies.⁴

2.2 *Main empirical characteristics*

The results of different case studies cannot always be compared in a straightforward manner, both because they use different definitions and because the clusters studied are different. In table 1 we summarize the defining characteristics of clusters that can be found in the literature. In empirical research, one is unlikely to detect all features in each case, and definitely not all of them at once. We would argue, however, that the presence of the first six criteria provides good grounds to assume that a cluster exists and that the operations of the enterprises are significantly shaped by this circumstance. The presence or absence of these characteristics can be ascertained with a moderate effort, at the outset of any fieldwork. The first three are directly observable and can be established by simply visiting the presumed cluster. The next three characteristics can be identified through a small number of company visits and preliminary discussions with their proprietors and managers, and these features, moreover, can be seen as defining whether we are dealing with a cluster or not. The other characteristics listed in table 1 (i.e. 7–20) are theory-dependent to a larger extent and more demanding in terms of empirical research; we will return to them throughout this paper.

The cluster concept has been defined in multiple ways by researchers and therefore they also tend to come up with a different selection of characteristics, according to the premise that you find what you are looking for. The formulation of a coherent theory concerning the importance of clustering for the competitiveness and development of small enterprises in developing countries therefore requires us to consider the interrelationship of these criteria. However, because the literature consists of a large

Table 1. Defining characteristics of clusters proposed in the literature.*Directly observable characteristics*

1. Relative spatial proximity (or nearness) of the enterprises¹²
2. A high density of economic activities generally¹³
3. Presence of numerous firms involved in same, similar, and subsidiary activities¹⁴

Foundational and universal characteristics

4. Inter-firm linkages between enterprises as a result of (vertical) subcontracting¹⁵
5. Inter-firm linkages between enterprises in specific forms of (horizontal) co-operation¹⁶
6. Some degree of specialization¹⁷

Theoretically constructed characteristics

7. A joint social history (i.e. migration processes)¹⁸
8. Mutual and collective learning processes¹⁹
9. Social networks that are not embedded in transactions among producers or traders²⁰
10. External economies resulting from linkages and networks²¹
11. A role for local and traditional institutions²²
12. A role for municipal and regional governments²³
13. Shared cultural background²⁴
14. Favourable and supportive institutional environment²⁵
15. Circumstances favourable to the generation of trust between business partners²⁶
16. Generalized atmosphere of trust and absence of or limits to opportunism²⁷
17. Similar levels of technical sophistication²⁸
18. Widespread local product imitation²⁹
19. Common labour pool³⁰
20. Shared technical competence pool³¹

number of case studies and a few review papers, it does not provide sufficient basis for systematic empirical comparison and conclusions about such interrelationships. Indeed, it is possible that the relevance of theoretical models is a variable itself, i.e. that for example trust may be important in some cases but irrelevant in others, and that technological dynamism is sometimes central, sometimes peripheral in comparison with, for example, local and global markets.

2.3 *Baseline findings from the literature*

However, in spite of this variability, two general findings stand out which should be underlined from the outset, namely that one can find clusters everywhere, and they form ‘spontaneously’. This phenomenon has been observed in many parts of the world throughout history and it is therefore neither a specifically ‘Southern’ nor ‘modern’ phenomenon.⁵ From this follows that in order to understand what happens in clusters in the South today it is useful to know what has happened in clusters elsewhere and earlier. However, attempts to transfer and impose ‘models’ are as unlikely to succeed in this case as in others.

The main point, however, is that support to clustering *per se* is not called for, except in a few local cases, perhaps, and research needs to be formulated accordingly. The issue is not whether clusters exist (they manifestly do) or whether they somehow influence enterprise operation (this has been shown convincingly in a large number of cases). The issue is rather if all clusters can be subsumed under the same category, and how they *specifically* impact both enterprise development and economic development. Thus, clusters are an intermediate level between the enterprise level on the one hand and regional and national economies on the other hand (Johannisson *et al.*

1994). In the South they shape in particular what we have elsewhere called *local economies* (Sverrisson and van Dijk 2000). However, they can also be embedded in global production chains and they are generally traversed by input and output linkages the scope of which can be strictly local, regional, national or global. Hence, while focusing on clusters and clustering it is important not to lose sight of the multifarious connections clusters have with economic activities elsewhere.

An additional, well-established result is that collaborative networks coagulate within clusters.⁶ Small enterprises do, for example, help each other with large orders (Sverrisson 1990, Sandee and Rietveld 2000), produce components for one another (Knorringa 1994, Sverrisson 1997), share the use of machinery (Sverrisson 1994a), share technical information (Meyer-Stamer 2000) and attempt collaborative marketing (Visser 2000). However, in most clusters such collaborative networks do not include everyone to the same degree, and they should in particular not be interpreted as manifestations of trust or similar subjective attitudes if these cannot be observed independently (cf. Knorringa 1995, Bagachwa 1997, Trulsson 1997). Further, within clusters one can often observe more or less developed forms of vertical integration meshed in otherwise collaborative relations (Sverrisson 1993, Scranton 1997). In yet other cases, vertical integration is the prevalent form of production organization, and horizontal connections or linkages in the cluster are rather found at other levels (Rabellotti 1997a, Pedersen 1997b, Meyer-Stamer 2000), although in some cases vertical integration and flexible small-scale production are united in a single production system (Takeuchi 1991, Cho 1994).

Further, competitive pressures or social cleavages can sometimes create an atmosphere in which both horizontal linkages, collaboration and information sharing are severely curtailed (Sverrisson 1992, 2002, Knorringa 1994, McCormick 1997), and global forces sometimes shape developments within clusters decisively, including the forms of networking (Pedersen 1994, Knorringa 1995, Bagella and Pietrobelli 1997, Meyer-Stamer 2000). Hence, the observation that firms are located close to each other does not necessarily imply that firms collaborate in any concrete sense of the word nor that this is the main source of economic dynamism (or catastrophe).⁷

Hence, it is *essential* that the cluster concept is operationalized in network terms. It is sometimes impossible to do this rigorously, particularly in secondary analysis, but qualitative consideration of social connectivity and network structures is far superior to simple concepts based on unfounded assumptions about the implications of spatial distributions.

