

## **Chapter 6      Patterns of Technological Innovation in Muar Wooden Furniture Industry: Learning, Linkages and Institutions**

### **6.1      Introduction**

This chapter explores and describes the technological innovation activities amongst the SMEs in the Muar wooden furniture manufacturing cluster. The findings from the interviews with innovation actors and direct observations on the common practices in the Muar furniture industry are used to complement the innovation survey findings in Chapter 5.

This chapter is divided into three parts. It begins with the introduction of the Muar District and its manufacturing activities. This is followed by an overview of the Muar furniture industry from the perspective of its emergence, structure and characteristics, and the factors that have contributed to the success of the industry. The second part of this chapter draws attention to the key elements of SIS of the Muar furniture industry, namely the technological and knowledge domain, learning and capabilities building, actors and networks, and institutions and routines. The third part will explore the factors that hamper the technological innovation efforts among the SMEs. The strategic thrusts that would contribute to the development of the industry are suggested at the end of this chapter.

## 6.2 Background of Muar District

Muar District is located in the north-western of Johor state, Malaysia. It borders Malacca state to the north, Segamat District to the east and Batu Pahat District to the south. Prior to the re-delineation of Muar's local administrative entities in 2001, the administration of Muar District was divided into two administrative councils – the Northern Muar District Council, and Southern Muar District Council. Both these councils are at the third level of government after the Federal Government and the State Government of Johor. The Northern District Council administrative territory is commonly known as Tangkak sub-district and Tangkak is the main town and the centre of the council's administration. Meanwhile, the Southern Muar District Council governs the planning and development of the southern parts of Muar District. Muar town, also referred to as *Bandar Maharani* (or the Empress Town) is the most important commercial and administrative centre in Muar District. It is 150 kilometres southwest to the Malaysian capital Kuala Lumpur, and 180 kilometres north-west of Singapore.

In 2001, there was a major administrative change, and the Tangkak sub-district was upgraded into a full district of Ledang and the Tangkak District Council is the local administrative authority of Ledang District. Concurrently, the Southern Muar District Council was also upgraded to Muar Municipal Council, or *Majlis Perbandaran Muar* (MPM). However, both administrative districts are still collectively called Muar District by their residents. Some of the on-going state and local development plans, such as Johor State Structure Plan 2020, and Muar District Local Plan 2002-2015 still use “Muar District” when referring to both the Muar and Ledang Districts. For the purpose of this research, the term “Muar District” is used mainly to refer to the southern part of

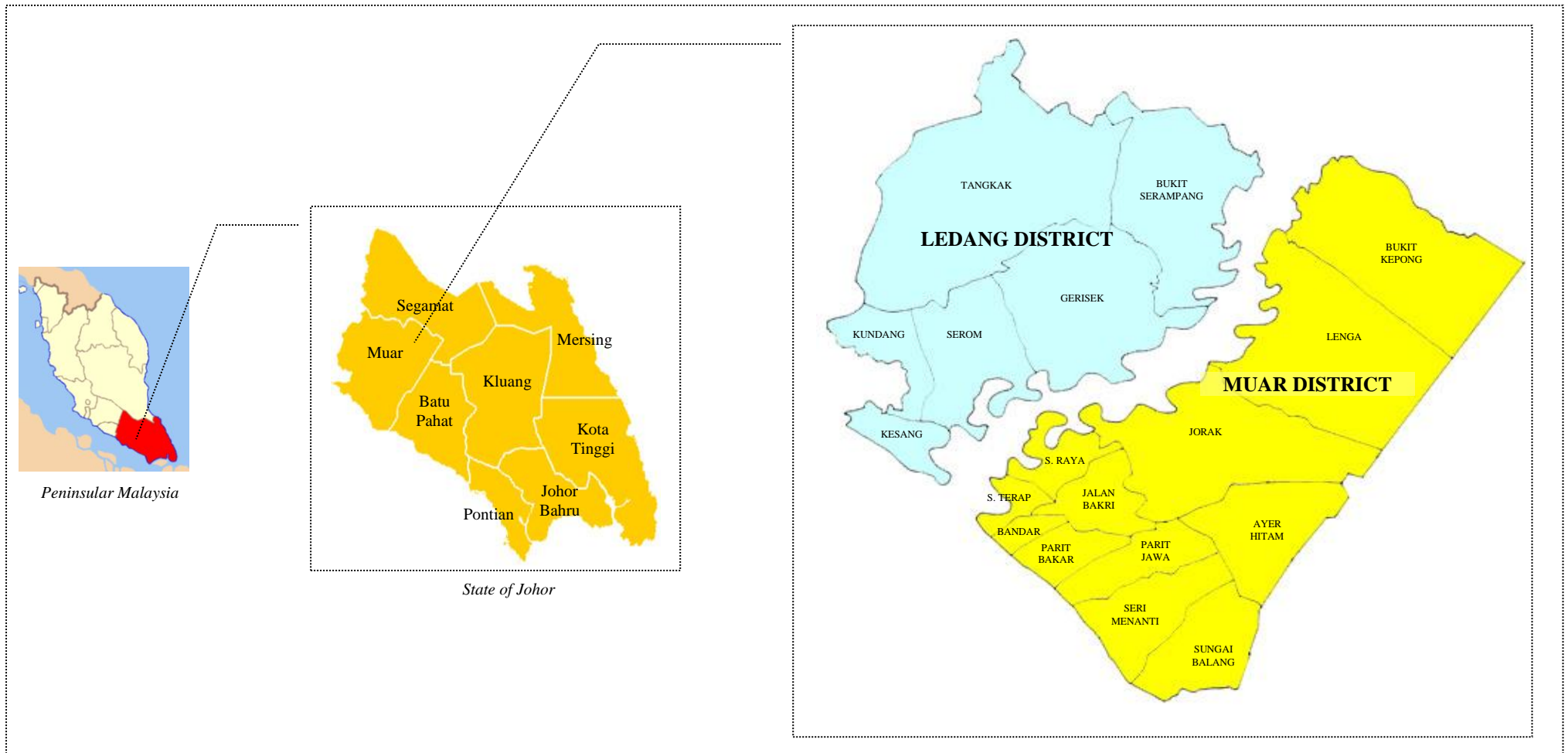
the Muar District, which is the previous Southern Muar District Council territory. This is because most of the furniture manufacturers are located there, particularly in Pagoh, Sungai Terap, Bukit Pasir, Bukit Bakri, Parit Jamil, Parit Jawa and Parit Bakar.

Presently, Muar District consists of twelve sub-districts, namely Bandar, Sungai Terap, Sungai Raya, Jalan Bakri, Parit Bakar, Parit Jawa, Seri Mananti, Sungai Balang, Ayer Hitam, Jorak, Lenga and Bukit Kepong. Ledang District consists of six sub-districts, namely Kesang, Serom, Kundang, Tangkak, Gerisek and Bukit Serampang. Figure 6:1 shows the current local administrative territories of Muar and Ledang District. The administrative territory of MPM covers 137,572 hectares and has a population of 330,355 people (MPM, 2002). The comprehensive administrative system of Muar District, as other district-level administrations in the country, is available in the Muar District Local Plan 2002-2015.<sup>39</sup> According to MPM (2002), 70.54 percent of land-use in Muar District is for agricultural activities. Of this, 21.33 percent is for rubber plantations, which is the main source of wood for the Muar furniture industry. Only 0.34 percent of the land is used for industrial activities. However, this figure doesn't capture the true picture of the land-use for industrial activities because most of the firms, especially the small and micro-sized enterprises are operating on the agricultural and residential land. The details of industrial activities in Muar District will be discussed in the next section.

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<sup>39</sup> In general, the administration system of Malaysia's spatial and physical is three-tiered, consisting of the federal government, the state governments, and local authorities (such as city, municipal, and district councils). At the national level, the National Physical Plan, or *Rancangan Fizikal Negera* (RFN) is prepared by the Town and Country Planning Department based on the requirement of the Town and Country Planning Act 1976 (A1129). It contains a written statement formulating strategic policies in determining the general directions and trends of the physical development of the country and to be accompanied by indicative plans. At the state level, the State Structure Plan, or *Rancangan Struktur Negeri* (RSN) is prepared by the State Department of Town and Country Planning to set out the policies and proposals for the development and use of the land in a state based on policies and directions stated in RFN. The local authorities prepare the District Local Plan, or *Rancangan Tempatan* (RT). RT controls the development at the local level and details the land use plan that incorporates the national as well as the state development policy.

