

van Geenhuizen, Marina; Indarti, Nurul

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## Knowledge and Innovation in the Indonesian Artisanal Furniture Industry

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# Knowledge and Innovation in the Indonesian Artisanal Furniture Industry

Marina van Geenhuizen \*

Nurul Indarti\*\*

## Abstract

The current paper addresses the ways in which small firms in a clustered industry in a developing economy obtain new knowledge and how this is connected with different types and levels of innovation. Indonesia is taken as an example of developing countries and the furniture industry is taken as an example of traditional manufacturing in such countries, facing a fierce competition in global value chains and an urgent need for upgrading to global standards. This study draws on an extensive fieldwork among small firms in the furniture industry in the district of Jepara (Java). A dominance of in-house learning and knowledge obtained from buyers (contractors) could be identified, alongside a small use of sources that directly connect the firms with global knowledge. In addition, about 40% of all innovations is based mainly on tacit knowledge. The outcomes support the idea that a combination of the previously mentioned knowledge sources and type of knowledge is associated with an overall low level of innovativeness in terms of newness in the market place. The paper concludes with a discussion of potential ways for upgrading given the weak position of the firms in the value chain.

**Key words:** knowledge, knowledge sources, clusters, innovation, furniture industry, Indonesia.

\*Faculty of Technology, Policy and Management; Delft University of Technology, Delft, the Netherlands; e-mail: [m.s.vangeenhuizen@tbm.tudelft.nl](mailto:m.s.vangeenhuizen@tbm.tudelft.nl).

\*\*Faculty of Economics, Department of Management, Gadjah Mada University, Yogyakarta, Indonesia.

## **1 Introduction**

It has now become commonplace to refer to knowledge as the primary input into economic processes and as a crucial condition for the ability of companies, communities and individuals to participate successfully in the global economy, both in developed and developing countries (Reich, 1991).

One of the key activities to take advantage of knowledge is knowledge management. In its most basic form, knowledge management can be seen as the explicit and deliberate building, renewal and application of knowledge to maximize a company's knowledge-related effectiveness and returns from its knowledge assets. Knowledge management is connected with different types of innovation, organizational adaptation and effective decision-making (e.g. Sallah and Goh, 2002). Small and medium-sized enterprises in developing economies may not be aware of knowledge management as an explicit and deliberate activity. In small artisanal firms, parents traditionally pass off craftsmanship and commercial wisdom to their children, and innovations are often undertaken on demand of local buyers (contractors) with support of knowledge exchange in the local communities. Besides, many small firms use learning-by-doing and copying from other firms in the cluster as knowledge sources. This local orientation and concomitant reliance on informal and tacit knowledge – often with a relatively poor content – tend to prevent SMEs to obtain the knowledge necessary for innovations (upgrading) to increase competitiveness in a global market (e.g. Beerepoot, 2005; Humphrey and Schmitz, 2000). However, it is often not known how pervasive these patterns are, due to a lack of systematic studies.

Against this background, the current study aims to examine systematically the ways in which small firms in a clustered industry in a developing economy obtain new knowledge and how this is connected with different kinds and levels of innovation. Indonesia is taken as an example of developing countries and the furniture industry is taken as an example of traditional manufacturing in such countries facing a fierce competition in global value chains and a concomitant urgent need for upgrading of business practices to global standards.

## **2 The World Furniture Market and the Jepara Cluster in Indonesia**

The world furniture market grows significantly from year to year. In 2003, the total world furniture market amounted to US\$ 71.64 billion, against US\$ 53.19 billion in 1999 (www.intracen.org). Around 140 countries, including Indonesia, compete with each other in increasing market share. In 2003, the value of furniture export from Indonesia was US\$ 1.57 billion (a share of 2.19% in the world market) giving a rank at place thirteen (Table 1). After the large depreciation of the RUPHIA in 1997, export competitiveness of local enterprises increased in Indonesia and the sector grew rapidly in the wake of the crisis.