3. A typology of networked clusters

It follows from the review above that there is no single type of cluster, and looking for the paradigmatic cluster is likely to be counterproductive. However, it is necessary to reduce the plethora of case studies that have been (and will be) produced to manageable proportions, and the typology of networked manufacturing clusters presented in table 2 is designed to accomplish this. It is based on a large number of case studies published in anthologies, journals and in Ph.D. theses during the last 10 years or so, which are referred to individually as we explain different parts of the typology.⁸ It represents an attempt to bring together the results of these studies in order to generate general propositions about clusters in the South, and about how transitions from one type to another are effected in the development process. The typology suggests, in

Table 2. A dynamic typology of manufacturing clusters and their evolution.

<i>Type or stage</i>	<i>Observable indicator</i>	<i>Main observed benefit</i>	<i>Technical dynamic</i>
Location	Proximity of firms	Information exchange	Imitation
Local market	Many similar activities	Easy access/competition	Product development
Local network	Division of labour	Specialization	Complementarities
Innovative	Local novelties	Adapting (e.g. materials)	Reverse engineering
Industrial district	Formal co-operation increased	Collective competition	Collective innovation

other words, foci for future research about clusters in different parts of the world in widely divergent social and economic environments.

Different cluster types are listed in the first column of table 2. For each type of cluster, it is indicated in the second column what is the main observable indicator of each type. The main observed benefits are summarized in the third column. The fourth column names the technical dynamic found in each type according to the available case studies.

The typology outlined in table 2 implies an evolutionary sequence. Clusters can develop from one type to the next. However, the types, as presented here are not exclusive and completely distinct, but rather nested, that is, 'lower' types of cluster mechanisms tend to exist on the fringes of 'higher' types and *vice versa*; companies and company groups which operate according to 'higher' types will often find themselves immersed in an environment in which 'lower' type operations prevail. Hence, the issue is not so much how to get *from* a 'low' type *to* a 'higher' type, as how to generate a 'high' type *from within* a 'low' type (Sverrisson 1993, Sandee 1995). As a consequence, the typology should be interpreted analytically rather than descriptively.

It can be argued that the distinctions between the stages identified in the typology imply differences of variable size and importance, and it can be argued that it is easier for location clusters to become local market clusters than for the latter to become local network clusters, for instance. This issue is addressed below.⁹

3.1 Location clusters

The first row of the table shows the location type of cluster, observationally indicated by the proximity of firms (indeed, sharing premises is common) in which the main observable benefit is the easy exchange of information that flows from cramped conditions, closeness, working outside, etc. The archetypal 'informal sector' or 'bazaar' area represents this cluster type. The main technological dynamic in this type of cluster is imitation, mainly product imitation (King and Aboudha 1991). Visser (1996) also mentions the diffusion of a range of still-tacit competence through direct observation: new ideas easily become public on a local scale. He mentions the importance of a two-way interaction between the local milieu and entrepreneurial strategies: entrepreneurs may well benefit from spills of collective information, knowledge and know-how, but can also enrich the local milieu with new experiences.

Small enterprises working in such clusters sometimes do better than those operating in isolated locations (Visser 1996, Klapwijk 1997). Through easy access to information they gain what they lose through excessive proximity to others. In a study made in

Accra, many of the entrepreneurs interviewed were ready to move to a location identified by local government for the concentration of metal-related trades. They expected a number of advantages from being there, together with other entrepreneurs, particularly the rapid dissemination of information, so this advantage is well known to local entrepreneurs (Van Dijk 1998, cf. Morrisson *et al.* 1996). For this type of cluster the only requirements are space and a minimal infrastructure (van Dijk 1996). Most of them are located by major roads or in other strategic locations, for example on the way traversed by workers between their home and places of work (Sverrisson 1992, Sandee 1995).

Although examples of this type of cluster can be found, it may not be so common on the ground. Many actual 'informal' clusters turn out to belong to some of the more developed types discussed below, when they are studied more closely, particularly clusters in urban areas. Indeed, from the available literature, it appears that this initial stage is exceedingly rare today in urban agglomerations although historical examples can be found in trade posts, bazaars and local markets of old. However, small rural clusters of this kind can be observed throughout Africa, in which a few workshops are struggling to maintain a local base (Sverrisson 1990, 1992, Pedersen 1997a). In addition, this basic type of cluster is a useful analytical construct, the primary utility of which is to detach the spatial aspects of clustering from other issues, but it should not be taken as 'typical' by virtue of heading the list. When the authorities move enterprises physically closer, for example through zoning regulations, this can, however, be the first step in a clustering process. In poverty stricken rural areas and small towns, clustering may never move beyond this stage.

3.2 *Local market clusters*

The next type presented in table 2 is the local market cluster, which appears in the second row. The presence of this type of cluster is indicated by the (relative) proximity of many *similar* activities and outlets, which cater mostly for similar customers. This type of cluster is very common, and typically, informal sector areas in large towns and cities are agglomerations of local market clusters. A good example of this is the Timber Market in Accra, where a variety of activities are found, but similar activities tend to be located close to each other (Sverrisson 1997).

The main benefit, and the reason to establish oneself in the cluster, is easy access by customers (Sverrisson 1997, van Dijk 1998, Visser 2000). Customers will arrive, because they can find many similar wares on offer, be able to compare them and so on. Suppliers will locate themselves nearby, because they are assured of outlets. In the South, merchants and other large-scale buyers are in particular likely to seek out a cluster rather than scattered individual firms, given the alternative. Hence, this type of cluster is highly effective for the development of new marketing opportunities, as shown by Sandee and Rietveld (2000).

Owing to the similarity of activities gathered within this type of cluster (which can be a sub-cluster within a cluster of the first type) competition is intense. As a result, individual entrepreneurs deploy a variety of strategies in order to stand out and attract the attention of customers, including product development, relative to others in the cluster, niche strategies and variations of the universal art of salesmanship. Access to information remains easy in this type of cluster, however, and product development is therefore often followed quickly by diffusion through imitation, and

a development dynamic, if somewhat limited, results (cf. Sverrisson 1990, 1992, King and Aboudha 1991, Visser 1996). It can be surmised that this somewhat reduces the ‘first-comer-profit’ (Schumpeter 1934). The often-excessive time spent on unsuccessful negotiations with customers also increases transaction costs relative to a local monopoly situation (Sverrisson 1993). Both these disadvantages are seemingly outweighed in many instances by the increase in volumes obtained in clusters – indeed, firms in out of the way locations risk getting no customers at all. However, in Accra, for example, carpenters may choose to locate away from the main cluster in the Timber Market, in or close to suburban shopping centres, for example, where they can expose their wares to customers on a daily basis.