Figure 6:1 The administrative territories of Muar District and Ledang District



Source: Author's compilation

### 6.3 Manufacturing activities in Muar District

According to JPBD (2007), there were 2,768 manufacturing establishments in the state of Johor in the year 2000. Of these, about 10 percent are in Muar District. Most the establishments in Johor are involved in metal and machinery fabrication (27.6 percent). Wooden products and furniture establishments are ranked third (14.1 percent) after the chemical, petroleum, and rubber or plastic products (20.1 percent). Table 6:1 shows the distribution of manufacturing industries in Johor for the year 2000.

Table 6:1 Distribution of manufacturing industries in the state of Johor, 2000

District	Number of Establishment									Total	Percent
	Food & beverage	Textile & clothing	Wooden products & furniture	Paper & printing	Chemical, petroleum, rubber / plastic products	Non-metallic minerals	Metals	Metal & machinery fabrication	Others		
Johor Bahru	142	130	137	159	444	53	72	557	130	1,824	65.8
Pontian	12	7	10	-	8	3	1	25	4	70	2.5
Batu Pahat	30	98	51	17	45	11	2	43	18	315	11.4
Muar	12	18	137	10	28	6	-	60	6	277	10.0
Segamat	5	5	14	3	6	4	-	19	1	57	2.1
Kluang	16	34	25	7	20	20	1	50	4	177	6.4
Kota Tinggi	2	1	13	2	5	5	-	7	-	35	1.3
Mersing	5	1	2	-	1	-	-	3	1	13	0.5
Total	224	294	389	198	557	102	76	764	164	2,768	100.0
Percent	8.1	10.6	14.1	7.2	20.1	3.7	2.7	27.6	5.9	100.0	

Source: JPBD (2007)

According to the Muar District Local Plan 2002-2015, the existing industrial zones are sufficient to cater for the projected industrial demand till year 2015. Hence, there is no plan to establish any new industrial zones at the moment, but there are plans to reallocate industrial establishments that are not on industrial land, that is, the illegal factories, into the industrial zones.<sup>40</sup> Table 6:2 lists the industrial activities in Muar District and its location whereas Figure 6:2 shows the main industrial estates in Muar District, namely Tangkak, Tanjung Agas, Jorak, Parit Jamil, Pagoh, Bukit Bakri, and Grisek.

Table 6:2 Types of industrial activities in Muar District and its location

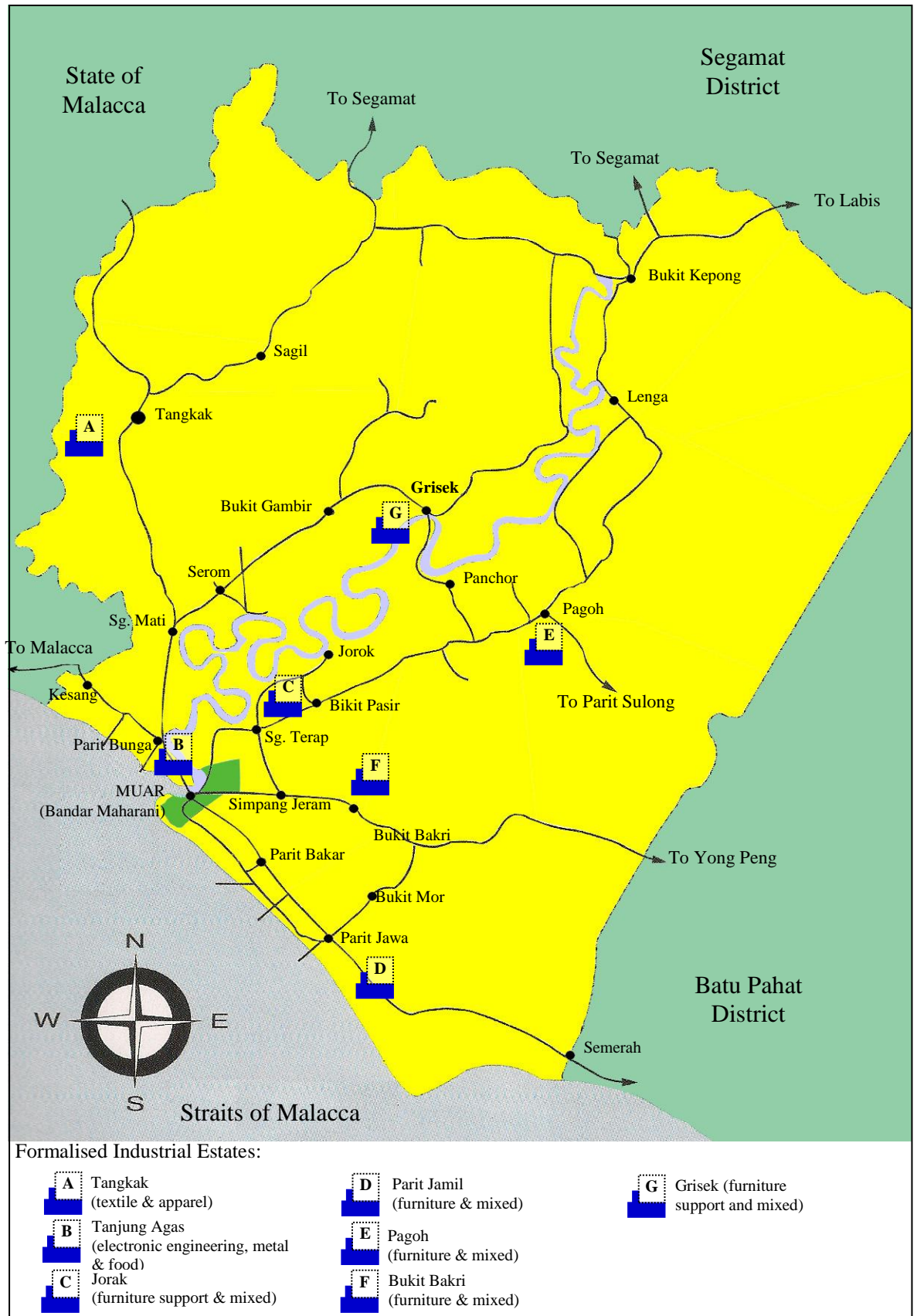
Types of Industrial Zone	Main Activities and Location
Furniture and mixed industrial zone	<ul style="list-style-type: none"> <li>Formalised industrial area of Pagoh, Bukit Pasir, Simpang Jeram and Parit Jamil</li> <li>Core product is furniture</li> <li>Focuses on furniture, mixed, textile etc</li> </ul>
Furniture support and mixed industrial zone	<ul style="list-style-type: none"> <li>Formalised industrial area of Sg. Terap and Gerisek</li> <li>Focuses on furniture support and mixed industry</li> </ul>
Textile industrial zone	<ul style="list-style-type: none"> <li>Tangkak Industrial Area and Sagil Industrial Area</li> <li>Focus on textile and apparel industry</li> </ul>
Electronic engineering, metal and food industrial zone	<ul style="list-style-type: none"> <li>Tanjung Agas Industrial Area</li> <li>Focus on electronic engineering, metal, chemical products, rubber and food</li> </ul>
Small and medium industrial zone	<ul style="list-style-type: none"> <li>Parit Bakar, Parit Jawa, Kesang, Serom and Semerah</li> <li>Focus on food , furniture cluster support, craft industries and workshops</li> </ul>

*Source: MPM (2002)*

<sup>40</sup> However, this contradicts the feedback obtained from the industry practitioners. According to them, there is currently a shortage of industrial land in Muar District. See Section 6.6 for a more detailed discussion.

Figure 6:2 shows the location of the main industrial estates in Muar District and its key activities. The industrial estates in Muar can be classified into four zones, namely furniture zones, textile zones, electronic engineering, metal and food zones, and SMEs zones (MPM, 2002). The Muar furniture industry is concentrated around the furniture and furniture support industrial zones, which span across the formalised industrial area of Pagoh, Bukit Pasir, Simpang Jeram, Parit Jamil, Sungai Terap and Gerisek. Besides, quite a number of small and medium-sized furniture manufacturers are operating on the non-formalised industrial area at Bukit Bakri, Parit Bakar and Parit Jawa. The following part of this chapter provides a comprehensive view of the Muar furniture industry.

Figure 6:2 Main industrial estates in Muar District



Source: Adapted and modified from MFA (2008) and MPM (2002)



## **6.4 Introduction to the Wooden Furniture Cluster**

This section provides a comprehensive introduction to the Muar wooden furniture cluster. It begins by exploring the emergence and development of the cluster. This is followed by the current structure and characteristics of the cluster. The success factors of the cluster are also discussed at the end of this section.

