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Re-visiting Indonesian cases for cluster realism

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Abstract

Purpose – The purpose of this paper is to use case study evidence to explain that enterprise agglomeration in itself may not advantage business development. Agglomeration has the potential to bring enterprise advantage but whether this occurs depends on additional supportive conditions.

Design/methodology/approach – The paper re-examines case studies of Indonesia clusters from a more critical perspective than adopted in their original presentation. This critical perspective follows a realist assessment of agglomeration in which advantages depend on specific business environments.

Findings – Five processes are identified that limited the advantage obtained from agglomeration: internal segmentation; enterprise independence; technological pooling; excessive competition and linkage dependencies. Three attributes that influence whether agglomeration assists business and regional development: enterprise diversification, entry barriers and cluster scale.

Research limitations/implications – The paper is limited by its reliance on previously completed case studies rather than a set of purpose-designed case studies.

Practical implications – Business promotion agencies should be aware that not all enterprise clusters have an equal likelihood of sustaining economic growth.

Originality/value – The combined evidence from previously published case studies of Indonesian cluster experiences adds to the understanding of the conditions required for agglomeration advantages to be realised.

Keywords Cluster analysis, Indonesia, Agglomeration, Enterprise economics

Paper type Case study

Introduction

It has been argued that Asia's experience should be used to broaden the scope of current economic geography theory (Yeung and Lin, 2003; Coe *et al.*, 2004). Understanding the contribution of enterprise clusters to business and regional development provides one such opportunity. Asian economies in general and Indonesia in particular are characterised by a pronounced clustering of economic activity. This can be observed at both the level of regions and provinces (Sjöberg and Sjöholm, 2004; Fan and Scott, 2003) and at the level of individual settlements and surrounding districts (Schmitz and Nadvi, 1999; Scott, 2006a, b; Tambunan, 2006; Dana, 2007). In this paper, we focus on the latter: small scale clustering at the level of individual settlements and districts. Our goal is to consider how the experience of Indonesia's *sentra industri* can help to inform the larger understanding of enterprise clusters. To this end, we exploit three aspects of Indonesia's cluster experience: the variety of cluster types from concentrations of micro artisan enterprise to advanced clusters of export enterprise; the variability in cluster performance between and more importantly within individual cluster categories; the availability of detailed case studies of a cross section of individual clusters.

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Implicit in this exercise is the view that existing cluster theory is incomplete. The paper assumes that there is a need for further understanding of the conditions under which a cluster generates business advantage. In many accounts of cluster development, primacy is given to the existence of agglomeration economies (Scott, 1988, 2006a, b; Fan and Scott, 2003). Indeed, some go further and suggest that it is impossible to conceive of economic concentration without the simultaneous existence of agglomeration economies (Parr, 2002). Our starting point concurs with those who have argued that agglomeration economies in themselves may not explain the emergence of enterprises clusters (Bresnahan *et al.*, 2001) and that enterprise clustering may merely be physical (co-location without agglomeration economies) rather than functional (as defined by Oakey, 1995; Oakey *et al.*, 2001). From this perspective, the conditions under which agglomeration exerts a positive push for business development remain to be fully understood.

This review agrees with those accounts that have recognised how a transition from relatively homogenous to relatively heterogeneous business communities changes cluster dynamics (Rabellotti and Schmitz, 1999; Burroni and Trigilia, 2001; Carbonara, 2002). Understanding how member heterogeneity affects the advantage obtained from clustering is a significant gap in the understanding of how agglomeration affects enterprise development. Indonesian clusters are frequently challenged by internal differences and an objective of this paper is to consider what lessons this holds for theories of localised economic development. This is not the only experience of note but it looms large and provides fertile material for extending the understanding of the contingencies for cluster success.

The paper re-examines already published case studies of Indonesian cluster experiences to offer some original guidance on the conditions needed to sustain enterprise advantage from clustering. When reported the individual experiences have not been used to challenge underlying assumptions about the advantage obtained by clustered over dispersed enterprise. By combining the accumulated evidence, Indonesian experience can start to point to the challenges in achieving forms of cluster that can accelerate business and industry development. Prior to providing our summary of the Indonesian cases we explain the need for a perspective on cluster development that recognises the potential advantages arise only in special circumstances.

Industrial districts and agglomeration advantages

The last few decades have seen a number of low and middle income economies experience significant bursts of development based around comparatively low technology and labour intensive industries such as clothing, footwear and furniture (Scott, 2006a, b). Globalisation has been one influence facilitating this growth as it allowed more places to engage in international trade and establish ties within value chains traversing low to high-income markets (Gereffi, 1994). An abundance of low cost labour that is adaptable to industrial employment has been another condition for the emergence of development "hot spots". Since not all low wage economies have experience of economic transformations it is evident that other factors are required too. The ability to build local agglomerations of economic activity that promote business competitiveness on many dimensions has been widely accepted as one of the additional forces at work (Humphrey and Schmitz, 1995; Mccormick, 1999; Schmitz and Nadvi, 1999; Scott, 2002; Fan and Scott, 2003).

The early literature on business clusters or industrial districts built a compelling case for the role of agglomeration in facilitating rapid economic upgrading within low income economies (Schmitz, 1995; Rabellotti, 1999; Visser, 1999). Much of this discussion followed the collective efficiency framework outlined by Humphrey and Schmitz (1995). This framework held that business clusters responded to the resource constraints existing at the outset of industrialisation by enabling smaller amounts of investment than where production commences in isolation or among dissimilar activities. For example, close proximity facilitated small scale activity through the ability to acquire raw materials through frequent, "just-in-time" orders and it enabled individual entrepreneurs to specialise on one activity and combine with the activities of other specialised enterprises. Traders might appear simply because they heard of the existence of the cluster (Mccormick, 1999, p. 1533). Specialised workshops to repair and upgrade equipment further reduce the barriers to entry. In effect:

> [. . .] the enterprise of one creates a foothold for the other, that ladders are constructed which enable small enterprise to climb and grow. It is a process in which enterprises create for each other – often unwillingly, sometimes intentionally – possibilities for accumulating capital and skill (Schmitz and Nadvi, 1999, p. 1506).