Industrial estates, handicraft zones and municipal markets are ‘formal’ clusters, in which small enterprises are brought together, which have the potential to develop into local market clusters as interaction is structured and proprietors of similar firms move closer to each other. Directing support to clusters in the form of credit and technical assistance can also encourage the process of cluster formation (Klapwijk 1997: 24). Poot and Kyuvenhoven (1990: 194) also point to the fact that clustered enterprises in Indonesia are usually oriented to a market outside their own community, which contributes to their success. Sandee (1995) also stresses the role of traders in the networks he studied. Visser (1996) observes that low costs of search and matching for buyers mingle with internal economies of scale and scope accruing to sellers of products in the textile cluster he studied in Lima, Peru. All these studies testify to the central importance of the customer/producer nexus in this type of cluster.

This is probably the most common type of cluster in the South. To the mechanisms based on spatial proximity and easy information flows that characterize the first type of cluster this type adds mechanisms based on the facilitation of commercial transactions. Hence, the potential for reaching customers including those coming from other locations, for example, rural buyers visiting town, or merchants from town who buy products in rural areas or small towns for resale in larger towns (cf. also Pedersen 1997a).

3.3 *Local network clusters*

In the third row, we find local network clusters. They are characterized by at least a rudimentary division of labour among enterprises. The main benefits here are those associated with specialization, with firms focusing on one or a few activities within a larger production chain, e.g. shoe soles (Knorringa 1995) or turned table legs (Sverrisson 1997). Schmitz (1989) has maintained that greater economic efficiency is associated with specialization, and this idea has been fleshed out further in his later writings about ‘collective efficiency’.

The technological dynamism behind the phenomena observed as specialization at the firm level is at the cluster level characterized by the development of complementary activities within a networked cluster (Sverrisson 1994b). Apart from niches based on particular steps in the production process, various specialized services such as, for example, transport enterprises, and in more advanced forms, accounting services, also find a fertile ground here: clusters provide such services with easy access to adequate numbers of customers.

The elementary division of labour in local network clusters also creates opportunities for elementary forms of mechanization. This opening of the opportunity

structure can take three different forms. The first form is that the entire production process is divided among small firms, as among the small enterprises in the Agra cluster studied by Knorringa (1995). In this cluster, the networked small firms catered for the low end of the market, and manually powered machines were common. The second form is specialization of a few moments in a production process directly coupled to the diffusion of electrical machinery, within clusters of firms most of which cover several or even all steps in the process. Thus in the carpentry clusters studied in East Africa by Sverrisson (1993) specialization was closely related to mechanization: some carpenters would acquire machines, and then rent the use of them or provide services such as sawing, turning and planing. This results in the diffusion of the benefits of mechanization rather than diffusion of the machines *per se*. The third form implies a reorientation of the cluster towards machinery introduced by one or more operators, as in the case studied by Sandee (1995). In this case, the introduction of electrically powered clay mixers into an otherwise traditional process created new network constellations, rather than just amplifying old ones. The proprietors of clay mixers became leading entrepreneurs in the tile cluster, and their activities stimulated incremental improvements in other parts of the process, eventually facilitating the mechanization of tile pressing (cf. Sverrisson 1994b, Scranton 1997).

However, imitation is usually rife and local information access is easy in clusters where this dynamic has started to appear. Hence, mechanical production rarely constitutes a monopoly, even initially, in the sense suggested by Schumpeter (1934). Rather, power machinery tends to remain exceptional because others than the proprietors can reap the benefits through a variety of transaction forms. Such transactions can be facilitated by generalized trust as suggested by Knorringa (1995) or kinship ties (Sandee 1995). However, in other cases, trust-based relations are not much in evidence, for example, among the furniture manufacturers in Accra, Mutare and Nakuru studied by Sverrisson (1990, 1992, 1993). Cash and carry transactions were the rule in these cases and credit was rare, while partial advance payment was often asked for.

Another important aspect of this type of technological dynamic is the character of local competence pools (cf. Marshall 1920). Thus, among the carpenters studied by Sverrisson, more craftsmen were able to handle power machinery than those who had access to it on a daily basis. They had learned through occasional use or elsewhere (e.g. in large furniture factories). In the shoemaking cluster studied by Knorringa the reproduction of skill and competence was intrinsically related to the caste system. Innovation that calls for redrawing of caste boundaries is problematic in such contexts and this circumscribes the suitable forms of mechanization. More generally, resilient social forms, ownership traditions, family norms, class boundaries and ethnic divisions can both facilitate and hinder innovation processes, depending on the context (Sverrisson 2002).

3.4 Innovative clusters

The fourth type, innovative clusters, is shown in the fourth row. They produce locally developed novelties, which can be 'exported' or imitated elsewhere, and which are based on the application of known techniques to, for example, locally available materials or the local competence situation. This is achieved mainly

through the process known as reverse engineering, an advanced and explicit form of imitative adaptation coupled to local product development and the splitting up of processes to develop flexible production systems. Research on Japanese industrial development has provided many examples of this phenomenon, as has research in Korea, India and Latin America (Yamazaki 1981, Jacobsson 1991, Takeuchi 1991, Cho 1994).

However, similar phenomena can be found elsewhere. For instance, van Dijk (1998) describes local entrepreneurs in Accra who make aluminium moulds used in the local production of household utensils, as well as components for block-making machines, car parts, gas cookers and gas containers for welders (carbide pots). Such entrepreneurs also make carpenter's tools, spraying machines, bolts and nuts (Sverrisson 1997). Similar phenomena have been observed in Kenya and Zimbabwe as well (Sverrisson 1992, Halimana and Sverrisson 2000). This suggests that the evolution of local light engineering industries is a key to the appearance of innovative clusters.