**Table 1: Fifteen leading furniture exporters in the world**

No.	Country	Export value in 2003	
		US\$ 000	% share
1	Italy	9,653,259	13.47
2	China	9,035,240	12.61
3	Germany	6,238,988	8.71
4	Canada	4,907,069	6.85
5	Poland	3,871,695	5.40
6	Mexico	3,740,772	5.22
7	USA	3,607,357	5.04
8	France	2,614,329	3.65
9	Denmark	2,398,546	3.35
10	Belgium	2,017,653	2.82
11	Spain	1,728,431	2.41
12	Malaysia	1,620,656	2.26
<b>13</b>	<b>Indonesia</b>	<b>1,569,628</b>	<b>2.19</b>
14	Austria	1,555,761	2.17
15	Sweden	1,472,233	2.05
	Total world export values	71,642,747	100

Source: <http://www.intracen.org/>

The world furniture market today is still dominated by old players, like Italy and China, but there is a tendency that the market share of Eastern European countries increases from year to year. For example, between 1999 and 2003, furniture export values of Poland increased by almost 50 per cent, causing a 5<sup>th</sup> place as a furniture exporter in 2003. Particularly Indonesia is facing an increased competition from China (already in 2<sup>nd</sup> place) and still small but quickly growing Vietnam. On the supply side, there is also the phenomenon of potentially depleting resources, which leads to additional pressure on costs of raw material in particular supplying countries, Indonesia being one of them. The contribution of the furniture industry to Indonesia's GDP is not large. Data, provided for a more comprehensive category, i.e. wood products, indicate a share of less than 5%. Nevertheless, the industry helps, aside from other exporting

manufacturing industries, to counterbalance the dependence on exports of crude oil.

One of the largest furniture manufacturing clusters in Indonesia is that of Jepara in the central part of the island Java. This cluster contains about 3.700 companies and exemplifies a quick growth in the years following the crisis (by 50%) (Table 2). Yet it contributes only for \$ 111.73 million dollar or 7.3 per cent to the national furniture export (2003), indicating the existence of various other large furniture clusters. We selected the Jepara cluster for our study because it grew quickly after the crisis and because – despite the fierce competition with China and Vietnam – it remains attracting customers, indicating a sense for adjustment among the furniture manufacturers (Loebis and Schmitz, 2005). However, most of the Jepara manufacturers are small and ‘captured’ in value chains with low price competition, and seem to rely on knowledge from local buyers. A systematic look into patterns of innovation and underpinning knowledge may clarify the direction of the adjustments in the context of an increased competition.

**Table 2: Size of furniture manufacturing in Jepara, 1997-2002 a)**

	1997	2002
Nr. of firms	2.439 (100)	3.700 (152)
Nr. of workers	38.264 (100)	58.210 (152)

a) partly based on estimations.

Source: Jepara District Office of Industry, Trade and Cooperatives (in Loebis and Schmitz, 2005).

The research questions addressed in this study are as follows:

- (1) What ways are employed by small manufacturers to achieve new knowledge? To what extent are knowledge sources internal or external to the firm, and local (within the cluster) or global? What is the concomitant level of codification of the knowledge underpinning innovation?
- (2) What is the relation between the use of particular knowledge sources and innovativeness, and what are – given specific subcontracting relations of the firms - the potentials for upgrading business performance and increasing competitive power to a global level?

The remaining of the paper is divided into five sections. First, we briefly discuss various theoretical perspectives and concepts used in the current study. This is followed by a section on the design of the empirical work. Next, we present the results concerning the ways in which small furniture

manufacturers achieve new knowledge as well as their patterns of innovation. In a separate section, we examine differences in knowledge gaining between firms that are more innovative and those that are less innovative. We conclude the paper with a discussion of the results and potential ways for upgrading of business operations of low innovative manufacturers, including some brief policy recommendation and future lines of research.