The outcome was an industrial district of mostly small and specialised firms that perform different, but complementary activities and that are linked horizontally and vertically through a mix of cooperative and competitive relations. The concentration as a whole operated with collective efficiency but by making it possible to advance in small steps the accumulation of capital and skills was correspondingly small. Where enterprise remains small and relationships between cluster participants were fluid, access to the advantages offered by the cluster came primarily through location rather than from individual entrepreneurial capacity. Open access implies that no business can sustain an advantage over any other and the cluster as a whole has limited capacity to withstand competitive shocks. Consequently, clusters remained vulnerable to changes in production technology or product markets (Schmitz and Nadvi, 1999).

Pure Marshallian agglomerations give all cluster enterprises access to the collective efficiency gains (Gordon and McCann, 2000). Schmitz (1995) argued that to be able to adapt to market changes and other business challenges and to nurture innovative enterprise with growth potential, the cluster had to be something more than a pure agglomeration. Transformation of the cluster into a sustainable business community with capacity to serve distant markets required the emergence of dominant enterprises with greater entrepreneurial capacity and ambition than "ordinary" cluster firms (Schmitz, 1995). These dominant enterprises would differ in making deliberate (planned) decisions about the use of cluster resources and by their tendency to work selectively with other cluster firms rather than operating without any particular loyalty to other enterprises in the cluster. Planned action is primarily a matter of negotiation between selected enterprises and is frequently stimulated by the ability of some enterprises to serve new markets. It encourages differentiation among cluster enterprises as it brings additional advantages to those enterprises able to take planned action over those that rely exclusively on the unplanned advantages arising from location as part of a cluster. The shift to planned action was explained partly as a risk management measure. When seeking to take comparatively large steps in enterprise development, individual entrepreneurs are encouraged to form particular relationships with other enterprises to help distribute the risk and reduce uncertainties over the

dependability of other businesses (Schmitz, 1999; Schmitz and Nadvi, 1999). According to these decisions, differences emerge between enterprises with respect to their size, resources, markets and pursuit of growth.

Business heterogeneity presents clusters with a new set of challenges compared with those built upon broadly homogenous types of enterprise. Leading enterprises may, for example, start to build business networks beyond the cluster and lessen the opportunities for the original cluster enterprises left outside these networks. Consequently, when Schmitz (1999) returned to a cluster that had initially seemed to have scope for continued growth there was instead evidence of a failure to agree "strategic cooperation". In essence, the largest cluster enterprises often favoured retaining their independence and established business methods rather than supporting strategies designed to support the cluster as a whole. This type of experience has been mirrored in the evolution of Italy's industrial districts to which the collective efficiency framework was also applied (Rabellotti and Schmitz, 1999). These districts, which are widely seen as the exemplars of business clustering, emerged during the 1950s with a new wave of industrialisation based on small scale, family enterprise (Bamford, 1987). With market expanding rapidly for the products specialised in, firms could operate without entering rigid relations with other enterprises and on the basis of opportunistic marketing strategies (Nuti and Cainelli, 1996). Post 1980, the districts entered a second stage of development as market growth slowed and informal ways of working were replaced by more selective and structured inter-firm relationships (Brusco *et al.*, 1996; Cossentino *et al.*, 1996). Typical outcomes for individual districts included the internationalisation of leading cluster enterprises, more reliance on non-cluster businesses and the increased concentration of production within fewer, larger enterprises compared with the earlier phases the district's development. The "classical" district comprising many independent small enterprises and supporting agencies is now a minority among surviving industrial districts (Paniccia, 2002).

Awareness that a cluster is a more problematic basis for development than was originally envisaged has seen efforts to shift the focus from clusters alone to their integration with international value chains (Humphrey and Schmitz, 2002; Schmitz, 2004, 2007). This line of investigation emphasises how different forms of value-chain governance control the opportunity for cluster enterprise to upgrade and acquire capacity for growth independent of their existing value chain relations. This line of investigation fits with other calls for broader integration of the role of globalisation, states and external networks in explaining patterns of regional growth (Coe *et al.*, 2004; Yeung, 2005). At the same time, claims about the importance of industrial districts as a basis for accelerating economic transformation continue not the least because China's rapid economic advancement appears to be built on the pronounced clustering of private enterprise (Christerson and Lever-Tracy, 1997; Sonabe *et al.*, 2002; Fan and Scott, 2003; Wang *et al.*, 2005). In developing economies where competitive advantage is not embedded in national institutions or accumulated resources, clusters may be at risk of rapid changes in fortune but they can be viewed as still offering the best prospects for growth. With this in mind it is important to continue to search for deeper understanding of the contingencies explaining why some clusters become the basis for enduring economic transformations while others provide merely short lived interludes of growth.

Following the collective efficiency framework (Schmitz, 1995, 1999) a critical junction in the evolution of a cluster is the transition from unplanned to planned

joint action. This marks a point where selected enterprises realise capacity for enhanced growth while other cluster enterprises are relegated to a more subordinate position within the cluster. The existence of this development hurdle is frequently overlooked in studies of the importance of enterprise clustering, particularly among those that assume clusters provide a harmonious blending of cooperative and competitive forces. Porter (2000), for example, argues that clusters represent a kind of organisation between markets and hierarchies in which independent companies compete for markets while also cooperating within vertical supply chain as well as with enterprises in related industries. Similarly, it has been suggested that because enterprises within a cluster are highly specialised and dependent on other enterprises they are "necessarily cooperative" (You and Wilkinson, 1994, p. 261). This cooperativeness is often related to claims that a shared culture or "industrial atmosphere" is a further feature of clusters providing a network of conventions, rules, shared understandings and the suspension of competitive practices such as labour poaching, wage competition or undercutting competitor prices (Bellandi, 1989; Lawson, 1999; Dei Ottati, 2003). A related claim is the willingness to share industry insight either through formal business transactions or through the frequent informal interactions created by the high density of personal relations and community ties linking enterprise owners (Uzzi, 1997; Wang *et al.*, 2005). In contrast to these types of claim, the onset of planned action often reveals the difficulty of maintaining a balance between cooperation and competition. Indonesian cluster cases provide a particular wealth of evidence revealing some of the reasons why a harmonious blend of cooperative and competitive forces frequently eludes a cluster.