The innovative edge that is gained as a result of such developments can be turned into a competitive advance *vis-à-vis* other clusters elsewhere and, therefore, it becomes possible to sell the products in other locations or regions and, sometimes, even in other countries. At this point, therefore, merchants and marketing agents, who have been accorded a small role in the previous types, become key elements (cf. Schmitz 1996, Nadvi 1997, Pedersen 1997a, as well as Meyer-Stamer 2000, Sandee and Rietveld 2000).

Relations with markets elsewhere usually introduce a different set of quality criteria, which can be instrumental in the evolution of the cluster. Thus Das (1996a,b) observes that entrepreneurial concern for quality led to adoption and assimilation of improved technology and closer supervision of textile production in Ahmedabad. Sandee and Rietveld (2000) also found, in their study of cooking utensil producers in Java, that production for external markets was organized under tightly controlled factory-like forms, whereas locally-destined production remained in the hands of independent producers. In Sverrisson's (1992) study of carpenters in Kenya, the opposite picture prevailed: local carpenters faced competition from organized and more sophisticated establishments elsewhere. However, in that case as well as the cases studied by Sandee (1995) and Knorringa (1995), producing for distant markets implies catering for higher-income market segments. Thus, when the more sophisticated producers 'export' they are likely to encounter consumers different from and more demanding than those at home. In large cities, however, markets are segmented locally as well (Halimana and Sverrisson 2000).

Briefly, the innovation clusters can be seen as the first step in industrialization, whereas the earlier types are pre-industrial. It is striking that the general introduction of power tools and machinery, and the development of local light-engineering enterprises which can build and maintain such machinery on a regular basis, is commonly linked to evolution of the opportunity structure in the form of access to higher-income segments and often participation in government tenders or other public purchasing activities.

3.5 *Industrial districts*

The fifth type of district is what can be called a fully-fledged industrial district, in which enterprises with related or similar products have developed strong relations,

which facilitate innovation and contribute to higher efficiency. Such districts are not all that common in developing countries and are represented by only a few putative examples in the case material from the South that is summarized in this paper (Schmitz 1996, Rabellotti 1997b, Meyer-Stamer 2000). However, it is important in our view to include this type of cluster in the discussion because indications are that they will become more common, as and if current cluster formations continue to develop.

In industrial districts, co-operation is increasingly formalized, and focused on competence infrastructure, physical infrastructure, joint marketing efforts, quality control schemes and other similar tasks. The cluster becomes an explicit and identifiable community, sometimes in the form of some kind of association, with a logo, a president, and so on, which organizes collective competition with producers elsewhere. Further, collective innovation (i.e. the normal form) clearly prevails over individualized adoption (cf. Allen 1983, who uses the term collective invention, and Scranton 1997). Sharing of information is achieved through both formal and informal mechanisms and trust-based relations can be important. Hence, easy access to information, imitation, local product development, complementarities and reverse engineering are still moments in the life of the cluster, but now they are utilized for competition with other clusters rather than within the cluster.

Examples of industrial districts have been studied in, *inter alia*, Sweden, Germany, Italy and even India. However, as we discussed above, the study of industrial districts poses difficult empirical problems, because of the large number of variables somehow held to be involved, which both pertain to the history of the cluster – industrial districts often arise in regions with long traditions in craft production (Johannisson *et al.* 1994) – and its present state. The concept also stresses socio-cultural factors, such as a homogeneous or common value system, which sustain mutual trust and reciprocity between the actors. Hence, in addition to everything already discussed, the formation of a fully-fledged industrial district seems currently to rest on three conditions, namely:

- a conducive socio-cultural milieu, facilitating mutual recognition and trust,
- traders and other marketing agents function as structuring agents within the cluster, and
- effective local government (handling zoning and utilities, etc.).

These conditions are not always fulfilled, only expected, which makes the conventional industrial district concept somewhat normative. A variety of agglomerations tend to be viewed as industrial districts *in spe*, rather than being analysed on their own terms or, as we have attempted above, by focusing on different dynamics occurring at different stages of development.

One consequence of the normative strain in the industrial district/cluster discourse is that the general characteristics of any cluster are highlighted in a large number of studies (proximity, general networking, local cultures and common backgrounds). These next-to-universal characteristics apparently work themselves out in similar ways in many different times and places; however, they cannot explain the obvious differences that obtain between clusters in terms of technological sophistication, competitiveness and wealth.

4. Mechanisms of cluster development

Recapitulating, five types of clusters were presented above. The first was predicated on information sharing and proximity, the second was based on the facilitation of transactions and reduction of transaction cost or time expenditure, the third type embodied the initial stages of specialization, the fourth introduced local innovation and the fifth type is characterized by the evolution of an institutional structure supporting co-operation, innovation and marketing.

These different types are all analytical constructs but based on existing empirical research. They are, in other words, empirical generalizations. Above, we have highlighted the circumstances that account for differences between cluster types, but focused less on aspects which apparently can be found in all cluster types, such as the importance of common cultural background, ethnic or tribal origins, trust based on such phenomena or the presence of generalized social norms. Further, networking, found in all types of clusters, has been specified as to the actual content of observed linkages: information sharing and product imitation, commercial transactions, specialization and shared production, innovation diffusion and, finally, institutionalized co-operation. Further, it was noted at the outset but cannot be emphasized too much, that the different types are nested: the particular characteristics discussed here as belonging to a 'lower' or earlier type of cluster are retained and metamorphosed in 'higher' or later cluster forms.

It is possible to distinguish four types of transition mechanisms within clusters, namely mechanisms of regression to lower or earlier stages, mechanisms of development to higher or later stages, mechanisms of growth, retaining the main character of the cluster and mechanisms of decline, also retaining the general character of the cluster.

Growth and decline are highly dependent on external circumstances. Thus, for example, migration can swell the ranks of craftsmen and local traders in a cluster, and create a market for their products as well (Pedersen 2000). Import liberalization and competition from producers in other countries can lead to lower growth and even contraction of production volumes, as well as a movement from production to trade (Sverrisson 1997, Visser 2000). Difficulties in export production can create opportunities for local producers, due to the consequent lack of foreign exchange, but it can also create severe problems for producers who are dependent on imported inputs.