### **6.4.1 Its Emergence and Development**

The Muar furniture industry has been around for more than three decades. Across 30 years, it has witnessed not only the rise of furniture manufacturers, but the upstream and downstream industries as well. It all began with the first backyard furniture workshops in the village of Parit Bakar, and the village has become one of the seven main industrial zones in Muar. According to Thean (1998):

Muar is the ‘furniture town of Malaysia’. Along the narrow ‘main road’ of Parit Bakar, wooden house are sandwiched between furniture factories. Some of these shanty-looking factories enjoy sales of RM 2 million a month. The furniture industry of Muar employs about 25,000 workers and sources up to 90% of its raw materials locally.

The development of the Muar furniture industry can be divided into three main phases, (a) the infant stage in the 1970s, (b) industrialisation stage in early 1980s, and (c) export era in the late 1980s and 1990s.

- a) *Infant stage (1970s)* – This was the early stage of the industry. There were only a few scattered furniture factories manned by three to five workers making furniture the traditional way. There were no industrial associations and the workers were mostly unskilled and illiterate. The industry was generally cottage-based as the staff were not trained to manage the business and they had no means to expand the market and lacked bargaining capability. Their earnings were seasonal and uncertain because the orders came in mainly during special occasions, such as weddings, Chinese New Year, and other festivals (MFA, 2008). Although mass production of furniture had not started at this stage, the contribution of this stage to the future development of Muar as a world class furniture cluster was very significant. By this stage, a pool of highly skilled carpenters and furniture makers had been produced. These elite furniture craftsmen became one of the main drivers of the Muar furniture cluster in the early 1980s.
- b) *Industrialisation stage (early 1980s)* – Since there was no other key industrial activities in Muar, participating in the furniture industry was the first preference for those who did not intend to venture into either agriculture or construction. According to a senior industry practitioner in Muar, most of the parents of the school leavers preferred their children to become apprentices in furniture companies rather than seek other employment. Many of the apprentices, after gaining years of experience, would form their own companies and supply parts to their former employers. They would feel proud to be part of the growing furniture industry (personal communication, May 6, 2010). At the same time, the furniture makers began to adopt semi-

automated manufacturing process in their production. The low entry barriers resulted in many of those who owned small parcels of land and had the capital to jump on the bandwagon by purchasing new machinery to start producing furniture on their property. This was the period that signalled the start of the era of industrialisation of furniture making in Muar (MFA, 2008).

Besides the internal drivers discussed above, the investment and relocation of the Taiwanese furniture enterprises to Muar was the main external factor that contributed to the industrialisation stage in Muar. Taiwan, a leading country in the furniture industry at that time, was looking for a new production base due to the shortage of materials and the increasing production cost in their own country. Interview with a MFA's senior management officer revealed that, Muar which had a pool of skilful furniture makers, abundance of tropical woods and cheaper workforce became one of the favourite choices for Taiwanese furniture enterprises. Another advantage of Muar, compared to other regions, is that most of the furniture makers there were Malaysian Chinese who could speak fluent Mandarin. In this regard, they had no communication barriers with the counterparts from Taiwan (personal communication, April 29, 2010).

- c) *Export era (late 1980s and 1990s)* – This was the beginning of the export era of the Muar furniture industry. The main reason for this was that the limited local market was not able to absorb the exponential production growth of the furniture manufacturers due to industrialisation. The local market was basically full of cut throat competition and fights, and there was little

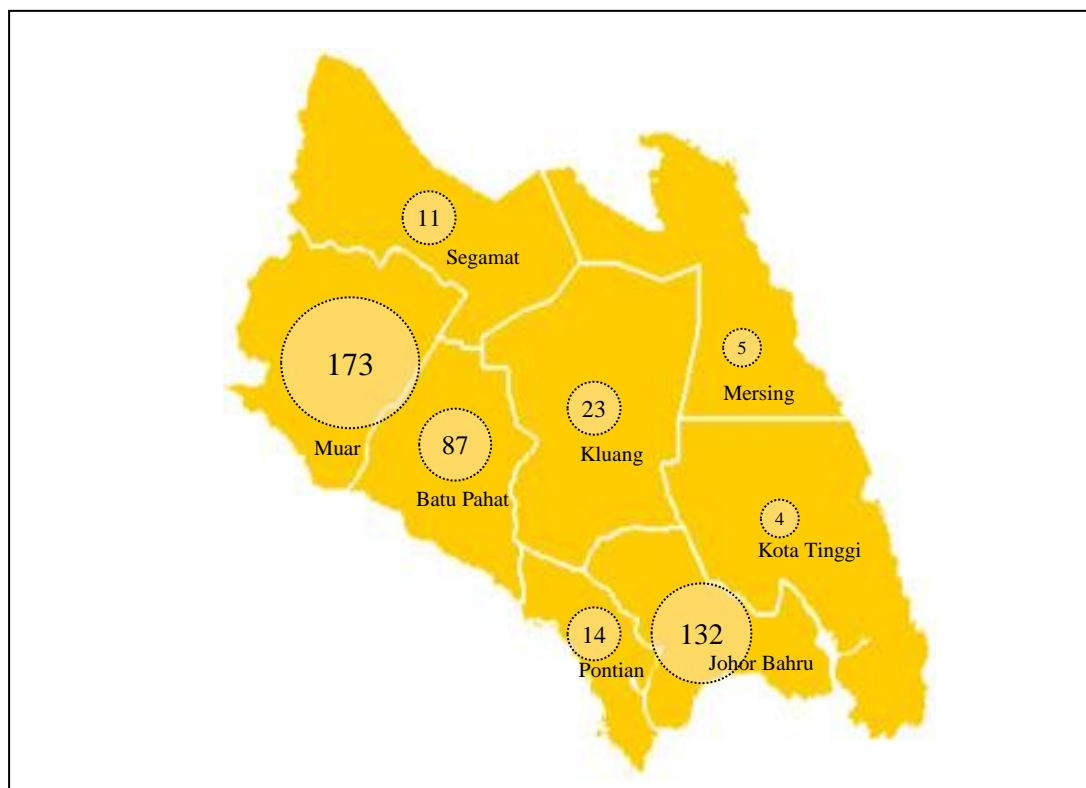
cooperation among the manufacturers. Since the local market was saturated, the furniture manufacturers decided to explore export opportunities. Meanwhile, knocked-down furniture had been introduced by some of the innovative manufacturers in order to solve the problems of shipment of large furniture items. This innovation provided the solution for packaging and shipping, thus helping boost the sales and exports of furniture. Other main drivers of the export growth was Malaysia's open door policy towards foreign workers, and the establishment of MFA in 1983 with the aim of enhancing cooperation among the furniture manufacturers as well as to protect the interests of industry players in the long run. The MFA has organised many furniture exhibitions under the banner of Malaysia Furniture Entrepreneur Association (MFEA). Today, the idyllic town of Muar contributes 40 percent to Malaysian furniture industry that is worth RM 8.5 billion (MFA, 2008).

In summary, furniture making in Muar, as stressed by most of the interviewees, started initially by chance. Later, coupled with new developments including the use of rubber wood and the country's liberal policy towards foreign workers, the Muar furniture cluster successfully emerged as a world renowned furniture centre. The following part examines the current structure and characteristics of the Muar furniture cluster.

#### 6.4.2 Current Structure and Characteristics of the Cluster

Presently, many of the furniture manufacturing enterprises are under the stewardship of the second generation entrepreneurs. The exact number of furniture manufacturers is difficult to determine since no official statistics is available at the moment. For instance, MFA (2008) estimates that there are currently about 300 - 350 furniture manufacturer in Muar District. On the other hand, unpublished data by the Department of Statistics Malaysia indicates that the number of furniture establishment in Muar is 173, which is relatively lower than that suggested by MFA (2008). Figure 6:3 illustrates the distribution of furniture establishments in Muar and other districts in the state of Johor.

Figure 6:3 Location of furniture manufacturers in state of Johor, 2007



*Source: Department of Statistics, Census of Manufacturing Industries 2005, unpublished*

The majority of these furniture firms are owned by the local Chinese community. Unpublished statistics by the Department of Statistics show that almost 94.5 percent of investments in the industry are local investments. In terms of size, almost 80 percent of the enterprises are small and medium-sized. Thus, SMEs are the main pillar of the Muar furniture industry. Their products are in the form of finished furniture, semi-finished furniture or parts. The market for their products is both local and international. The remaining 20 percent of the furniture manufacturers are either large or micro sized. According to MFA (2008), there are currently seven large furniture enterprises or consortiums which are listed in Malaysian Stock Exchange, namely SHH Resources Holdings Berhad, Poh Huat Resources Holdings Berhad, Lii Hen Industries Berhad, T.A. Furniture Industries Sdn. Bhd., Sern Kou Resources Berhad, UDS Capital Berhad, and JayCorp Group. According to Desmond Tan Boon Hai, there are hardly any micro-sized furniture enterprises because those enterprises are not able to survive as they are unable to cope with the intense competition in the market. Another important observation is that there is no transnational corporation in the Muar furniture cluster.