Rural enterprise in Indonesia is strongly located within clusters (Dana, 2007). With different levels of performance it is possible to discern contingencies affecting the survival and growth of clusters that it may be harder to detect when studying individual clusters. Less advantageously, Indonesia is not well represented with clusters that feed into global commodity chains (Tambunan, 2006). Rather than relationships with overseas customers, Indonesian clusters tend to serve a variety of national markets or work through Indonesian-based intermediaries to reach export markets. The diversity of national marketing channels and the variety of business structures nonetheless provides opportunity to illustrate how five processes affect the extent to which agglomeration exerts a push for development:

(1) internal segmentation;
(2) enterprise independence;
(3) technological pooling;
(4) excessive competition; and
(5) linkage dependencies.

Before explaining these processes, the next section commences with an overview of Indonesian business clusters.

Beyond agglomeration-induced localisation

The conditions under which agglomeration exerts a positive push for business development are elusive. Alfred Marshall's enduring classification of agglomeration economies arose in the context of seeking to understand how industrial districts

survived in the face of a more general tendency for industry dispersion. He judged that industrial districts associated with two types of goods had most chance of survival: goods in general use that were "not very changeful in character" and goods that could be represented effectively in illustrated catalogues or samples distributed to wholesale and retail dealers (Marshall, 1923, p. 288). Market stability meant that there was "no particular time at which strong incitement is offered to open up the industry elsewhere" (Marshall, 1923, p. 227). Even then Marshall thought that district survival relied on the attraction of "new shrewd energy to supplement that of native origin" so as to avoid the risk of "obstinacy and inertia" among established entrepreneurs (Marshall, 1923, p. 227). In modern day terms, following the interpretation of Pawson and Tilley (1997), it might be argued that Marshall had a realist assessment of cluster survival. Agglomeration advantages provided a mechanism to offset the disadvantages of small scale but they worked only under conditions of relative industrial stability and open business populations.

The contingencies identified by Marshall contrast with the many influential studies that associate clusters with flexibly specialised business populations (Scott, 1988; Storper, 1997; Scott and Storper, 2003). The dated nature of Marshall's conditions for agglomeration advantage possibly explains why his contingencies have gained less attention than his codification of agglomeration economies. More significant it appears that the business advantage generated by a cluster is thought to transcend differences in other characteristics of cluster enterprises. For example, it has been argued that regardless of how economic agglomerations originate they all share two fundamental features in common: interdependence between individual production units and a shared labour market (Scott, 2002). The further assumption is that interdependence and shared labour markets are generally positive for enterprise and local economic development: both enable resource sharing and reduced investment costs (Scott, 2002; Fan and Scott, 2003).

Some criticism of universal cluster advantage does exist. The processes facilitated by agglomeration have, for example, been shown in some circumstances to be of less significance than other mechanisms supporting enterprise growth (Hendry *et al.*, 1999, 2000). Negative outcomes from agglomeration have been noted including how a shared labour market may have disadvantages. It can result in agglomerated employers needing to pay a premium for labour so as to prevent poaching of staff by competing enterprises (Combes and Duranton, 2001) and it can encourage the strategies of enterprises in a cluster to converge with a consequent intensification of competition (Stuart and Sorenson, 2003, p. 235). In the light of these possibilities, Combes and Duranton (2001) argue that operating in a shared labour market is advantageous for enterprises that are different to each other but less so for enterprises that are similar to each other. Stuart and Sorenson (2003) suggest that sharing a labour pool is useful for new venture creation but reduces capacity for business growth. In line with these propositions, evidence from Italy's industrial districts shows that employees do not get a wage premium from prior experience in another clustered firm (Cingano, 2003). This result is interpreted as showing that district enterprises are sufficiently dissimilar for past work experience to be discounted by new employers. This may be explained by Combes and Duranton (2001) hypothesis that clustering is optimal for firms that retain distinctive specialisations.

The collective efficiency framework that has been applied for studying cluster development in low incomes economies (Humphrey and Schmitz, 1995) is a useful starting point for identifying the contingent conditions needed for pro-development agglomeration. This framework held that a combination of local external economies (incidental) and joint action (deliberate) provided the basis for enterprise cluster development. During the initial development of a cluster, external economies helped overcome the resource constraints holding back industrialisation in low-income countries. By enabling resources to be shared, clustering reduced the scale of effective investment into smaller steps than where production commences in isolation or among dissimilar activities (Schmitz, 1995). Upgrading, such as it occurred, was an outcome of the collective impact of individual decisions and left cluster advantages open to all enterprises in the cluster. For example, gaining access to market linkages did not need coordinated action. Traders might appear simply because they heard of the existence of the cluster (Mccormick, 1999, p. 1533). On the other hand, individual enterprises tended to be weak. By making it possible to advance in small steps, the accumulation of capital and skills was correspondingly small and clusters remained vulnerable to changes in production technology or product markets (Schmitz and Nadvi, 1999).

In this way, studies of low income country clusters have frequently shown awareness that enterprise growth depends on more than agglomeration economies alone. Moving the cluster to a higher stage of development relied on a corresponding increase in the investment made by individual enterprises. This depended on above average entrepreneurial capacity and coordination among a select group of enterprises to gather the necessary resources and share risk. From the onset of such planned action, business populations within clusters become increasingly differentiated. The fate of the cluster was then influenced by the effectiveness of industry associations and public agencies in opening access to joint action to enterprises excluded from privately negotiated joint action.