Generally, small enterprise clusters in the South adjust quite flexibly to such events, but within the prevailing paradigm of production and trade, and the 'mental model' in which it is embodied (Visser 2000). As a result, output in particular clusters fluctuates as well as the number of enterprises, the number of persons they employ and the incomes of their proprietors. During hard times, a variety of survival strategies are employed, and during good times, quantitative growth can be readily observed (Sverrisson 2000). In the short and medium term, such changes dominate the picture in any particular cluster (Sverrisson and van Dijk 2000).

Mechanisms of transition and regression, that is, qualitative changes which work themselves out over longer periods, pose more complicated issues. In this section we discuss the available evidence pertaining to such *transitional mechanisms*. They are then summarized in table 3, where they are also linked to policies that could facilitate the transition.

Table 3. Transition mechanisms from location clusters to industrial districts.

<i>From/to</i>	<i>Transitional mechanism</i>	<i>Policies external events that can stimulate this</i>
Location/ Local market	Information sharing Focused imitation	Zoning, Credit, Urbanization
Local market/ Local network	Division of labour Initial mechanization	Provision of space and infrastructure Elementary technology transfer
Local network/ Innovative	Specialization & Competition	Enhanced inter-firm relations Increased export activities
Innovative/ Industrial district	Collective information processing and innovation	Innovation centres and introduction of cutting edge techniques

4.1 *Moving from location clusters to local market clusters*

Moving from the simplest to the second stage implies a congregation of *similar* firms. This facilitates increased utility of both information exchanges and imitation, which becomes much more *focused* than in the case of generic clusters in which firms in general are close to each other. Further, customer access both on the input and the output side is facilitated, but competition also spurs product development both in the form of novelties, which through quick imitation benefit the entire cluster, and in terms of quality diversification.¹⁰ Thus, in a furniture cluster one would find carpenters who focus on high-quality furniture (teak and mahogany), and others who focus on making cheap products with a minimal effort and material cost (Sverrisson 1993). In a garment cluster one would find similar quality differences, overlaid by the interplay between global and local fashions in firms that cater for young and older customers, respectively (Visser 2000).

How would such a diversified cluster grow out of a simpler type? We propose that it is an *agglomeration* effect. As a cluster grows with its customer group, the basic flexibility built into simple production (i.e. being able to do many different things) is transformed into diversification strategies due to competition. Further, a larger cluster has, *ceteris paribus*, more numerous internal sources of novelty and more potential recipients of information about novelties initiated elsewhere, than a small cluster, and hence, higher potential for developing through imitation. In addition, because of the presence of many similar firms, such imitation tends to be focused on details in material, production methods and so on rather than the general type of imitation found in earlier stages. This results in a deepening of the collective fund of tacit knowledge about possible product alternatives and the methods to make them. Hence, once clusters of this type are established through a combination of urbanization and zoning regulations, competition for customers and efforts to increase visibility follow.

However, this type of cluster also carries within it the seeds of its own stagnation and even regression. So long as innovation happens in forms that everyone, or almost everyone, in the cluster can imitate, the individual benefits of innovation remain temporary indeed. Further, because everyone makes, or can in principle make, anything that others make, the incentives for co-operative ventures are small, and such ventures tend to be temporary and tied to large projects (relatively speaking) that generate large orders. This does not mean that growth is impossible. The cluster can

expand, and individual enterprises in the cluster can expand as well, sometimes at the expense of others. However, long-term development resulting in the transformation of these clusters to a higher stage requires a different dynamic.

4.2 *Moving from local market clusters to local network clusters*

The movement to local network clusters characterized by increased division of labour implies that the mechanisms discussed above remain in place, but to this is added a measure of specialization and division of labour leading to complementarities and interdependencies between enterprises that facilitate the establishing and continuation of co-operation of some kind. In its simplest form, this implies that the technical division of labour (according to function) is reflected in the social division of labour (among organizational units).

We can think of a very simple form of division of labour here such as, for example, moving from a situation in which all carpenters select their own trees in the forest, fell them and transport them to town, dry them and then make furniture or household utensils that they sell in the workshop. Although such primitive forms of vertical integration can be observed on the ground (Sverrisson 1993, Sandee 1995), a more common situation is that production of consumer goods is organized in a craft-like fashion and close to the customers, whereas the growing, harvesting (or mining) and initial working of raw materials is left to others, often because it takes place elsewhere. Being near customers is more important for competitive success than is proximity to the source of raw materials (significantly raw materials are available close by in the exceptional cases). However, initial specialization can be observed in numerous instances even if its simplest form is left out of consideration. Spinning, weaving and sewing are an obvious long-standing example, which also suggests what is the dynamic force behind such developments, namely initial mechanization and, in particular, the uneven pace of mechanization in different steps of any particular process. Sverrisson has elsewhere (1993, 1994a, 2000, 2002) analysed such processes in considerable detail, and here we will limit ourselves to noting the main conclusion: major innovations which are adopted in *clusters* can immediately benefit the entire cluster through co-operative arrangements, sometimes masked as commercial transactions, based on a division of labour between adopters and non-adopters. Co-operation is inscribed into the technological configuration of the cluster. Thus, for instance, if the owner of a wood-lathe (to remain with the simplest of innovations) provides turned table legs, etc. to other carpenters in the vicinity, he can specialize in making cylindrical components, and the other carpenters can provide such components as parts of the furniture they sell to their customers. Hence, everyone benefits from the presence of a single lathe (or some other machine) in the cluster. Sandee (1995) suggests a similar conclusion in his analysis of tile-making in Java.

The division of labour among firms is likely to generate more benefits and growth to the extent that it spreads to the entire cluster. Further, the larger the cluster (or its customer base, which amounts to the same at a given level of labour productivity), the more room for specialization. Empirically observed small enterprise clusters tend to vary considerably in this regard. Thus, for example, Knorringa (1995) observed a large shoe-making cluster in Agra with very developed specialization which had, however, got stuck in producing for local markets, while other, more factory-like, enterprises produced shoes for export markets, and the two production systems were

largely independent. Sverrisson (1992, 1994b, 1997), at the other extreme, observed carpentry clusters that included both firms with extensive vertical integration in production for local markets and small firms with considerable division of labour among themselves, which *inter alia* provided services to larger firms and *vice versa*.