In terms of the geographical distribution of these enterprises, they are located across the industrial zones of Pagoh Industrial Estate, Bukit Pasir Industrial Estate, Bakri Industrial Estate, Parit Jamil Industrial Estate, Tanjong Agas Industrial Estate, Gerisek Industrial Estate and Tangkak. Besides, there are still a large number of small-sized enterprises that operate on the residential and agricultural land that is not gazetted for industrial activities. According to the senior officer from MFA, these “illegal” enterprises are mainly in Bukit Bakri, Parit Bakar and Parit Jawa. In Parit Bakar alone, there are now about 200 enterprises that operate illegally on residential and agriculture land (personal communication, May 6, 2010).

According to unpublished statistics by the Department of Statistics, the overall number of establishments in the Muar furniture cluster, which includes the suppliers of materials and machinery, traders etc. in 2007 was about 661. In general, the structure of the cluster is a simple single layer where a wooden component and parts supplier supplies to a single OEM. Many of the component parts suppliers are ex-employees of the bigger companies that retain a considerable amount of trust and loyalty. Most of the machines are imported from low cost suppliers such as China and Taiwan. Overall, the cluster is rather immature and needs to be developed. This is in contrast to the more complex vertically and horizontally integrated clusters in Italy and Taiwan.

Other main characteristics of the Muar furniture cluster derived from the unpublished statistics by the Department of Statistics are as follows:

- a) *Types of wooden furniture* – Solid rubber wood is the main raw material for the furniture manufacturers and most of the rubber wood furniture is for the export market. There are various types of furniture manufactured within the cluster. The main types are dining sets and bedroom sets, whilst the other items produced are sofa sets, office furniture; chairs and tables. Dining sets, chairs and tables are more compact in their knock down form in relation to value and hence are cheaper to transport in containers.
- b) *Raw materials* – the most important consideration for furniture makers is the availability and quality of their resources and raw materials. The total demand

for rubber wood by the Muar furniture manufacturers is approximately 1 million cubic metres which is about 60 percent of the total requirement for the whole of Johor state. The estimated requirement for sawn timber in Muar in 2008 was 80,000 cubic metres per month. Rubber wood furniture is a strong area for Malaysia as we have the advantage of a constant supply of raw materials. However, rubber wood prices have increased due to the reduction of the land area under rubber plantation as a result of rapid conversion to oil palm. Johor is able to supply only about 30 percent of the requirement. The government's encouragement to source raw materials from other ASEAN countries has resulted at least one company (JayCorp Bhd) to invest in a rubber wood processing plant in Medan, Indonesia. Also, the Johor state government has embarked on a large scale programme to develop rubber forest plantations in the state.

- c) *Technology* – the machinery used is generally up to date and at par with the standard technology being used elsewhere in the world. Automation is rather limited compared to the industry in Italy or Taiwan.
- d) *Training* – almost all the training carried out is in house on-the-job training. Some management staff appear to have had experience and training in Taiwan.
- e) *Employment* – the number directly employed was 15,486. For the cluster as a whole, the total number can be up to 25,000. The majority (about 60 percent) of them are foreign workers from Nepal, Myanmar and Bangladesh.

A more comprehensive account of these characteristics can be found in Section 6.5.



### **6.4.3 The Success Factors**

Interviews with a senior officers from MFA revealed that the success of Muar Furniture Cluster was due to a situation where timing, geographical location and support of the people were favourable, or in other words – “right time, right place and right people” (personal communication, May 6, 2010):

- a) In terms of timing, while some of the major furniture exporters, for example, Taiwan was looking for a new production base, the emergence of Muar with a pool of skilful workforce, low production cost and abundance of solid wood was at the right time. At the same time, the Malaysian rubberwood had proven to be a versatile, affordable and well accepted raw material for furniture production. The advent of rubberwood as a raw material is a significant advantage because it is abundantly available in Muar and the neighbouring districts. Rubberwood particleboard’s selling points compared to solid timber are its low cost, its availability in large flat sheets, and its ability to be decorated with melamine based overlays.
  
- b) In the context of geographical location, Muar is close to rubberwood resources such as the district of Segamat and Batu Pahat, the state of Malacca and Negeri Sembilan. Besides, Muar is close to Johor Port and Singapore, which is the regional center for machinery and hardware supplies.

- c) With respect to people, although Muar is blessed with ample natural resources and low cost labour to feed the growing furniture industry, none of these factors mattered if it were not for the people toiling to drive the industry. Since Muar is a relatively small town, the relationship amongst the community (and also the industry players) is particularly close. There is mutual understanding amongst the competitors to see each other as partners on their way to advance to greater heights in the international arena. The achievement of the Muar furniture cluster is built upon the collective efforts of the industry players who are prepared to share business opportunities and information.

Over the years, the government has set up numerous furniture villages such as those in Olak Lempit and Ulu Yam in Selangor, Setiu in Terengganu, Senawang in Negeri Sembilan, Kuantan and Temerloh in Pahang, Bukit Selambau in Kedah, and Mukim Blanja in Perak and numerous others in stages of development. These villages are part of the government's effort to locate furniture manufacturers in one designated area. A furniture village provides basic facilities such as roads, electricity, water, preservation plan, kiln drying, raw material storage, transport and others. However, those furniture villages have not been successful if compared to the furniture cluster in Muar.

A senior officer from MFPC contends that these furniture villages are not achieving their ultimate goals as expected because they are "policy driven" clusters. Based on the fact that resources were readily available, the government identified the clusters' locations, and provided them with financial assistance and development programme. As these furniture villages were developed by government agencies, they are less commercially oriented and the sense of urgency is not there. Whereas, Muar is a

different type of cluster, it evolved naturally without much government intervention. Basically it has developed because of its own dynamics. It is a completely different model because it is driven by business:

For the past 20 years, you can see that it is driven by the fact that the demand for the furniture is increasing, and they (Muar furniture cluster) are also able to produce to cope with the demand. The whole dynamics is because of the business. It is this multiplied effect and more and more furniture companies have been established. What is more important, it is a business where people find that they can generate considerable profits. (personal communication, April 29, 2010)

Moreover, the furniture villages have failed basically because those selected locations did not have sufficient infrastructure to operate the programme, both in terms of skilful workforce and experience. A furniture industry practitioner in Muar used the following analogy to describe the success of Muar furniture cluster and the failure of the policy driven furniture villages:

We (Muar furniture cluster) are here like weeds, we must quickly grow on our own because we are facing numerous threats and challenges; they (furniture villages) are like golf course turf, need to be carefully protected. (personal communication, May 6, 2010)

On the other hand, a senior officer of a lead enterprise reveals that the Muar furniture cluster has succeeded mainly because the furniture making activities have long existed in Muar. Over the years, Muar has gradually developed to become not only a center for mass production of furniture, but also the focus for all kinds of support industries

related to furniture making, such as materials and machinery suppliers. Moreover, it is easy to find skilled workers in Muar, and the prices of Muar furniture are attractive due to the open competition amongst the manufacturers. On top of that, since Muar is a small town, the relationship among the residents is generally close. These co-opetitive networks and social capital which have underpinned the success of the Muar furniture cluster cannot be found in the government promoted furniture villages (personal communication, May 6, 2010).

## **6.5 Technological Innovation**

This section provides an in-depth analysis on the dynamics of technological innovation activities in the Muar wooden furniture cluster. It begins by providing the background of technological and knowledge domain of the cluster, and followed by exploring the learning and capabilities building of the cluster. The actors of innovation as well as the networks of innovation are also explored at the end of this section.

### **6.5.1 Technological and Knowledge Domain**

As mentioned in the earlier parts of this chapter, the wood furniture industry in Muar is a heavy consumer of rubber wood. For the past twenty years, rubberwood has replaced the conventional tropical rain forest wood species such as *mengkulang*, *merbau*, *nyatoh* etc. for furniture making. Rubberwood is generally referred as “Malaysian Oak” or “White Mahogany”, which is more attractive-sounding. Notable advantages of rubber wood are it is strong, flexible, and resistant to fungus and bacteria. It is also compatible

with most industrial adhesives and easy to work with and has a beautiful grain suitable for quality furniture. Moreover, the current trend towards using eco-friendly materials makes rubberwood even more popular among international consumers since rubberwood, which is sourced from plantation trees, is promoted as an "environmentally friendly" wood. In addition to the foregoing, rubberwood is relatively cheaper compared to other woods and this will certainly reduce the cost of production of Muar furniture in both local and international markets.