This model of enterprise cluster development was applied to cluster experiences in many developing economies (Schmitz and Nadvi, 1999). It proved effective at explaining the emergence of export-orientated clusters but was less successful in identifying conditions under which clusters became open to joint action and the conditions under which joint action would sustain cluster growth. It is against this context that a re-examination of Indonesian cluster cases can augment the understanding of the conditions required for sustainable cluster advantage. With many clusters and different levels of performance it is possible to discern structural differences that may be harder to detect than among clusters in different contexts. Less advantageously, Indonesia is not well represented with clusters that feed into global commodity chains (Tambunan, 2006). Rather than relationships with overseas customers, Indonesian clusters tend to serve a variety of national markets or work through Indonesian-based intermediaries to reach export markets. The diversity of national marketing channels and the variety of business structures nonetheless provides opportunity to illustrate how five processes affect the extent to which agglomeration exerts a push for development:

(1) internal segmentation;

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Cluster diversity in Indonesia

The incidence of clustering in Indonesia is high among developing economies (UNIDO, 2000). The Ministry of Trade and Industry's record of clusters or so-called *sentra industri* encompasses geographical groupings of at least 20 similar small enterprises, or less if some the enterprises export all or some of their production. On this basis, it was estimated that there are around 25,000 clusters in Indonesia providing employment for perhaps close to two-thirds of all persons working in cottage and small-scale manufacturing (Sandee and ter Wengel, 2002). This includes clusters found in urban and rural areas. Examined as a proportion of rural settlements, around 10,000 villages have registered a *sentra industri* amounting to 14 per cent of all villages (Weijland, 1999). Beyond the frequency of clusters, their uneven performance has been identified as their most outstanding characteristic (Weijland, 1999; Hill, 2002; Tambunan, 2006). Some clusters have become home to internationally competitive exporters, many are dormant and some have "remained so poor and stagnant that one might wonder whether their producers would not be better off elsewhere" (Weijland, 1999, p. 1520). Thus, while the collective efficiency framework suggested a development trajectory is open for clusters it appears that few clusters are able to achieve it.

Four types of cluster have been identified according to their level of development (Table I). Artisanal clusters account for around 90 per cent of all the clusters identified

Type	Characteristics
Artisinal	Mainly micro enterprises; low productivity and wage; stagnated (no market expansion, increased investment and production, improved production methods, and management, organisation and production development; local market (low-income consumers) oriented; used primitive or obsolete tools and equipment; many producers are illiterate and passive in marketing (producers have no idea about their market); the role of middlemen/traders is dominant (producers are fully dependent on middlemen or trader for marketing); low degree of inter-firm cooperation and specialisation (no vertical co-operations among enterprises); no external networks with supporting organisations
Active	Use higher skilled workers and better technology; supply national and export markets; active in marketing; participation in internal and external networks
Dynamic	Participation in international trade networks; internal heterogeneity within clusters in terms of size, technology, and market served; leading/pioneering firms have disproportionate influence over the cluster's development
Advanced	Inter-firm specialisation and cooperation is high; business networks between enterprises with suppliers of raw materials, components, equipment and other inputs, providers of business services, traders, distributors, and banks are well developed; cooperation with local, regional or even national government, as well as with specialised training and research institutions such as universities; many firms are export-oriented (mainly through trading houses or exporting companies)

Table I.
Different types of cluster in Indonesia

in Indonesia, indicating that clustering is predominantly associated with the pre-industrial economy. These clusters in activities such as bamboo weaving, ceramics, palm sugar and garments are associated with rudimentary forms of production and informal enterprise (Burger *et al.*, 2002). With productivity and wages below that of small- and medium-sized enterprise in the formal economy, Altenburg and Meyer-Stamer (1999) suggest that artisanal clusters exhibit little inter-firm cooperation or labour specialisation and are best viewed as "survival" clusters. Few evolve to a more interdependent form of agglomeration or experience any development in terms of market expansion, increased investment, improved production methods or enhanced capacity for product development (Asian Development Bank (ADB), 2001; Sandee and ter Wengel, 2002). Under conditions of non-sustainable resource harvesting, most artisanal clusters have a limited life. Artisanal clusters survive to the extent that the resource base and market survives and this depends mainly on local demand from low-income households.

Active clusters retain features of an artisanal cluster in terms of quality-related problems and a high dependence on local markets with varying degrees of skill improvement, technological upgrading and movement into national or even export markets. Typical activities supporting this trajectory include roof tiles manufacture, metal-casting, shuttle-cock production, shoe making and brass-handicrafts. Within active clusters, some enterprises may start to exert disproportionate influence over the development of the cluster and traders or trading houses from outside the clusters start to be of importance.

Dynamic clusters are distinguished by trade networks that may stretch nationally and internationally along with considerable internal heterogeneity in terms of enterprise size, technology capacity and markets served. Examples of dynamic clusters have included textile weaving clusters in Majalaya and Pekalongan, the Jepara furniture cluster, the Purbalingga wig and hair accessories cluster and the Kasongan handicraft cluster, although they have struggled to adapt to the changed economic environment post the late 1990s Asian financial crisis. Direct investments made by foreign immigrants are an additional feature of the Jepara and Kasongan clusters that has influenced the opportunities for the wider cluster (Supratikno, 2002). In some cases, inter-firm specialisation and cooperation is pronounced although this is usually associated with a decisive role for a few leading or pioneering firms. These lead enterprises (Table II gives examples) are typically larger and faster growing than other cluster enterprises and have a large and differentiated set of relationships with firms and institutions within and outside clusters. Some leading firms may make use of

Cluster	Location	Leading firms[a]
Wig and hair accessories	Purbalingga (Central Java)	PT Royal Korindah, PT Indo Kores
Handicraft	Kasongan and Sleman (Yogyakarta)	PT Out of Asia
Textile weaving	Pekalongan (Central Java)	PT Pismatex
Furniture	Jepara (Central Java)	Duta Jepara, Grista Mulya, Satin Abadi
Brass handicraft	Juwana (Central Java)	Krisna, Samarinda, Mas Sokka
Roof tile	Kebumen (Central Java)	

Note: [a]PT, limited corporation
Source: Supratikno (2002)

Table II.
Leading firms in some active and dynamic clusters

advanced production technologies and compete with leading multinational companies in their sector. Examples of dynamic clusters with advanced local enterprises at their head include a clove cigarette cluster in Kudus, a tea-processing cluster in Slawi and Bali's tourism cluster (Supratikno, 2002).