Hence, local cluster development on the basis of a social division of labour is the prerequisite of successful mechanization in many cases. However, other mechanisms can lead to stagnation and lock-in. Thus, if no actors in the cluster develop the wherewithal to take advantage of more advanced forms of technology and produce more complex or higher quality products the entire cluster remains at an elementary level of industrial development. In order to break through to the next stage, of generalized industrial change, innovation and product development, yet more advanced mechanisms need to be in place.

4.3 *Moving from local network clusters to innovative clusters*

In order to move from division of labour in local networks to innovation in clusters, firms still need to exchange technical information relatively freely, which facilitates imitation. They also need to be similar enough to provide focus for this interaction, but diversified enough to avoid cutthroat competition. Elementary mechanization, elementary division of labour and the resulting complementarities are also needed to create the initial incentives for long-term co-operative relationships or, at the very least, stable user/producer networks. None of this is, however, enough to generate an industrialization dynamic in *clusters*.

The division of labour stage has been reached by numerous clusters, which remain in this state without any sign of an imminent change. However, more advanced clusters can also be found in which local innovation, based on the adaptation of generic concepts to local materials and on the reverse engineering of both products and production equipment is, if not ubiquitous, then at least a significant share of the activity in the cluster, which shapes co-operative networks in distinct ways.

This last point is important because adaptation to locally available materials and reverse engineering are common enough. However, the results can either remain isolated, because they are generated in vertically integrated enclaves, rather than within local producer networks, or they are imitated very quickly by *everyone*, and therefore do not lead to any change in the configuration of networks within the cluster. Productivity may increase and the competitive position of the cluster may be enhanced temporarily, but the basic parameters remain the same.

The main point here is that dynamic local innovations build on and develop the existing division of labour. They deepen specialization processes and generate differentiated and uneven technological advances locally. However, increasing specialization also implies increases in network stability (as everyone sticks to his chosen turf). This enhances effectiveness, but reduces flexibility, both at the enterprise level as individual firms become locked into their niche and at the cluster level, as the particular cluster configuration based on an established and competitive product and production method solidifies.

Hence, in order to retain flexibility and be able to accommodate repeated introduction of novelties, be they product or process innovations, considerable sophistication of collective information-processing capabilities are necessary. They may not be distinctly organized at this stage, but regular and sophisticated interaction and infor-

mation sharing among at least some of the participants is a minimum requirement for successful innovation to become a *regular* feature of cluster life. This can happen in the framework of formal associations, in connection with university-based or other projects, or in the subcontracting networks evolving around leading actors.

4.4 *Moving from innovative clusters to fully fledged industrial districts*

The industrial district type of cluster was initially defined on the basis of studies of small enterprise networks in Northern Italy, in which many of the cluster attributes discussed above can also be found (Pyke *et al.* 1990, Pyke and Sengenberger 1992). However, in spite of the specific character of these clusters, and of their embeddedness in Italian labour history, the general approach of these studies received widespread attention, not least among scholars who study economic processes in developing countries. However, like any example of clustering, the Italian clusters cannot be taken as the one and only model of feasible cluster development (cf. Maskell *et al.* 1998, Steiner 1998).

The formalization of information processing capabilities and fora for exchanging product information, diffuse technical specifications and planning and providing education are important characteristics of industrial districts proper. Responsive and negotiable subcontracting arrangements and collective and accessible information processing facilities distinguish fully-fledged industrial districts from other types of clusters with which they share the other attributes outlined above (van Dijk 1995). However, such complete industrial districts are, as noted above, fairly rare as yet in developing countries. They are, however, included in the typology because we believe that they will eventually become more numerous.

A number of experiments have been conducted in developing countries in the creation of formalized associations, export promotion units both private and public, and other generally accessible fora for co-operative ventures. These experiments are intended to leverage the informal mechanisms that arise in earlier cluster types and create benefits for all enterprises located in specific clusters, districts and regions. However, the cases reported so far are few in number and inconclusive. Such experiments come up against serious obstacles ranging from opportunism to inadequate skills among their leading figures. Although they have created various benefits for participants, while they lasted, they have not led to the establishment of industrial districts proper (Meyer-Stamer 2000, Visser 2000, Grierson 2001), not to mention more advanced forms of collaboration, which are as yet limited to the emerging information economies of the North (cf. Steiner 1998).

With the fully-fledged industrial district we have traversed, in theory, from small enterprises which co-operate only occasionally to company agglomerations that thrive *because* they form a cluster, and which indeed can only thrive because they have access to support of various kinds which, moreover, is organized and accessible to everyone. It is important not to confuse these different types or stages with each other: certain attributes (such as the general importance of social capital, see Sverrisson 2002) are, of course, common to all cluster types, whereas other attributes are quite different.

The argument in this section is summarized in table 3, which also indicates important policy issues that are discussed in the next and concluding section. The point of the table is that development and support for certain evolutionary mechanisms is important in some transitions, and more or less taken as given in others. Hence, in designing

policies and support intended to facilitate development of existing clusters, an analysis of the stage they are in will be helpful in indicating what measures are likely to bear fruit, and which, although they have been useful elsewhere, need to be postponed. Thus, we believe that lasting advances would be facilitated among cluster experts and among the entrepreneurs that they study or assist by the realization, that some lessons can wait to be learned.

5. Concluding discussion

In this concluding section, we discuss two topics that have attracted attention and sometimes led to debates among researchers and policymakers in this area. The first topic is whether cluster development should be preferred to vertical integration, and if clusters can generally be seen as competitive *vis-à-vis* vertically integrated operations in the context of development in the South. The second topic is which general policy criteria should be applied to the variety of support measures proposed over the years and intended to facilitate cluster expansion and upgrading.

5.1 Cluster development or vertical integration?

Clusters of enterprises in developing countries are in many cases the outcome of the survival activities of very poor people who lack capital, markets, and skills for starting and running factory-type establishments. They are likely to be quite volatile, however, because the possibility of vertical integration is always there (Sverrisson 1993, Sandee and Rietveld 2000). Once, for example, a production chain is established which coagulates into regular and smoothly working supply/purchase relationship, the option to incorporate some of the other companies in the chain becomes tempting, not least to keep such suppliers away from the competition. Conversely, dysfunctional supplier relationships can lead to attempts by enterprises to start such activities under their own auspices in order to avoid delays (Trulsson 2000). The larger and less diversified a market is, the higher is the premium on vertical integration, everything else being equal, and the larger a player is in its market, the higher the likelihood that the cost of control can be offset through some means or another (including less competition costs, such as advertising or spending a long time with each customer, see Sverrisson 1993).