With regard to the technology profile of the Muar furniture industry, since Malaysia is the pioneer in rubberwood furniture manufacturing, most of the furniture industry practitioners assert that the industry players in Muar currently use one of the best technologies available in the world, and he doesn't think other countries can claim that their technology in rubberwood furniture is superior to Malaysia's. Most of the machines are imported from China, Taiwan, Germany and Italy. According to a senior officer from MFA, the selection of machines and its suppliers basically depends on their strategies and budget. Wood processing machines from China and Taiwan are more attractive in terms of pricing, whilst German and Italian machines are mostly for high end production (personal communication, May 6, 2010).

According to a MFPC officer, there are not many wood working machine manufacturers in Muar, or even in Malaysia. It is not economical to manufacture wood working machines locally as the Malaysian market is small. What has been the common practice is that they are more interested in importing machines, or reconditioning the used machines to suit the in-house production line of the manufacturers (personal communication, April 29, 2010). In Muar, a range of furniture related manufacturing

machines, for instance finishing line system (such as tow line conveyor system, pallet conveyor system, overhead conveyor system, and auto electrostatic coating system), dust extraction system (such as dust collector system, and dust filter), and wood working machines (such as high speed moulder, multiple spindle, molding edge sending machine, and rip saw machine) are supplied by the suppliers such as Goldinjaya Engineering Trading and Services Sdn. Bhd., HongJing Machinery, HongLiong Machinery Sdn. Bhd., and Sin Ching Machinery Sdn. Bhd. These machinery suppliers assist in automation and to upgrade existing systems to greater efficiency and productivity at an affordable cost.

Representatives from MFA opine that there is no clear distinction between the large manufacturers and SMEs in terms of the technological capabilities. In other words, what can be produced by the large enterprises can also be produced by the SMEs. The advantage of large enterprises is merely in terms of volume of production as they have bigger space, more capital and bigger workforce (personal communication, May 6, 2010).

All the industry practitioners do not view the use of automation and CNC machinery as guaranteeing better product quality. For them, although it is true that such high-tech machines are able to increase the production volume, the nature of the furniture industry which is heavily based on the bond between art and industry is not suitable for the implementation of such high-tech machinery. Machinery enables an increase in production but fails to democratize style. The value of furniture is determined on the quality of aesthetic appeal and the craftsmanship of the furniture makers. For this reason,

the industry does not require a large number of engineering and technical personnel (personal communication, May 6, 2010).

Brand building is the cornerstone to success business, but sadly this is still lacking in the Muar furniture industry. For MFA (2008), there is no shortage of proficient sales personnel in the country but there is a critical shortage of design and research personnel. Most of the enterprises do not have their own in-house professional design teams. Their creations are from the experience and information gathered during exhibitions in and out of the country. In this regard, the MFA has met with the renowned design colleges in Malaysia to discuss ways to grow the industry. Another reason why most of these furniture manufacturers are reluctant to invest heavily in designing their own furniture product is because of the nature of the industry – the designs of the products are easy to copy and replicate. According to a senior management officer of a lead enterprise, although the industry realises that design innovation is a crucial consideration to manufacturers that focus on the niche market, however in the real world based on open market, there is a tendency for competitors to follow the trend of a successful market, which in turn erodes the uniqueness of the original design. Moreover, it takes time for a new design to be tested before it could be launched in the market (personal communication, May 6, 2010). This explains why most of the products exported from Muar are ultimately rebranded and sold under the brands of foreign distributor. Even the furniture of the world famous IKEA is manufactured in Malaysia (MFA, 2008).

One way to ensure the quality of the furniture products is through laboratory tests. In Malaysia, only FRIM provides such facilities to the local manufacturers. However, the take up rate for FRIM's FTL by the local manufacturers (including those from Muar) is

low because of two main reasons. Firstly, the services are not well promoted and highlighted and most of the manufacturers are not aware of the services offered by FTL. Secondly, unlike electronic and electrical products, the standard test for furniture products is not compulsory in both the global and local markets. Thus, the manufacturers do not go for the standard test unless it is required by the buyer – normally international buyer. For the local market, it is generally assumed that the product is safe. A representative from MFPC emphasised repeatedly:

The bottom line is the business. Because of the cost, our furniture manufacturers will do minimum, unless it is requested by the buyers. For local market, it is not practical to make such standard tests compulsory because it will increase the cost of production. Moreover, even developed countries such as US are not making such standard tests compulsory. (personal communication, April 29, 2010)

The key problem encountered by both FTL and the furniture manufacturers, according to a representative from FTL, is many of the furniture manufacturers are not aware of types of standard tests that are required (personal communication, May 5, 2010). Box 6:1 details the functions of FTL and their experiences in dealing with furniture manufacturers.



## Box 6:1 Furniture Testing Laboratory (FTL), FRIM

### Background and Functions

Furniture Testing Laboratory (FTL) is a unit under the Advanced Processing & Design Programme, Forest Research Institute Malaysia (FRIM). Established in 1989, the unit strives to provide test services for the furniture industry. The ultimate goal of the unit is to assess and improve the quality of Malaysia's furniture. Business profit is not its philosophy as it operates subject to the provision of government allocation extended by FRIM. Thus, charges for the test services are set at an acceptable level.

### Expertise and Type of Standard Tests

The unit offers a range of furniture performance tests to furniture manufacturers. However, the services do not include material testing. During the period of 2006-2008, a total of 619 tests were conducted by the unit. Presently, the unit consists of seven full-time staff. They are fully responsible to conduct all the standard tests for the clients. Among the products regularly received and tested in the unit are chairs, settees, beds and bunk beds. Listed below are the test services offered in FTL.

PRODUCTS TESTED	TYPE OF TEST	TEST STANDARD	TURN AROUND TIME (DAYS)
Chairs & stools including upright chairs	Strength & durability	BS 4875-1:2007 BS EN 1728:2001 ISO 7173: 1989	7-30
	Stability	BS EN 1022: 2005 ISO 7174-1: 1988	2
	Strength, durability, safety.	BS EN 15373:2007	7-10
	Safety Strength & Durability	BS EN 13761:2002 BS EN 12727:2000	7-10 20-50
Chairs with tilting or reclining mechanisms when fully reclined and rocking chairs	Stability	ISO 7174-2:1992 BS EN 1022:2005 BS 15373: 2007	2
Settees	Strength & durability	BS 4875: 1: 2007 BS EN 1728:2001	7-30
	Stability	BS EN 1022: 2005 BS 15373: 2007	2
Tables and trolleys	Strength & durability	BS EN 12521: 2009 BS EN 1730: 2000	7-14
	Stability	BS EN 12521: 2009 BS EN 1730: 2000	2
Educational furniture- chairs and tables	Safety	BS EN 1729-2:2006	10-14 (Chair) 7-10 (Table)
Storage furniture	Strength & durability	BS 4875- 7: 2006 BS EN 14749: 2005 ISO 7170: 2005	7-25
	Stability- contract	BS 4875-8: 1998	2
	Stability- domestic	BS EN 14749: 2005	2
	Safety- domestic	BS EN 14749: 2005	2
Office furniture	Stability & strength	BS EN 527-2:2002	2
		BS EN 527-3:2003	7-10
Office Screens	Safety & Stability	BS EN 1023-2:2000	2
		BS EN 1023-3:2000	7-10
Wooden and metal garden furniture (not plastic)	Safety	BS EN 581-1:2006	2
	Stability & Strength	EN 581-2:2009	4-10
	Stability & Strength	BS EN 581-3:2007	4-10
Beds	Safety, Strength & Durability	BS EN 1725:1998	10-14
Bunk beds	Safety, Strength & Durability	BS EN 747-1:2007	10-14
		BS EN 747-2:2007 BS EN 13453:2004	

..... *continued*

State-of-the-art machines and testing equipment are used by the unit in conducting the standard tests. In fact, with its vast experiences and expertise, the specification of the machines and equipment used for testing is determined by the unit itself. Works in maintenance, calibration, minor repair, and upgrading of machines are also carried out by the unit.