### **3 Knowledge Gaining and Innovation**

New knowledge can be seen as a key resource in competition. Provided that it is - to a certain extent - unique, difficult to transfer and to be imitated, new knowledge gives competitive edge. Many authors have argued that knowledge management is an important business activity and a determining factor in innovation (Nonaka and Takeuchi, 1995; MacDonald, 1998). According to Cohen and Levinthal (1990) knowledge capacity - defined as an organization's ability to recognize the value of new external knowledge and to assimilate and apply it effectively - is a critical part of an organization's potential to innovate.

Strategies to increase new knowledge can be divided into those focusing on internal sources and those focusing on external sources. Employing internal sources may follow a structured path (planned) like in-house research and development and small scale experimentation, but it may also be incorporated in the way of working, like learning-by-doing. External sources encompass a wide range of sources. According to Afuah (2003), knowledge sources - as *functional* sources of innovation - can be classified into five major categories: (1) internal value-chain functions; (2) external value-added chain of suppliers, customers, and complementary innovators; (3) university, government and private laboratories; (4) competitors and related industries; and (5) other nations or regions. Among SMEs in developing economies the first two categories and concomitant actors may play a strong role, e.g. internal value-chain functions by family members and friends, and external value-adding activity, mainly by local buyers (contractors) and suppliers.

Achieving new knowledge may be rather expensive. Ogawa (1998) gives various reasons for high costs of transfer, like the nature of the knowledge itself - e.g. a high complexity and a protected status of the knowledge - and the type of channel used for transfer, like in the situation of embodied knowledge when buying new equipment. However, in most developing economies where small firms operate within the confines of subcontracting relationships, new knowledge is often provided for free by

buyers. But this knowledge is also one-sided including a limited scope for subcontractors, because it aims at increasing the competitiveness of the buyers in first place (e.g. Geriffy, 1999). Achieving knowledge from buyers tends to cause a focus on product innovation, such as an improved product or new design. Particularly if the subcontracting relations give only small margins, the few organizational (managerial) and process innovations that take place tend to support survival, rather than significantly improve business performance. Aside from buyers (contractors), new knowledge originates in the local community - neighbors, family and friends in the same business - as mainly tacit knowledge. Different from clusters in the *developed* world, this knowledge is *disconnected* from global knowledge flows and tends to reproduce traditional practices (e.g. Humphrey and Schmitz, 2000, 2002).

The previous circumstances indicate the existence of a relationship between the knowledge sources used and the types of innovations introduced in business practice (e.g. Darroch and McNaughtan, 2002). This calls for an appropriate applied study on the basis of systematic fieldwork among small manufacturers.

#### **4 Research Design**

This study employed an extensive fieldwork among small firms in the furniture industry in the district of Jepara. Most of the small firms, being home industry and family business - are not registered and therefore, the sampling was based on visibility of the manufacturers from the streets and on the researchers' knowledge about presence and development of furniture industries in the various villages. The sampling was done in such a way that the selected firms fairly represent the large segment of very small firms and the small segment of somewhat larger firms. Accordingly, most firms are independent businesses and fall in the class of less than 25 employees (80%). The remaining ones are subsidiaries and somewhat larger but still less than 100 employees. Data were collected in April and May 2005 on the basis of personal face-to-face interviews and this fieldwork produced a sample of 90 manufacturers. According to estimations by the furniture association, the sample represents about 3 per cent of the population of furniture manufacturers in Jepara.

Interviews supported by a semi-structured questionnaire were carried out by well-instructed students and staff members of the Gadja Madah School of Management (Yogyakarta). This way of working enabled to provide respondents with additional explanation concerning the more complicated

questions, like on the difference between tacit and codified knowledge and the level of innovativeness (ranging from new to the firm to a breakthrough in the world) and to keep an eye on correct answering if necessary. Note that the answers given reflect to a large extent the self-image of the furniture manufacturers and this image may be somewhat colored by a certain optimism among them, also reported in other studies (e.g. Loebis and Schmitz, 2005).