Advanced clusters are comparatively rare. They are defined by high levels of inter-firm specialisation and cooperation and well developed enterprise networks encompassing suppliers of raw materials, components, equipment and business services. Supportive links with local, regional or even national government, as well as with specialised training and research institutions such as universities can also be a feature of an advanced cluster. These connections may rely on drawing on inputs from a nearby region, or developing regular cooperation with a university or research institution in another city. Many enterprises in this type of cluster are export-oriented but generally through the use of an intermediary trading house or export company (ADB, 2001). As well, the scarcity of places associated with advanced clusters is amplified by their tendency to overlap and interlink with each other in the same locality. In the Yogyakarta-Solo area, for example, tourism, furniture and interior decoration, metal processing, leather goods and textile and clothing clusters co-exist with mutual benefits.

Optimism in cluster potential in Indonesia is based partly on the overall dynamism of small scale enterprise rather than survey evidence comparing clustered and non-clustered enterprise (Hill, 2002). At a time of rapid industrialisation and economic growth from the mid-1980s to the late 1990s, the size distribution of firms in the manufacturing sector appeared to remain unchanged. As economic growth was not associated with an increasing dominance of big business, and because small enterprise is concentrated in clusters, it can appear that clusters contributed to enterprise success (Sandee *et al.*, 2000, p. 187). This is hard to establish as small enterprise was helped by a policy environment that was increasingly conducive to doing business (Schiller and Martin-Schiller, 1997). One particular success, for example, was the growth of effective banking facilities for small-scale enterprise such as that provided by Bank Rakyet Indonesia (Perry, 2003). Direct evidence of cluster impact on enterprise development comes mainly from case studies of individual clusters. This evidence actually identifies differences in cluster performance rather than a uniform advantage in clustering (Hill, 2002, p. 168). This is explored by reference to case studies illustrating the five processes that were identified above as influences on the development push obtained from agglomeration.

Internal segmentation – Tegal metalworking and Jepara furniture

Unlike agglomeration based on a high level of enterprise interdependence, business populations in Indonesia tend to be segmented into enterprises operating in different markets with different business relationships. Such segmentation, for example, is a feature of two frequently cited clusters successes: the Tegal metalworking cluster and Jepara furniture cluster.

Tegal in Central Java has been a centre for metalworking since the mid nineteenth century but the contemporary structure of the cluster is of recent origin (Tambunan, 2006). A pronounced segmentation of enterprises into three main groups has arisen from the cluster's development into a place for manufacturing components for the national market. Each of the enterprise types has a distinctive experience of the agglomeration. In 2005, there were around 2,811 metal workshops in the district

distributed over seven officially recognised *sentra industri*. These enterprises can be classified into one of three groups (Tambunan, 2006):

(1) The largest enterprises, employing up to around 100 workers supply metal components to firms outside the district. These workshops, known as Inti work for some of Indonesia's largest manufacturers including PT Komatsu Indonesia Tbk, PT Daihatsu and some divisions of the Astra Group such as PT Sanwa, PT Kubota and PT Katshusiro. These companies typically source metal components from several production centres in West Java.

(2) A second tier of enterprises, known as plasma workshops work as subcontractors to Inti enterprises as well as having their own customers. Plasma workshops are small or even micro scale enterprises reliant on family labour supplemented by cheap, unskilled labour but with the technical capacity of the workshop highly dependent on the owner's skills.

(3) The third group are small scale workshops that do not have access to subcontract jobs and that rely on orders from wholesalers and retailers (who may distribute the products nationally) and sales to local consumers.

This structure is an outcome of the emergence of a manufacturing industry in the 1980s with a need for components. Although the metalworking skills were originally broadly based, growth came from orders for simple metal products or components to be utilised in household appliances, handicrafts, furniture and to a lesser extent, by the general machinery and automotive industries. Tegal's small workshops have the flexibility to accommodate small order volumes assisted by abundant cheap labour. These features have allowed the workshops to compete with more capital-intensive production but have resulted in often intense price competition between the workshops (Tambunan, 2006).

For workshops at the most advanced end of the cluster, working for a major national company gives access to product and production upgrading opportunities related to the components that they are asked to supply. Out of the almost 3,000 workshops, fewer than 25 work directly with national companies. A larger number of workshops have tried to join them but buyers select only those suppliers that have the required machinery, labour resources and quality management expertise rather than investing in these capacities. But if the entry audit is passed, workshops enter a virtuous circle where subcontracting leads to training provided by the buyer and access to ongoing work and a wider range of orders (Iman and Nagata, 2002). Within the context of the cluster, this assistance is significant but to date buyers have had no inclination to move Tegal beyond its status as a low-cost production centre for selected components.

Further opportunities for upgrading are restricted mainly to the plasma workshops that in total produce 10-15 per cent of the orders received by Inti. The motive for this subcontracting is mainly to get access to lower production costs in small workshops although some assistance to ensure plasma meet expected quality standards may be needed. This can include soft loans to fund the purchase of new machines. Inti workshops may coach plasma on quality control standards and, in some cases support former employees already familiar with these standards in starting up plasma. This diffuses knowledge within the context of obligated relationships that Inti can draw up in meeting their variable work load.