Further, cluster development is based on distributed and gradual innovation processes. It is of course possible that innovation happens quite differently and that some entrepreneurs manage to acquire all the necessary techniques to make a product or transform a production process from a manual process to a mechanical one, for instance. This usually happens with some kind of external support that is channelled in through extra-economic conduits. Thus, white Zimbabweans run furniture factories, as do Indian Kenyans, amidst numerous and collaborating small-scale enterprises. German and Italian immigrants have built veritable clusters of their own in Brazil. In Tanzania, development co-operation funds distributed through politically structured channels have supported vertically integrated enterprises and this has happened in Kenya as well. The efficacy of Chinese family networks all over East Asia is well known too (Castells 1996). These examples of the utilization of social capital to support innovation that leads to vertical integration and independence from

other enterprises in the same location suggests that continued clustered development is only one option in industrial development. Vertical integration and the corresponding type of innovation is often predicated on ethnic cleavages, or, for example, reinforced by caste and class cleavages (Knorringa 1995) the entrepreneurs involved usually do not only lack the economic incentives to develop co-operative relations with other similar ventures in the vicinity, they also lack the inclination to do so.¹¹

In addition, cluster-based development is a possibility rather than an option in many cases because it calls for complex co-operation among enterprises, whereas vertical integration strategies can be initiated by a single enterprise. Thus, cluster development can result from a situation in which no enterprises have established leading positions in a branch, area, or both, and this is particularly characteristic of pre-industrial clusters. In other cases, the costs of vertical integration may be excessive, or the necessary capital unavailable. Vertical integration can also be impractical for other reasons, e.g. because demand fluctuates strongly, or because an appropriate mass production technology has either not evolved or has not diffused or been transferred to a particular country or region. Hence, enterprises remain small and co-operate as appropriate.

Just as specific conditions are needed in order to make mass production and vertical integration practical and efficient, development in small enterprise clusters is also contingent on a variety of factors, if not quite so well understood, which we have outlined above. In consequence, cluster development paths can co-exist with vertical integration paths, and developing clusters can give rise to vertical integration within them just as vertically integrated industries sometimes find themselves bypassed by small enterprise clusters.

5.2 *Policy criteria and support measures*

One obvious lesson from the discussion in the preceding section is that policymakers must take account of the opportunities posed by both vertical integration strategies and cluster development strategies. This is particularly important when both vertically integrated, often relatively dynamic, firms co-exist with small, often informal, firms in similar activities, the latter of which tend to gather in small clusters within industrial zones or small towns. Generally, policies have been geared towards supporting 'established' or 'formal sector' firms, whereas smaller firms have been ignored or even harassed by the authorities (van Dijk 2000, Kamara 2001).

Further, it is impractical to support millions of small-scale firms through direct and costly interventions in their operations (although there are those who would try). Rather, one can expect cluster development to be facilitated through the evolution of locally staffed business support systems which enable and indeed empower local entrepreneurs to take advantage of improvements in the macro-economic environment and the deregulation of imports and exports. Such business support systems or services can and should be put in place primarily through private sector initiatives, in co-operation with local and regional government authorities. A large hurdle to be overcome is therefore the limited capacity of local authorities in many countries in the South.

Currently, creating business development services tends to be a supply and donor-driven process with limited impact. Dawson (1997) stresses their failure to reach large numbers, and the fact that they are very expensive. Training is usually focused on

generic business training with a standardized content. Follow-up is minimal and therefore the impact, if any, is not documented. A different approach would be demand-led, assuming entrepreneurs know what they want. In addition, effective training would be participatory, relevant and focused, adequately monitored and based on, at least, cost recovery (Gibson 1997).

A problem with the approach of Gibson (1997) and other similar approaches is that it does not take cognisance of the fact that there are different types of clusters and different stages in cluster development although the call for participatory design ameliorates this problem to some extent. It can be argued that support to existing clusters of enterprises of different sizes and working in different industries should be tailored to their development level. Thus, in order to support clusters at the initial levels of development, space could be reserved for smaller units in existing industrial zones, where co-operative competition would be possible. The physical grouping of enterprises of different sizes and levels of development could be encouraged as well. In these situations, provision of elementary infrastructure (on a cost-recovery basis) can also work wonders.

In clusters that have reached more advanced stages, the facilitation of participation in government tenders is particularly important, including creating standards and routines for handling subcontracting networks and providing credit against future earnings from such contracts. However, creating effective conduits for technology transfer, particularly the lifting of import restrictions that affect small-scale production machinery and massive provision of vocational and other technical training remains the most effective way to help clustered enterprises move from the initial stage towards becoming labour-division clusters, when combined with the information exchange and collective information processing that occurs spontaneously in enterprise clusters.

In order to move on from there, channels which connect clusters to wider markets than the immediate vicinity have been central, but this also implies more advanced capability locally for the necessary sharing and processing of information, which is also why the competitive edge of vertically integrated firms tends to make itself particularly keenly felt at this stage. Hence, the development of innovative clusters calls for regular and sophisticated interaction in associations, clubs, at meetings arranged by different external actors, etc., as well as interaction with government agencies and/or export agencies which enforce health regulations, quality standards and otherwise provide information about the expectations in other and more sophisticated markets. Access to services such as accounting, legal advice, equipment service and maintenance are important as well, which is why such clusters can hardly be expected to develop in decidedly rural areas.

Emulation of products sold in global markets is often the initial stage of innovative cluster development, leading to reverse engineering and adaptation of production methods. This is, of course, the 'Japanese way'. However, without continuous sources of information combined with local knowledge development and adequate service provision it is difficult to move on even for well connected small enterprises. When successful, however, this leads to the creation of a large pool of practical, yet sophisticated knowledge that enhances the competitive position of the entire cluster. Again, provision of education is central to these developments as well as an effective and competent local administration.