The analysis presented in the next section is purely descriptive. It depicts the pattern of knowledge gaining and the pattern of innovation. The section that follows hereafter, however, presents a comparative analysis between more innovative and less innovative firms, revealing some indications of causal relations between knowledge gaining typical for clusters in developing countries and level of innovativeness of the firms concerned.

## 5. Knowledge Sources and Innovation

The importance of various knowledge sources was measured on a five-point scale, with 1 as virtually no importance and 5 as very strong importance. New knowledge among the small Jepara furniture manufacturers appears to be partly developed within the firms and partly derived from outside sources (Table 3). Learning-by-doing and buyers (customers) are considered as the most important knowledge sources, witness an average score of 4.15. In addition, in-house experimentation ranks among the most important ways of achieving new knowledge (a score of 3.96). It appears that the manufacturers make less often use of sources that link them with mainly global knowledge, like consultation of specialists, research institutes, and government agencies (scores between 2.01 and 1.76). Also, the Internet is not often used as a source of knowledge (a score of 1.73), a situation that can be explained by a poor access to this source (just a little more than 10% of the manufacturers has access to the Internet). Knowledge sources that are an exception to the small use of global sources, are magazines (newspapers), exhibitions and television (radio) (scores between 2.58 and 2.42). The dominant pattern of local knowledge sources implicates that knowledge necessary to make the companies familiar with up-to-date standards and requirements to compete in global markets reaches them only to a limited extent.

**Table 3: Knowledge sources, average scores on importance**

	<i>Currently</i>	<i>Near future</i>	<i>Significance of t-test outcome</i>



<i>Mainly local origin</i>			
Learning-by-doing	4.15	4.47	**
Experimentation on purpose	3.96	4.37	**
Buyers (customers)	4.15	4.38	*
Suppliers	3.27	3.95	**
(Other) business partners	3.66	3.95	**
Friends, neighbors, etc.	2.61	2.89	**
Religious affiliations	1.97	2.22	**
Competitors	2.72	3.23	**
<i>Mainly global origin</i>			
Industry association	2.01	2.58	**
Research institutions, universities	1.76	2.24	**
Consultants	1.79	2.07	**
Exhibitions	2.56	3.71	**
Government agencies	1.97	2.51	**
Magazines, newspapers	2.58	3.38	**
Television, radio	2.42	3.33	**
Internet	1.73	3.48	**

\*p>0.05, \*\*p>0.01

Source: Fieldwork

The types of knowledge used fit into the previous pattern. Mainly tacit knowledge is the basis for knowledge exchange for almost 40% of the innovations. This may include knowledge exchange between the manufacturers and buyers, family members and local friends on interpretations of, for example, ways of copying new furniture design (style). Slightly more common is the use of a combination of tacit and codified knowledge (42.3%), whereas mainly codified knowledge is used in supporting a minority of the innovations (20%). An example in this context is a manual delivered with new machinery. A dominant use of local, tacit knowledge is also found in a study of artisanal furniture industry in the Philippines (Beerepoot, 2005).

Of course, the ways of accessing new knowledge by the Jepara manufacturers are not the result of a rationally established knowledge management. These manufacturers act upon family traditions and trust within the local community. At the same time, there is an overall ambition to make a greater use of all sources of knowledge, including the ones of global origin (Table 3). The differences between future importance and current importance are significant for all knowledge sources. However, most manufacturers suffer from constraints in realizing their ambitions. As much as 94.7% of them are facing obstacles and most of these obstacles (80.2%) are financial (Table 4). We may understand from the relatively small current and also future use of research institutions (universities) and consultants that financial barriers are particularly active in accessing these

knowledge sources. Among non-financial barriers, the missing capability to understand highly complex subject matter and foreign language appear to be a major set of barriers (together 10.5%). A large physical distance to knowledge sources is of minor importance.