The majority of Tegal workshops are without subcontract opportunities and must compete for orders from retail buyers that frequently operate with no loyalty to individual suppliers. The items sought from the cluster are mainly simple products such as pulleys and window fames ordered on the basis of price rather than quality attributes. With cost cutting through the use of inferior raw materials one tactic employed to gain orders, the cluster has remained locked into a downward spiral in which buyers' price expectation of lowers quality, perpetuates a poor reputation and leads individual workshops to guard any new and possibly advantageous technical knowledge gleaned from their retail customers. The main exception to this is a government-assisted cooperative of 17 firms that makes customised, hand-pushed tractors (Pantjadarma, 2004) but in the context of the cluster as a whole this collaboration is insignificant.

The process whereby a select few cluster firms receive market opportunities that are not open to cluster firms in general is a feature shared with clusters linked to overseas markets. The Jepara wooden furniture cluster has been viewed as one of Indonesia's export success stories (Sandee *et al.*, 2000). This claim is justified by the growth in export volume; from around 200 containers per month in 1996 to a high of 2000 per month in 2000. Less promising for the cluster as a whole was an estimate that the top ten firms controlled about 50 per cent of exports (Schiller and Martin-Schiller, 1997, p. 6). Export quality furniture requires technology investment for example to pre-treat timber to prevent warping or cracking in countries less humid than Indonesia. In practice, foreign buyers rather than indigenous enterprise was responsible for much of the upgrading although partly through joint ventures with selected cluster enterprises (ADB, 2001). Some Jepara enterprises have independent access to export trade networks but most production for exports is now controlled by foreign buyers on an order-by-order basis. Consequently, while the Jepara cluster has been counted as employing close to 60,000 people in over 3,000 enterprises, export activity touches only a fraction of the cluster. Domestic production accounts for over half the cluster's employment (Sandee *et al.*, 2000).

Enterprise independence – the Ceper foundry cluster

The case of Ceper, also located in Central Java, is of interest as an illustration of how cluster enterprises can favour external linkages over internal interdependence (Sato, 2000). Ceper has close to 350 metal casting enterprises and history dating back several centuries. Its modern form dates from the 1980s when the number of furnaces more than tripled and the use of machine tools became widespread. In the late 1990s, the cluster accounted for almost a third of Indonesia's annual metal cast production. Enterprises were of three types (Sato, 2000):

(1) A top tier of about ten large foundries with integrated machining and assembling processes, with capacity sometimes augmented by subcontracting to lower-tier foundries in the cluster.

(2) Medium-sized enterprises with machine tooling, enabling processing of cast products, and accounting for around 70 per cent of the industry's employment.

(3) Small home-based foundries specialising in casting and accounting for around 60 per cent of cluster enterprises.

In the case of all types of enterprise, production is mainly to satisfy specific orders. These orders may come from an assembly business (in which case, semi processed components are supplied); a wholesaler or retailer (in which case final goods or replacement components are supplied); or an end-user such as a factory or a public works project seeking equipment parts.

In a sample of Ceper enterprises all types of business in the cluster had direct links to customers outside the locality (Sato, 2000). These linkages were important sources of enterprise development, although this partly depends on the inclination of particular buyers and the nature of individual trading relationships. Whatever the upgrading assistance obtained, in Sato's assessment enterprises prefer to remain as comparatively self sufficient, integrated enterprises. The option of specialising and becoming reliant on linkages with other cluster firms is unattractive. Enterprise owners perceive that specialisation risks being relegating to the lowest tier in a vertical division of labour. To guard against this outcome, owners are described as being disinclined to share any form of market or product information for fear this might put them at a disadvantage. As a result, every firm tends to maintain a wide product range and the cluster as a whole operates with minimal interdependence (Sato, 2000, p. 159). As a consequence, passive search and reach effects were judged to be the main benefits obtained from the cluster. Ceper's high accessibility to the national economy made it possible for enterprise independence to survive. The result has been described as keeping Ceper into a "low road" development strategy in which producers aim at cost reduction to remain competitive (Sandee *et al.*, 2000).

The preference for independence over a potentially higher road to development has been observed elsewhere in the context of unsuccessful public policy initiatives aimed at linking cluster enterprises to sources of technical expertise (ADB, 2001, p. 12).

During the 1990s, urban-based, modern sector firms in industries such as motorcycle assembly played changed their approaches to subcontracting in ways that might these relationships more supportive of business development (Thee, 1997; Hill, 2002, p. 170). This was significant as previously subcontracting networks had been limited, fluid and more characterised by opportunistic behaviour than the pursuit of mutual advantage (Thee, 1994). Capitalising on this, public policy support to promote business linkages and technical upgrading were introduced. These efforts to link clusters with urban-based manufacturing that could provide a source of technological upgrading overlooked suppliers' preference to work with their existing customers (ADB, 2001, p. 12). For example, clusters targeted as potential subcontractors to large-scale vehicle manufacturers frequently preferred to keep their existing role as suppliers to numerous small vehicle repair workshops in nearby large cities. Existing customers tended to be price rather than quality conscious. Switching to serve a single customer with rigorous quality expectations was unattractive although in theory it might have been more advantageous to long-term business growth.

Technological pooling – roof tile clusters

The ability to upgrade through pooling technology among clustered enterprises can be viewed as a prime cluster advantage. Examples of technology pooling have been observed in the case of roof tile clusters but these clusters equally illustrate how pooling can restructure business relations and not necessarily deliver the technology required for long-term growth.