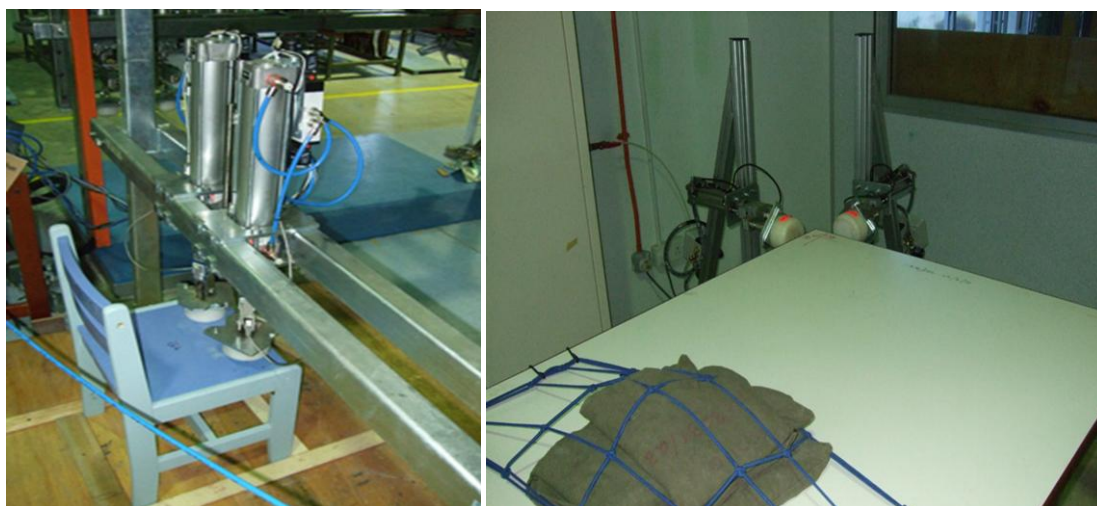
### **Client Profiles and International Partnership**

Most of the clients are local SMEs, only a few of them are large enterprises. In most of the cases, the tests are conducted for the purpose of export, or for purpose of government tenders. Each year, about 50 - 60 enterprises test their furniture products under the roof of FTL, and quite a number of them are from the Muar furniture cluster. In general, the failure rate is low, only less than 10 percent of the total tests conducted. Most of the failures are due to the inappropriate use of material and selection of fitting.

The unit has established a close partnership with the Furniture Industry Research Association (FIRA) which is headquartered in the United Kingdom. In fact, the unit act as an agent of FIRA in Malaysia. Products that have passed the standard tests in the unit will receive a certificate issued by FIRA. From time to time, auditors from FIRA will audit the unit.

### **Problems and Challenges**

The clients often are not aware of and do not understand what type of standard tests are required for their products. They are poor in terms of time management and documentation. In addition, they are not aware that some tests require a longer time to be completed. Most of the time, the clients send their sales personnel who are not familiar with the technical elements of the furniture while dealing with the unit. Hence, the unit has difficulty in explaining the result of the test in technical terms, and the problem of failure cannot be rectified immediately. For the unit itself, there is no proactive approach aimed at promoting its services to the industry players.



*Strength and durability test for chairs and tables*

*Source: personal communication, May 5, 2010*

### 6.5.2 Learning and Capabilities Building

In general, most the training in the Muar furniture cluster are by in-house on the job training. Knowledge is accumulated through experience gained from everyday work in the industry. For instance, when an apprentice joins a new workplace, he will be guided and trained by the senior staff. After gaining sufficient experience, some of them will become supervisors in the enterprise. Those who have sufficient capital will establish their own factories and the cycle will be repeated. According to a representative from MFA, one of the commendable attitudes of the Muar people is that they are always ready to share their experience and knowledge. There is no jealousy amongst the industry practitioners. More importantly, most of the parents, especially during the earlier days strongly encouraged their children to join the furniture industry. This explains why the in-house on the job training is so successful in Muar (personal communication, May 6, 2010).

In other words, the players in the industry worked hard collectively to reach where they are today. One good example is the furniture vocational programme that used to be conducted in Pei Hwa High School,<sup>41</sup> an independent Chinese school located in Sungai Mati, Muar. The programme was first started in 1998 under the stewardship of the former principal, Tey Tong Kem. In an interview, he said that the ultimate goal of the programme was to produce skilled furniture workers who are literate (personal communication, May 12, 2010). The program received full support from the industry,

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<sup>41</sup> Pei Hwa High School is one of the 60 Chinese Independent High Schools in the country. Chinese schools were founded by the ethnic Chinese in Malaysia as early as the 19th century. The schools were set up with the main intention of providing education in the Chinese language. As such, their students remain largely Chinese to this day even though the school themselves are open to people of all races and backgrounds.

both in the form of expertise and materials. The students who graduated from the programme have received high recognition by the industry. What is more remarkable is that the students have actively participated in the National Skills Competition organised by the Ministry of Works Malaysia. For four consecutive years, from 1996 to 1999, they won the Prime Minister Golden Hand Award. Year 1999 was the most fruitful year for the programme, when Goh Chong Kar, one of the excellent students from the programme represented Malaysia in the 35th World Skills Competition which was been held in Montreal, Canada. Goh won the 12th place in the category of wood working (door and window division). It was the greatest achievement of Malaysia's team at that time. However, the programme had to be called off in 2002 due to the changes of top management of the school and high operation cost. Details of the Pei Hwa High School furniture vocational programme are provided in Box 6:2.

### **Background and Objectives**

The ultimate goal of the programme, which was first started in 1998, was to produce both technical and management personnel in the furniture industry. Additionally, it was expected to improve the employment opportunities among the graduates and at the same time respond to the regional needs in the Muar district.

The two most cited problems in the Muar furniture industry in the 90s were: Firstly, poor product design and lack of innovation capability. This is due to the lack of both management system and quality assurance personnel in the industry. Product designs were basically taken from other people. Secondly, as the local furniture manufacturers were mostly small and family-scale producers, they were not only incompetent in terms of mechanical equipment, but also lacked skilled personnel in the fields of finance, R&D, human resource development, product development, marketing and coordination. Realising the needs of the local furniture industry, the underpinned objective of the programme was basically to resolve the lack of skilled personnel problems faced by the industry. In order to cater the needs of the industry, the programme was designed to encompass a wide array of personnel training, such as managers, technicians and designers.

### **Syllabus and Accreditation**

The syllabus and teaching aids used in the programme, such as slides, recorded video, slides and models were adopted from National Taiwan Normal University. A close collaboration was established with National Taiwan Normal University for both the content and teaching staff of the programme. Like other vocational courses, the orientation of the programme was practical rather than theory. Besides, it also incorporated and took into accounts the foundation courses such as English, Chinese, Malay, Mathematics, and knowledge on social science.

The programme duration was three years. The first year provided the students with the basic concepts of furniture making and carpentry. This included the making of simple joinery and handling of simple tools such as hand pressing planer, flat planning machine and circular saw. Also, the first year students were required to attend practical sessions on welding. In the second year, students were taught the use of various types of wood machinery. Students were required to use the available machines to produce at least five units of furniture products, such as bed, cabinet, table and chair. In the final year, the emphasis of the programme was on furniture design and production. Besides the classroom practical, the students were required to undergo industrial training during the semester break. An exhibition will be held in the school at the end of the year to showcase the students' finished products.

Throughout the programme, the students were required to sit for two examinations. The first is the Unified Examination Certificate, run by the United Chinese School Committees Association of Malaysia and recognised as a qualification for entrance into many tertiary educational institutions around the world. The second is the Malaysia Skill Certificate levels I and II, which is conducted by the National Vocational Training Council, Department of Skill Development Malaysia.

### **Students' achievements**

Pei Hwa High School actively participated in the National Skills Competition (Youth Category) organised by the Ministry of Works Malaysia. For four consecutive years from 1996 to 1999, students from the programme won the Prime Minister Golden Hand Award in the wood working category. Year 1999 was the most fruitful year for the programme, where Goh Chong Kar, one of the excellent students from the programme represented Malaysia in the 35th World Skills Competition which was held in Montreal, Canada. Goh won the 12th place in the category of wood working (door and window division). It was the greatest achievement of Malaysia's team at that time.

Most of the graduates from the programme pursued their studies in Taiwan. In terms of career development, those that decided to join the workforce market were employed by the local furniture companies.

### **Communities, Industries and International Collaborations**

Being a private school, Pei Hwa High Schools did not receive funding from the Malaysian government. The school survived almost exclusively from donations from the public. As such, the MFA and its members provided full co-operation and assistance to the school, for instances in terms of assisting the school to get raw materials and machines at special price. In addition, with the assistances from the local furniture industries, the school will identify the furniture, such as table, chair, book cabinet, etc., that could be produced by the students during the school holidays. This collaboration not only reduced the operating costs of the school, but also improved the practical skills of the students. In fact, some of the students' finished product such as tables and chairs are still being used in the school canteen at the moment.

Pei Hwa High School also collaborated closely with National Taiwan Normal University, particularly in terms of curriculum design and training for the teaching staff. In 1998, in order to resolve the problems of the teaching staff, two professors from National Taiwan Normal University came to Pei Hwa High School to provide short-term training classes to the school. One of the professors focused on theory and another professor was responsible for the technical knowledge development of the staff. Additionally, in May 1991, National Taiwan Normal University sent another two professors to conduct a ten-day teaching workshop for the school.

### **Problems**

Although the programme has been widely recognised by the industry players as well as the public, unfortunately it had to be terminated in 2002 due to the changes in the top management of the school and high operation cost.