**Table 4: Obstacles to access new knowledge**

<i>Obstacle</i>	<i>N</i>	<i>%</i>
Financial	199	80.2
High level of complexity of new knowledge	25	8.1
Large physical distance to knowledge source	11	4.4
Language barriers	6	2.4
Others	10	4.8

N = 251 (obstacles).

Source: Fieldwork

By focusing on the manufacturers' expectations in the near future in more detail, it becomes clear that they particularly expect an increase of using global knowledge sources (Table 3), namely the Internet, exhibitions, and through magazines and newspapers. Apparently, financial obstacles are no hindrance to access these particular sources in the near future.

In the remaining section, the pattern of innovation will be examined. The importance of innovations could be identified by asking the manufacturers the three most important ones on the basis of contribution to turnover. Next, a distinction could be made between product, service, process, market, logistic and organizational (managerial) innovations. The level of innovativeness could be determined by distinguishing between the context in which the innovations are new, i.e. only new for the firm, new for the sector in the region, new for the sector in Indonesia, and new in the world.

Product innovations appear to be the most important category (Table 5). Out of 270 reported innovations, product innovation (31.9%) stands out as most significantly contributing to turnover. New product design and new types of products are the most common product innovations. The second and third most important ones are market (26.7%) and logistic (23.0%) innovations, respectively. If we focus on innovations that contribute most to turnover, the role of product innovations is even stronger. Almost half of these innovations are product innovations (47.8%). The same holds for market innovations, but not for logistics innovations. The latter innovations follow from a situation in which reserves of good quality raw material (wood) are shrinking and manufacturers are forced to search for new sources, new suppliers or an innovative organization of transport of wood over larger distances to the factories. Thus, logistics innovations contribute to the survival of the firms, not to extra income. Further,

process innovations are of minor importance, whereas organizational (managerial) innovations are very rare and confined to large companies. The typical Indonesian culture in which uncertainty avoidance is high (Hofstede, 1991) contributes to an explanation of the virtual absence of the latter innovations.

**Table 5: Type of important innovations a)**

<i>Type of innovations</i>	<i>First important innovation</i>		<i>All three most important innovations</i>	
	<i>N</i>	<i>%</i>	<i>N</i>	<i>%</i>
Product	43	47.8	86	31.9
Service	4	4.4	28	10.4
Process	4	4.4	19	7.0
Market	25	27.8	72	26.7
Logistics	14	15.6	62	23.0
Organizational	0	0.0	3	1.1
Totals	90	100	270	100

a) Importance on the basis of contribution to turnover.

Source: Fieldwork

A dominant position of product innovation as observed among the small Jepara furniture manufacturers is in line with research findings for SMEs in other developing economies, e.g. in Tanzania. Kristiansen et al. (2005) observe that most innovations among small garment and furniture industries occur in products, while process, organizational, and logistics innovations are rare.

With regard to newness of the innovations, the vast majority of innovations (81.0%) is merely new for the firm (Table 6). 11.8% of the innovations are considered to be new for the sector in the region, 5.3% are considered new for the sector in Indonesia, and the remaining innovations (1.9%) are considered new in the world. The few latter innovations – to be considered as radical or a break-through – mainly include product innovations. However, the vast majority of product innovations (79.8%) is merely new for the firms, indicating that these are often incremental in nature, connected with learning-by-doing and demand from buyers. By comparing the different types of innovations, it becomes clear that the newness of the other types of innovations, except for logistic ones, tends to be even stronger confined to the own firm than in the case of product innovations (up to 85.7%). Logistic innovations tend to be most often new outside the firm. This pattern may be explained by the fact that in-bound and out-bound logistics are by definition taking place outside the confines of small firms and their localities.