The roof tile cluster in and around the village of Karanggeneng in the Boyolali province of Central Java is one experience that has been claimed to show the development of intra-cluster subcontracting networks that have helped sustain a cluster (Sandee and Weijland, 1989; Sandee, 2002; Sandee *et al.*, 2000). Tile clusters have faced a transition from traditional methods to so-called pressed tiles requiring a significant increase in the use of equipment such as mixers and presses. In Karanggeneng, coordinated change followed visits by groups of Karanggeneng producers to other clusters that had already made the shift and the development of subcontracting ties within the cluster. As predicted by the collective efficiency framework, the joint action increased inequality between cluster enterprises. The largest enterprise operated seven presses in 2002 and employed 34 workers. It rented out another 13 presses to other producers who are used as subcontractors to help complete orders. Machine pressed tiles are not made for stock, unlike lower value roof tiles, meaning that technology pooling is mainly for capacity subcontracting by the lead enterprise rather than being an unambiguous instance of collective advantage. Across Indonesia the number of roof tile clusters has declined as demand for industrially produced tiles has grown. Technological pooling of the sort just described cannot match the economies of industrial production bringing the long-term future of the Karanggeneng cluster into question. A similar experience has been observed in the case of a small village in Bali (Soemardjan, 1992).

Excessive competition – Bali clothing and Jepara furniture

Agglomerations tend to be based on enterprise that has comparatively low barriers to entry. A resulting danger is that new market opportunities attract too much entrepreneurial activity in the sense of encouraging price-based competition that weakens the capacity of individual enterprises to shift to high value activity. The Bali garment cluster was an example of this (Cole, 1998).

The Bali garment industry cluster grew spectacularly in the 1980s. Foreign tourists facilitated initial growth by connecting Balinese producers to retail outlets overseas. Marketing links developed quickly and the industry changed from a seasonal, home-based activity to a putting-out system with subcontracting networks coordinated by the larger producers (Tambunan, 2006). A second wave of foreign buyers took control after a slowdown in the early 1980s and this brought more sophisticated business, production and design skills to the cluster. Further expansion came as Balinese producers started to put out work to workers in East Java. This gave access to a larger workforce but was also motivated by producers who wanted to protect their clothing designs from copying. As the supply expanded, overseas countries buyers tightened their quality inspection procedures in ways that necessitated factory production. By this stage Bali's reputation as a producer of low quality goods had locked it into competition with other low wage Asian economies and the opportunity to establish a unique Bali brand had been lost, at least for a time (Cole, 1998).

Even in the context of clusters based on a long history of production, that might have been thought to generate a limited pool of expertise, immediate market opportunities can bring forward rapid expansion that ultimately becomes a new development challenge. The Jepara furniture cluster has had this experience. The Asian financial crisis and associated collapse of the Indonesian currency in 1997

(Arndt and Hill, 1999; Chang *et al.*, 2001), resulted in a rapid growth of output that exacerbated longer term weaknesses (Sandee and Ibrahim, 2001). Quality control was not maintained to the satisfaction of all foreign buyers, partly as a consequence of a large influx of workers with no prior experience in furniture making. In response, some buyers have shifted orders to other furniture clusters inside and outside Indonesia. An outflow of workers and entrepreneurs to emerging clusters has followed. Overcrowding and a relatively unfavourable location have encouraged some producers to move to other clusters in Central Java.

Linkage dependencies – rattan furniture clusters

Traders and trading houses have been the prime movers in linking clusters to export markets. As well as providing access to new sales outlets, traders help clusters modify designs of traditional products, give advice on production improvements and may assist in financing equipment. Typically the traders having a significant impact on clusters are connected to the markets that they serve rather than the areas that they buy from. A trader's affiliation to an overseas market questions their level of commitment to the clusters that they source from. Sandee and ter Wengel (2002), for example, relate the case of rattan processing clusters in south Kalimantan that were transformed from making low-value products for local consumers into exporters of mats to Japan. The stimulus for change is credited to a Japanese businessman who made the new specialisation possible by introducing technology and product ideas. After an initial success, which saw several clusters participate in the new trade, the Japanese market has declined because of consumer resistance to the product quality. Improvements in production equipment are required that Japanese buyers were reluctant to assist Kalimantan's producers make. The clusters were selected for a rudimentary activity and there is now opportunity to source product from elsewhere in Indonesia where buyers can be more confident of quality production than in Kalimantan. The experience illustrates how traders may promote upgrading without developing long-term commitment to the clusters they trade with. In this context, the development of home-grown buying organisations is significant although they tend to be restricted to handicraft sectors. For example, the Indonesia's People's Handicraft Marketing Service (Pekerti Nusantara) handles output from over 60 clusters (Sandee and Ibrahim, 2001, p. 25).

A rattan-based furniture industry cluster in Padang, West Sumatra has proved more enduring than the cluster on Kalimantan but in this case it has been the cluster's well-developed networks for sourcing raw material that have helped it survive (Tambunan, 1998, 2006). The cluster has secured long-term procurement of raw rattans from elsewhere in West Sumatra and from other parts of Indonesia. Many enterprises in the cluster also have networks with large enterprises outside the cluster who supplied semi-finished rattan products. In contrast, linkages to overseas markets have remained relatively undeveloped. The majority of enterprises sell their products only to local markets, especially those making basic chairs and tables, or have expanded to other regions on the basis of their higher quality production and sales to urban-based trading companies in the cities. Enterprises involved in export activities do this indirectly through agents in foreign countries or through Indonesian-based trading companies.

Beyond the rattan industry, the Cibatu cluster of metal working enterprises is another case illustrating how external linkages to markets have not in themselves sustained the growth of a cluster. The cluster manufactures agricultural equipment, household items, industrial components, various military products and handicrafts such as samurai swords for sale in Japan. Traditionally, enterprises in the cluster marketed their own products without using "middlemen" or traders to nearby markets. This has been changed as the cluster's dependence on distant markets has grown (Sandee *et al.*, 2002; Tambunan, 2006). The result has been to increase the dependency on buyer, order-driven demand: individual buyers, traders or large enterprises have taken control of the design of products and the allocation of orders among Cibatu enterprises. This form of working has reduced the capacity to produce for stock and reduced the scope for enterprises to develop a joint strategy to search for new markets outside their present networks. Large national and international big companies such as PT Astra International, United Tractor Engineering Komatsu and Sanwa now effectively determine how far the cluster will grow and what form it will take.