Students' products still being used in Pei Hwa High School

Selected newspaper cuttings related to the program:

## 麻家具同业会成立小组 助培中迈向国际

郑清华 报道



■黄永德：该商会将提出一个建议，供培华木工家具班学生参展。

〔麻坡 11 日讯〕一份爱心，一份真诚的关怀！事业取得成功，不会忘记华文教育中，赤子之心，关怀着独中的成长，更要以实际行动给予支援，让家具班走向“国际”！

一行八人在主席黄永德带领下，前往培华中学，其他成员有总务廖锦良、副团长王健、廖锦良、李国兴、蔡利成等。他们受到该校董事黄礼典、董事李长江、校长黄礼典、副校长黄礼典的热情接待。

有关讨论讨论所取得的共识，其中重点是如何协助与提升该家具班，在长期计划是如何解决原料及经费的问题，短期更值得是，如何协助家具班学生，有参与参与内外的广阔天地，让他们有表现的机会，对学习更有兴趣与信心。

该商会的黄永德表示，培华独中家具班能有一切的发展，目前更值得是如何进一步提升，让学生对参与家具班的学习更具信心，以及具有自豪感。

## 培华独中金手奖得主 代表我国赴加参赛



■培华独中吴章佳同学在专心制作。

MFA setting up committee in helping Pei Hwa move towards international (Translation). (1999, August 12). *Nanyang Siang Pau*.

Pei Hwa High School Golden Hand Award recipient representing Malaysia in Canada (Translation). (1999, October 8). *Nanyang Siang Pau*.

Source: personal communication, April 12, 2010; April 23, 2010; May 12, 2010

Furniture fairs are the best channels for the industry to market their products and keep up to date with the latest trends in the industry. As stated by MFA (2008), an exhibition is not only an avenue for keeping abreast of the market, but also a key segment in the entire sales cycle. The exhibition is not just about showcasing products. The communication process and service attitude displayed during the exhibition plays a vital role as well. According to a representative from MFA, through the exhibition, the Muar furniture industry is able to benchmark their products with their competitors. The cost of participation in local or overseas exhibitions is not a major problem for the Muar furniture manufacturers. Those who participate in the international exhibition can claim subsidies from MATRADE.

Under the leadership of MFA, the Muar furniture industry has participated in numerous exhibitions and fairs. MFA itself has organised many furniture exhibitions under the banner of MFEA to further explore the local and global industry trend as well as dissemination of knowledge. Additionally, in order to gain access to the international market, the MFA persuaded the furniture associations from other states to participate in the Muar Furniture Exhibition, Johor Furniture Exhibition and Muar Furniture Export Exhibition. These exhibitions have attracted many overseas buyers and helped the industry gain entry into the international market. Listed in Table 6:3 are the main furniture exhibitions held by MFA:



Table 6:3 Major events held by MFA

Year	Events
1992	Organised Johor Furniture Exhibition
1994	Organised Muar Export Furniture Exhibition
2000	Organised MAFEX 2000
2002	Organised MAFEX 2000
2002	Organised Furniture Quality Forum
2003	Organised a 3 months furniture design course
2006	Organised the 2006 EFE
2007	Organised the 2007 EFE
2008	Organised the 2008 EFE
2009	Organised the 2009 EFE
2010	Organised the 2010 EFE

\* MAFAX: Malaysia Furniture Export Exhibition

EFE: Export Furniture Exhibition

*Source: MFA (2008)*

For the MFA (2008), effective human resources development is a must. However, this has been a stumbling block to the growth of the industry as the education system is visibly lacking behind the need of the furniture industry. An officer from MFA asserts that Malaysia is lacking in mid and high level vocational training, and we are at least ten times below the standard of Italy. This is one of the prime reasons for Malaysia's lack of innovative design. In the same vein, the higher education institutions in Malaysia are not producing graduates who are able to enhance the technological capabilities of the industry, particularly the R&D and design personnel (personal communication, May 6, 2010).

Although there are some institutions that are currently offering courses relevant to the needs of the furniture industry, for instance UPM and LimKokWing University, most of the industry practitioners are not able to benefit from those courses. Among the main reasons is that the entry for those courses require some academic pre-requisites. Another reason is that the majority of the Muar furniture industry workers are from Muar itself.

They are reluctant to leave their families behind to study in institutions located in the Klang Valley and Kuala Lumpur. As discussed in the earlier part of this chapter, most of the enterprises prefer to provide their workers in-house on the job training. An officer from MFA claimed that this might also be due to the mindset of the owners of the enterprises who are afraid that on completion of the training course, the workers won't return to their employers. Thus, they prefer the HEIs or the vocational schools in the county to train the school leavers before sending them to the industry, rather than the industry sending their workers for training in the institutions. This might explain why although there is a vocational training school available in the country, the furniture enterprises there seems to have no interest in the programme (personal communication, May 6, 2010).. Among the examples of the training institutions are the Wood Industry Skills Development Centre (WISDEC) and *Institut Latihan Perindustrian* (ILP) Ledang. Detailed accounts of WISDEC and ILP Ledang are provided in Box 6:3 and Box 6:4 respectively.

### **Background and Objectives**

The establishment of WISDEC in 1995 under Malaysian Timber Industry Board (MTIB) is in line with the objective to accelerate technology transfer and the processing of value-added products such as furniture, joinery and mouldings which has been accorded emphasis in the Industrial Master Plan (IMP). In this regard, WISDEC takes responsibility to organise training programs for skills upgrading, technology transfer promotion, product development and provision of technical advisory services for the furniture industry.

### **Training Modules and Recognition**

Through its Wood-based Industry Apprenticeship Scheme (Furniture) programme, WISDEC Banting offers a wide array of courses designed to facilitate the development needs of skilled manpower for the furniture industry. Some of these courses are: application of CAD in furniture design, garden furniture making, sofa furniture making, and interior design (furniture). The apprenticeship training programmes are open to all secondary school leavers, either Form 3 or Form 4. However, students must pass the interview to qualify for admission. WISDEC has been working closely with the Wood Advisory Panel, which is composed by all the relevant industry representatives, scholars and government agencies in the process of designing the course content. In addition, the curriculum of the courses will be reviewed every year by WISDEC and its consultants.

The courses conducted by WISDEC are widely recognised by both local and international professional organisations, namely Limkokwing University, Universiti Teknologi Mara, Universiti Putra Malaysia, Furniture Industry Research Association (FIRA) from UK, Italian Woodworking Machinery and Tool Manufacturers Association, Japan International Cooperation Agency, Yunlin University of Taiwan, etc.

There are on average almost 600 participants per year, while graduates from youth training program are about 150 people. The merits of WISDEC's programmes are: (i) it is appropriate to the needs of customers, especially from the industry and can be modified at any time as necessary, (ii) the programme is recognized by the industry, and (iii) percentage of students absorbed from youth programs to work in wood-based industry is high.

### **Partnership and Collaboration**

Besides having a network with some of the higher education institutions in the country such as Universiti Malaysia Sabah, Universiti Putra Malaysia, Limkokwing University, etc., WISDEC has also established close partnership with the industry. One good example is its collaboration with LY Furniture from Batu Pahat, Johor. A memorandum of understanding has been signed between WISDEC and LY Furniture in which the trainers for the programme are sent to LY Furniture factory for training.

*Source: Personal communication, May 10, 2010*

### **Background and Objectives**

ILP Ledang, formerly known as ILP Muar, was established under the Manpower Department, Ministry of Human Resources with the aim to provide formal technical skills training to school leavers and workers in the industry. ILP Ledang was launched officially on 13 October 2000 and the first intake of students was on January 8, 2001. Among the objectives of ILP are:

- To produce skilled and qualified workforce to meet the country's industrial sector;
- Improving the skills of workers industry; and
- Facilitate young school leavers to get jobs through industrial training which is more systematic and efficient.

### **Modular Course**

ILP Ledang offers a wide array of courses in the fields of mechanical and production, installation and construction, and electronic and electrical. For the furniture industry, courses that are relevant are CNC Machining and Industry Product Design. The design of the courses is confined to the National Occupational Skill Standard (NOSS). Certificates will be awarded upon successful completion of training by Vocational Training Council of Malaysia (SKM Level 1 and 2) and the Industrial Technician Certificate from Department of Skill Development. Besides, graduates from ILP have opportunities to further their study to the level of SKM 3, 4 and 5 which are equivalent to the diploma and degree in Advanced Technology Training Centre, Japan Malaysia Technical Institute, German-Malaysian Institute, Centre for Instructor and Advanced Skill Training, Universities, etc. Diagram I presents the NOSS and concept and structure of Malaysia Skill Certificate System.