**Table 6: Types and newness of innovations**

<i>Type of innovation</i>	<i>New for the firm</i>		<i>New for the sector in the region</i>		<i>New for the sector in Indonesia</i>		<i>New in the world</i>	
	<i>n</i>	<i>%</i>	<i>n</i>	<i>%</i>	<i>n</i>	<i>%</i>	<i>n</i>	<i>%</i>
Product	67	79.8	9	10.7	4	4.8	4	4.8
Service	24	85.7	2	7.1	2	7.1	0	0
Process	16	84.2	3	15.8	0	0	0	0
Market	58	85.3	8	11.8	2	2.9	0	0
Logistic	45	73.8	9	14.8	6	9.8	1	1.6
Organizational	3	100.0	0	0.0	0	0.0	0	0.0
All innovations a)	213	81.0	31	11.8	14	5.3	5	1.9

a) non-responses of 2.6%.

Source: Fieldwork

Although the interpretation of the previous patterns is hampered by a lack of standards for comparison, we may conclude on the basis of newness of innovations that the level of innovativeness among SMEs in the Jepara furniture industry is relatively modest. This complies with the pattern of knowledge creation and exchange through in-house activity and local networks of mainly subcontractors in other studies. However, there is some differentiation in innovativeness between the companies in Jepara. A small segment of the manufacturers is able to produce radical product innovations. In the next section, we take a closer look at differences between more innovative firms and less innovative firms in terms of knowledge sources and types of knowledge used. We particularly examine the idea that a dominance of local sources and tacit knowledge is associated with low levels of innovativeness.

## 6. More Innovative Versus Less Innovative Firms

This section attempts to clarify whether the level of innovativeness is influenced by the pattern of knowledge use. To this purpose, a comparative analysis was carried out between firms engaged in different levels of innovativeness. The level of innovativeness was determined as follows: a weight was assigned to each of the three most important innovations based on the degree of newness (i.e. new for the firm (1), new for the sector in the region (2), new for the sector in Indonesia (4), and new in the world (8). For each firm, the sum of the weighted outcomes of the three most important innovations was calculated as an overall score. Firms facing a score below the average score were considered as less innovative (65 out of 90) while those with a score above average were considered as more innovative (25). Of course, the weighting procedure is

subjective in a way, but it clearly reflects a difference in valuation of innovations, i.e. between the more local, incremental innovations on one end of the spectrum and the more radical innovations, new in a national or global context, on the other end. In terms of structural characteristics, the more innovative firms tend to be often somewhat larger, older and more often a subsidiary of larger firms.

It appears that more innovative firms make a smaller use of in-house learning (experimentation) than less innovative firms and that the former firms also make less use of buyers (customers) to gain new knowledge; but only the difference concerning the latter source is significant (mean difference of 0.28) (Table 7). This outcome supports the idea that disclosing new information mainly through buyers hampers innovation among small subcontractors.

**Table 7: Knowledge sources, average scores on importance**

	<i>Less innovative firms</i>	<i>More innovative firms</i>	<i>Significance of t-test outcome</i>
<i>Mainly local origin</i>			
Learning by doing	4.16	4.12	
Experimentation on purpose	4.00	3.87	
Buyers (customers)	4.22	3.94	*
Suppliers	3.22	3.36	
(Other) business partners	3.61	3.76	
Friends, neighbors, etc.	2.53	2.82	*
Religious affiliations	1.86	2.26	*
Competitors	2.69	2.79	
<i>Mainly global origin</i>			
Industry associations	1.95	2.17	
Research institutions, universities	1.72	1.86	
Consultants	1.78	1.81	
Exhibitions	2.46	2.85	*
Government agencies	1.84	2.27	*
Magazines, newspapers	2.52	2.77	
Television, radio	2.37	2.61	
Internet	1.68	1.95	

\*p>0.05, \*\*p>0.01

Source: Fieldwork

For more innovative firms, all other mainly local and mainly global knowledge sources tend to be more important compared with less innovative firms, which indicates that the former tend to use more knowledge in supporting production processes and innovation. In particular, a relatively strong use (compared with low innovative firms) is made of exhibitions and government agencies, witness mean differences that are significant. These sources apparently give a relatively strong push towards higher levels of innovation by transferring global information.