Conclusion

Agglomeration has been viewed as positive for enterprise and local economic development in the context of some degree of flexible specialisation (Scott, 2002). Indonesian experience identifies that most clusters operate in markets that are not predicated on shifting alliances between diverse enterprises in the manner usually associated with flexible specialisation. Rather two contexts seem to capture the market context of most clusters. Predominantly, the pattern is either that cluster enterprises operate independently, engaged in small scale and customised activities, or that they are a subcontractor to enterprises operating at a more industrial scale of production. The subcontracting connection is frequently based on a narrow operation such as making a specific type of component rather than subcontracting to access a range of skills. Alternatively, in cases such as the roof tile clusters capacity subcontracting occurs with lead enterprises using subcontractor capacity as a risk minimisation strategy. In Indonesia, this means that the minimum criteria for effective agglomeration as outlined by Scott (2002) need to be adjusted to take into account the context in which enterprise clusters operate.

Indonesian clusters are conditioned by the challenges facing business growth in a low income country and by episodic opportunities for market expansion. These two contexts are linked as it means that connections to new markets tend not to be based on unique, hard to replicate skills and that linkages to the global market place tend to remain fragile. Most clusters in Indonesia originate from artisan activities in which communities specialise in products based on comparative advantages derived from locally found raw materials or processing resources. Overtime, the initial advantages can be augmented by the accumulation of industry know how and market reputation. This form of clustering tends to result in localised concentration with industries such palm sugar, bean curd (*tahu*), bamboo weaving, bricks, roof tiles and garments giving rise to numerous small clusters (Weijland, 1999). On this basis, many clusters of batik production still exist across Java at places including Yogyakarta, Pekalongan, Cirebon, Surakarta and Tasikmalaya. With incremental changes in technology and the growth of national markets some artisanal clusters grow into active or dynamic clusters. Smyth (1990, 1992), for example, described how the clustering of rattan furniture

producers absorbed an entire village in Tegal Wangi, West Java and created numerous satellite small-scale industrial activities in neighbouring hamlets.

Advanced clusters generally do not emerge from the continued, incremental development of long established clusters but rather in response to externally generated opportunities. Most usually this arises from connection to an international market. In Indonesia's case this has usually been through individual traders from overseas markets rather than through joining a global supply chain coordinated by an end buyer. The main impact is a sudden jump in opportunities for selected cluster enterprises and the attraction of new enterprise and labour that seeks to capture some of the growth. The result is a rapid transformation in the scale and composition of the cluster. Schiller and Martin-Schiller (1997), for example, recount how the Jepara wood furniture cluster was transformed in the 1980s from a small cluster serving markets around Java into a thriving commercial centre with a five-mile avenue of furniture showrooms and factories, modern hotels, new commercial banks, supermarkets, telephone and fax stalls and European restaurants. For a time clusters such as Jepara appear to be a model success story but rapid development brings challenges and market growth is hard to sustain. Products such as furniture or clothing, on which most of Indonesia's high growth clusters have been based, are susceptible to shifts in fashion, changes in consumer sentiment and competition from alternative sources. Unlike the situation existing for new technology based industry, clustered enterprise does not become a repository of unique skills or production capacities.

From the case studies reviewed in the previous section, it is possible to suggest three attributes that help to distinguish the more effective forms of cluster from those that struggle to sustain business growth:

(1) *Enterprise diversification.* For individual enterprises, maintaining a diversity of markets is important in reducing the barriers to entering new markets. Individual enterprise owners have sometimes resisted moving into potentially more lucrative markets out of concern that increased returns may reduce their independence. This barrier can be reduced where enterprises are able to maintain a diversified customer base, facilitating incremental adjustment in a way that minimises the risk of enterprise capture by a single dominant buyer. Where this occurs, there is the further benefit of enterprise learning being transferred across customers. How far transitions can be managed in this way will partly depend on the entry requirements to gain access to higher value markets. If it depends on large upfront investments in quality assurance and new production technology, there is pressure to make the customer shift more rapidly than where enterprises are able to utilise their existing capacities. Similarly, if buyers must make investments in individual enterprise capacities this is likely to be conditional on the enterprise dedicating a high proportion of their business to the customer's needs.

(2) *Entry barriers.* Overly rapid development of a cluster is a significant risk to its capacity to maintain a competitive advantage. A common assumption is that clusters are based on unique repositories of skills and resources that inhibit the entry of new enterprises and labour. In low-income economies, resources appear to be often highly mobile in pursuing scare opportunities for market growth. This seems to be encouraged by the presence of returned migrants and foreign nationals that disperse their entrepreneurial skills and resources

through joint ventures and subcontracting linkages. Rapid expansion of cluster enterprise becomes a challenge to the sustainability of the cluster as it can intensify price competition and become a disincentive for individual enterprises to invest in quality assurance and superior technology.

(3) *Cluster scale.* In the context of intense supplier competition, individual enterprises within clusters are typically reluctant to share new and possibly advantageous technical knowledge. Sharing information, whether with employees or other enterprise owners, may simply mean that individual enterprise advantages are lost. At the same time, some degree of information exchange is important for innovation and technical upgrading. There is some evidence that in larger clusters, such as the Tegal metalworking cluster, enterprise owners selectively share information with personal friends in non-competing enterprises (Tambunan, 2006). This suggests that cluster scale is a further influence on cluster enterprise in terms of the extent to which clusters facilitate contact with non-competing enterprise.

These three attributes can provide a context in which agglomeration becomes a positive force for development. Their identification has been based on the reinterpretation of existing case studies completed with a more optimistic assessment of the significance of agglomeration. Clearly, there is a need for investigation that starts with awareness that the conditions under which clustering creates advantage may be specific to Indonesia. Such studies would evaluate the significance of the claims made here and possibly diversify the range of necessary conditions for cluster advantage.

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