Creating fully-fledged industrial districts implies, as we discussed above, the formalization of collective information processing capabilities in local technological insti-

tutes accessible to all, in local branch associations, in locally rooted marketing and exporting organizations, local newsletters, etc. In short, many of the information networks which form around large orders, joint exporting, machine rentals and through the circulation of competent personnel among firms in earlier stages are opened up for everyone in the cluster through the institutionalization of similar functions.

Thus, the appropriate policy criteria would be how the clusters can be advanced from their current stage to the next, if they present viable alternatives to vertically integrated production chains at all.

Notes

1. Convenor of the European Association of Development and Training Institutes (EADI) Working Group on Industrialisation Strategies and IHS Professor of Urban Management in Emerging Countries, Economics Faculty, Erasmus University, PO Box 1738, H12-27, 3000DR, Rotterdam, The Netherlands; e-mail: mpvandijk@few.eur.nl
2. Co-convenor of the European Association of Development and Training Institutes (EADI) Working Group on Industrialisation Strategies and Associate Professor, Department of Sociology, University of Stockholm, 10691 Stockholm, Sweden; e-mail: arni.sverrisson@sociology.su.se
3. However, proximity of firms is often the first *empirical* indication that something interesting is happening and proximity can even be useful as an operational variable (Visser 1996).
4. Most of these case studies have been presented and discussed at the meetings of the European Association of Development and Research Training Institutes and published in Rasmussen *et al.* (1992), Pedersen *et al.* (1994), van Dijk and Rabellotti (1997), Sverrisson and van Dijk (2000), and Sandee and van Dijk (2002). See also Schmitz and Nadvi (1999).
5. There is a large literature about networked aggregations of industrial firms, their dynamic growth and/or stagnation. Marshall is usually credited with the first systematic observations on the phenomenon (see Aspers 1999), which was also analysed early on by Mumford (1962). Historical forms have been studied *inter alia* by Kriedte *et al.* (1981), Yamazaki (1981), Isacson and Magnusson (1987), Takeuchi (1991) and Scranton (1997). A number of relevant and recent case studies can also be found in Sabel and Zeitlin (1997). Relevant studies of contemporary phenomena include Piore and Sabel (1984), Pyke *et al.* (1990), Piore (1992), Mitsuhiro (1993) and Johannisson *et al.* (1994). The paper by Maskell *et al.* (1998) is a recent collection that focuses on learning in local contexts in small European countries.
6. Obviously this implies that there are non-collaborative networks, i.e. people know each other and relate to each other without doing anything together, except meeting, talking, etc., an important enough activity in itself. In addition, one can think of networks, which are characterized by opposition or animosity among some or all of the participants. In the present context, a pair of competitors within an otherwise collaborative network would of course not be excluded from the network by virtue of this, and it is also possible to conceive of a group of competitors (for instance in a particular market) as a network or as being a part of a larger network. See, for example, Piore (1992).
7. A summary and further analysis of this issue is given in Sverrisson and van Dijk (2000).
8. Useful collections are Rasmussen *et al.* (1992), Pedersen *et al.* (1994), van Dijk and Rabellotti (1997), Schmitz and Nadvi (1999), and Sverrisson and van Dijk (2000).
9. Pedersen (1997b) has suggested a different typology, in which clusters are divided into four types. These are petty commodity clusters (household production and related forms), market town clusters (retailers and small producers), both catering for low-income markets, subcontracting clusters and diversified industrial clusters, aiming at high income markets. Each of the three first-named types can, according to Pedersen, develop into diversified industrial clusters, with varied degrees of sophistication, and eventually, in this way, become the vehicles of dynamic development. Alternatively, they can stagnate or even regress into survival-oriented crisis management. A main difference between Pedersen's proposal and ours is that Pedersen emphasizes the role of growing markets whereas we make no assumptions about that (cf. McCormick 1998).
10. American sociologist and network theorist Harrison C. White has developed a theory of markets founded on the concept of quality diversification. Hence, the observation in the text of a rather commonplace phenomenon carries important theoretical implications (from White's point of view): a basic prerequisite of a market – rather than a bazaar – economy appears on the scene (White 2001).
11. A further twist to this analysis is provided by Meyer-Stamer (2000) who notes that local immigrant milieux are sometimes so torn by internal strife that they are unable to co-operate among themselves and are thrown back on contacts to their point of origin.

12. For example, Sandee (1995), Visser (1996), Klapwijk (1997) and van Dijk (1999).
13. For instance King and Aboudha (1991), Knorringa (1995), Meyer Stamer (2000).
14. Examples are Schmitz (1996), McCormick (1997), Sverrisson (1997).
15. Discussed in Cho (1994), Rabellotti (1997b), Sverrisson (1997), Trulsson (1997), Sandee (2000).
16. See *inter alia* Knorringa (1995), Sandee (1995), van Dijk (1997), Meyer-Stamer (2000).
17. For example, Rabellotti (1994), Halimana and Sverrisson (2000), Sandee and Rietveld (2000).
18. Analysed *inter alia* by Visser (1996), Meyer-Stamer (2000).
19. For instance Sverrisson (1993, 1994a), Schmitz (1996), Visser (2000).
20. Knorringa (1995), Trulsson (1997), Sandee and Rietveld (2000).
21. See Schmitz (1989), Sverrisson (1993), Visser (1996), Rabellotti (1997b).
22. Cf. Cho (1994), van Dijk (1997), Sandee and Rietveld (2000), Trulsson (2000).
23. Discussed by Pedersen (1997b), Meyer-Stamer (2000), van Dijk (2000).
24. This aspect is discussed in particular by Knorringa (1995), Sverrisson (2000).
25. See Rabellotti (1997a), Meyer-Stamer (2000), Pedersen (2000), Sverrisson (2001).
26. Cf. Knorringa (1994, 1995), Schmitz (1996), Trulsson (1997).
27. Marshall (1920), Mumford (1962), Pyke and Sengenberger (1992).
28. Analysed in particular by Sverrisson (1994a, 2000), Sandee (1995), Sandee and Rietveld (2000).
29. See King and Abouda (1991), Rasmussen (1992), Sverrisson (1997), Visser (2000).
30. Discussed *inter alia* in Sverrisson (1993), Knorringa (1995), Sandee and Rietveld (2000).
31. King and Aboudha (1991), Sverrisson (1997, 2001), McCormick (1998), Visser (2000).

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