Remarkably, more innovative firms make also a relatively strong use of local knowledge sources through friends, neighbors and religious affiliations. This seems to contradict our expectation that local knowledge in developed economies is not favorable for upgrading business according to global standards. However, more innovative firms may have developed the ability – through knowledge of global standards - to filter local knowledge and merely absorb those components that support an improved performance. In addition, if we focus on the types of dominant knowledge used, it appears that more innovative firms make a stronger use of codified and a mix of codified and tacit knowledge compared with less innovative firms (80.0% versus 50.8%) (Table 8). This difference is significant. Thus, the idea that using mainly tacit knowledge exchange is not a supporting mechanism in clusters in a developing economy, is supported by our data on the type of knowledge underpinning innovative activity.

**Table 8: Types of knowledge underlying innovations (a)**

	Codified and mixed codified /tacit	Mainly tacit	All firms
Less innovative firms	33 (50.8%)	32 (49.2%)	65 (100.0%)
More innovative firms	20 (80.0%)	5 (20.0%)	25 (100.0%)
All firms	53 (58.9%)	37 (41.1%)	90 (100.0%)

Chi-square = 6.37,  $p < 0.05$

Source: Fieldwork

## 7. Concluding Remarks

This paper contributes to the discussion on the use of particular types of knowledge by artisanal firms in developing economies and impacts of this

use on the level of innovativeness of the firms. By taking the furniture industry in the district of Jepara (Java, Indonesia) as an example, a dominance of in-house learning and knowledge gaining from buyers (contractors) could be identified, alongside a small use of sources that directly connect the firms with global knowledge. In addition, about 40% of all innovations is based on mainly tacit knowledge. Our outcomes support the idea that a combination of the previously mentioned knowledge sources and type of knowledge is associated with an overall low level of innovativeness in terms of newness in the market place. Most of the innovations are only new to the firm (81%). Nevertheless, a small segment of more innovative firms could be identified. These firms tend to differ from the less innovative ones in various ways. First, they make an overall stronger use of knowledge but rely less on knowledge exchange with buyers (contractors). Secondly, with regard to global sources, they rely significantly more on exhibitions and government agencies than low innovative firms. Third, they make less use of mainly tacit knowledge in processes underlying innovation. Accordingly, support programs that aim to increase the innovative level of small manufacturers need to give due attention to enhancing such patterns of knowledge achieving, provided that financial barriers can be removed.

However, this does not mean that the majority of the small firms - holding a relatively poor position as subcontractors - can easily escape from such a position. Power relations in the supply chains may hamper upgrading and limit the flow of key knowledge within chains. At the same time, a basic requirement for upgrading is the strategic intent of the firms involved. If this strategic intent exists, various ways of breaking out the poor position can be envisaged (e.g. Humphrey and Schmitz, 2000, 2002). We mention two of them:

- To use the new knowledge for supplying *other* markets than that of the buyer, in which relationships are more balanced, e.g. to modify a design. Small producers cannot easily compete directly with their powerful buyers; therefore, other markets are essential.
- To move to functions that leading firms in the chain leave open, like in logistics and in development of new processes and adaptations to existing design.

How far upgrading can go depends on the type of buyer and type of uneven relationships with them, as well as on the ability of small producers to make individually or collectively the required investment. Here lies a task for future research, i.e. to evaluate which factors - aside from global knowledge - determine success and failure of upgrading strategies in the cluster of Jepara, but also in other clusters to enable joint

learning. The role of regional/local government agencies in a scenario of upgrading would be at least to create conditions that enable global knowledge to flow into the local clusters in such a way that it can be accessed and absorbed by all firms in the cluster.

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