### **Community and Employment Support Service:**

For the past two years, the Community and Employment Support Service Unit (CESS) in ILP Ledang has playing its role in establishing collaboration between the institution and the community. The philosophy of CESS is taken from Japan and it acts as a facilitator and matching between employers and graduates. Diagram II illustrates the concept of CESS.

### **Customised Programme for Industry**

Besides the modular courses, ILP Ledang also conducts customised programmes to suit the needs of the industries. However, the takers for the programme are usually from the information technology and electronic industries. So far, the furniture industry has not participated in these customised programmes. The financial constraint is the main reason why the furniture industry is not interested in the programme.

## Diagram I: NOSS and Structure of Malaysian Skill Certificate System

### 1. National Occupational Skill Standard (NOSS)

Definition: A NOSS is defined as a specification of the competencies expected of a skill worker who is gainfully employed in Malaysia for an occupational area, level and the pathway to achieve the competencies.

### 2. Concept and Structure of Malaysian Skill Certification System

#### Type of Skill Certification

##### MTM Level 8: - Senior Maister Technologist

(Malaysian Maister Technologist)

Mastery over range of skills and knowledge in developing an original understanding and extend an area of knowledge or professional practice. It reflects the ability to address situation that involved highest level of complex judgement, highly varied and/ or specialised major functions, and interacting factors through initiating, designing and undertaking research, planning and development of strategic activities. It involved the exercise of broad autonomy, judgement and leadership for the development of a field of work or knowledge or for creating substantial professional or organisational change. It also reflects a critical understanding of relevant theoretical and methodological perspectives and how they affect the field of knowledge or works.

##### MKM Level 7: - Maister Technologist

(Malaysian Skills Maister)

Mastery of broad and/ or specialised skills in reformulating and use relevant approaches to address highly varied and/ or specialized situations that involve many interacting factors. It includes taking responsibility, understanding, methodologies for planning and developing courses of action that initiate or underpin substantial change or development, as well as exercising broad autonomy and judgments. It also reflects an understanding of theoretical and relevant methodological perspectives, and how they affect their area of study or work.

##### TKM Level 6: Management Level

(Malaysian Skills Technologist)

Competent in applying a significant range of complex principles and techniques across a wide and often unpredictable variety of contexts. It reflects the ability to refine and use relevant understanding, methods and skills to address complex problems that have limited definition, includes taking responsibility for planning and developing courses of action that are able to underpin substantial change or development, as well as exercising broad autonomy and judgment. It also reflects an understanding of different perspectives, approaches of schools of thought and the theories that underpin them.

##### DLKM Level 5: Management Level

(Malaysian Skills Advance Diploma)

'Competent in applying a significant range of fundamental principles and complex techniques across a wide and often unpredictable variety of contexts. Very substantial personal autonomy and often significant responsibility for the work of others and for the allocation of substantial resources feature strongly, as do personal accountabilities for analysis and diagnosis, design, planning, execution and evaluation. Specialise of technical skills should be demonstrated.

##### DKM Level 4: Supervisory Level

(Malaysian Skills Diploma)

'Competent in performing a broad range of complex technical or professional work activities performed in a wide variety of contexts and with a substantial degree of personal responsibility and autonomy. Responsibility for the work of others and allocation of resources is often present. Higher level of technical skills should be demonstrated'

##### SKM Level 3: Supervisory Level

(Malaysian Skills Certificate)

'Competent in performing a broad range of varied work activities, performed in a variety of context, most of which are complex and nonroutine. There is considerable responsibility and autonomy and control or guidance of others is often required.'

##### SKM Level 2: Operation and Production Level

(Malaysian Skills Certificate)

'Competent in performing a significant range of varied work activities, performed in a variety of context. Some of the activities are non-routine and require individual responsibility and autonomy.'

##### SKM Level 1: Operation and Production Level

(Malaysian Skills Certificate)

'Competent in performing a range of varied work activities, most of which are routine and predictable.'

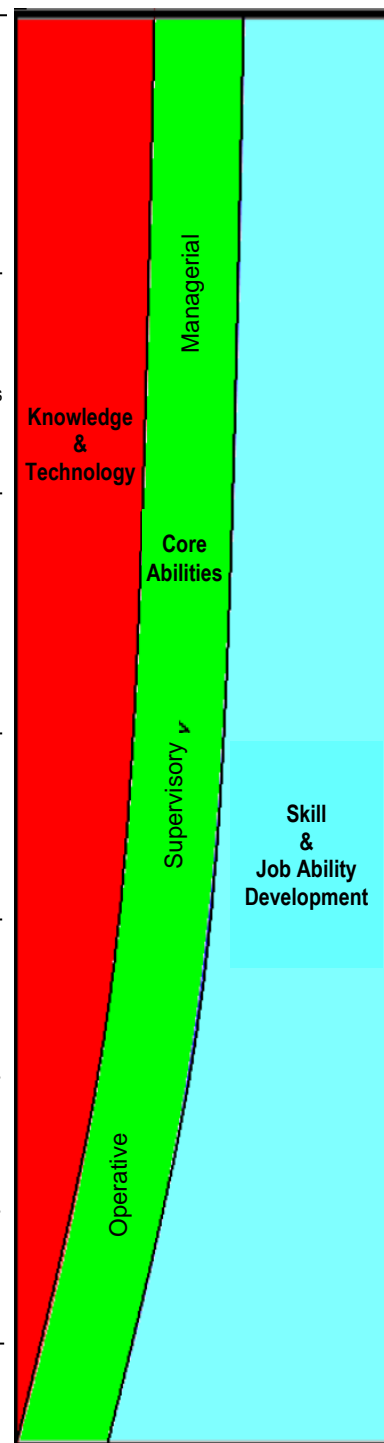
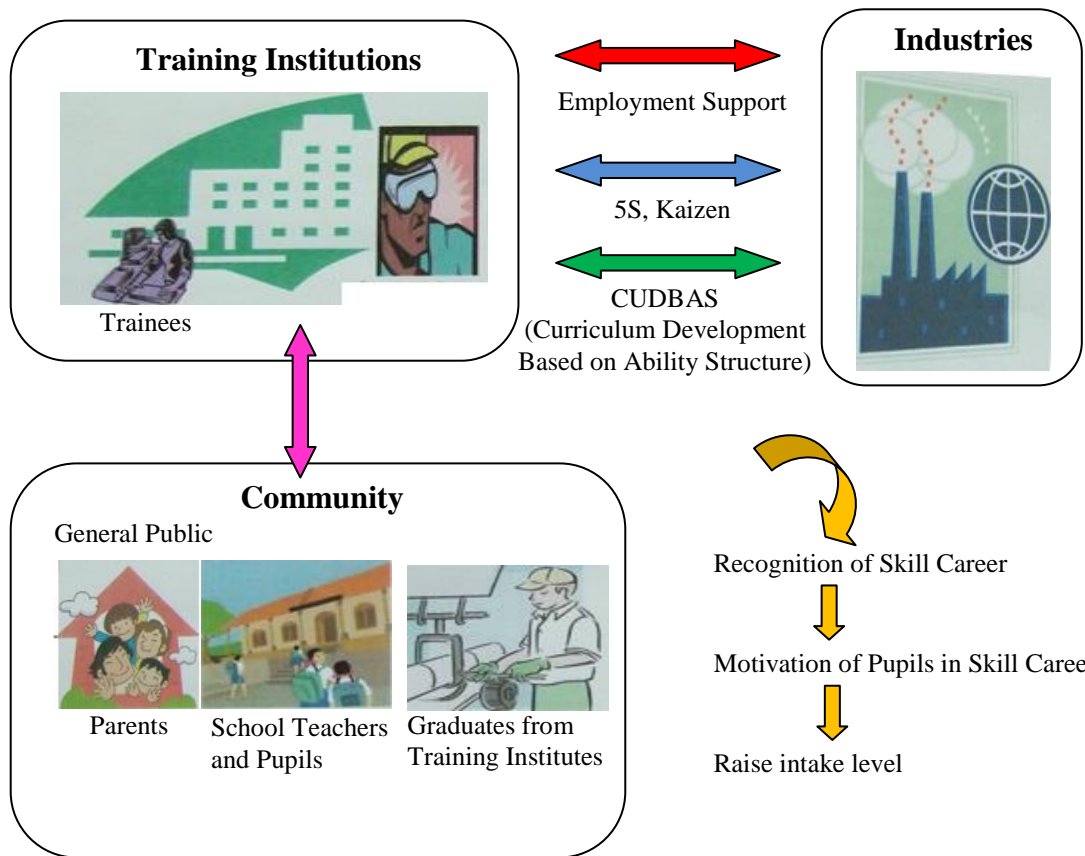


Diagram II: NOSS and Structure of Malaysian Skill Certificate System



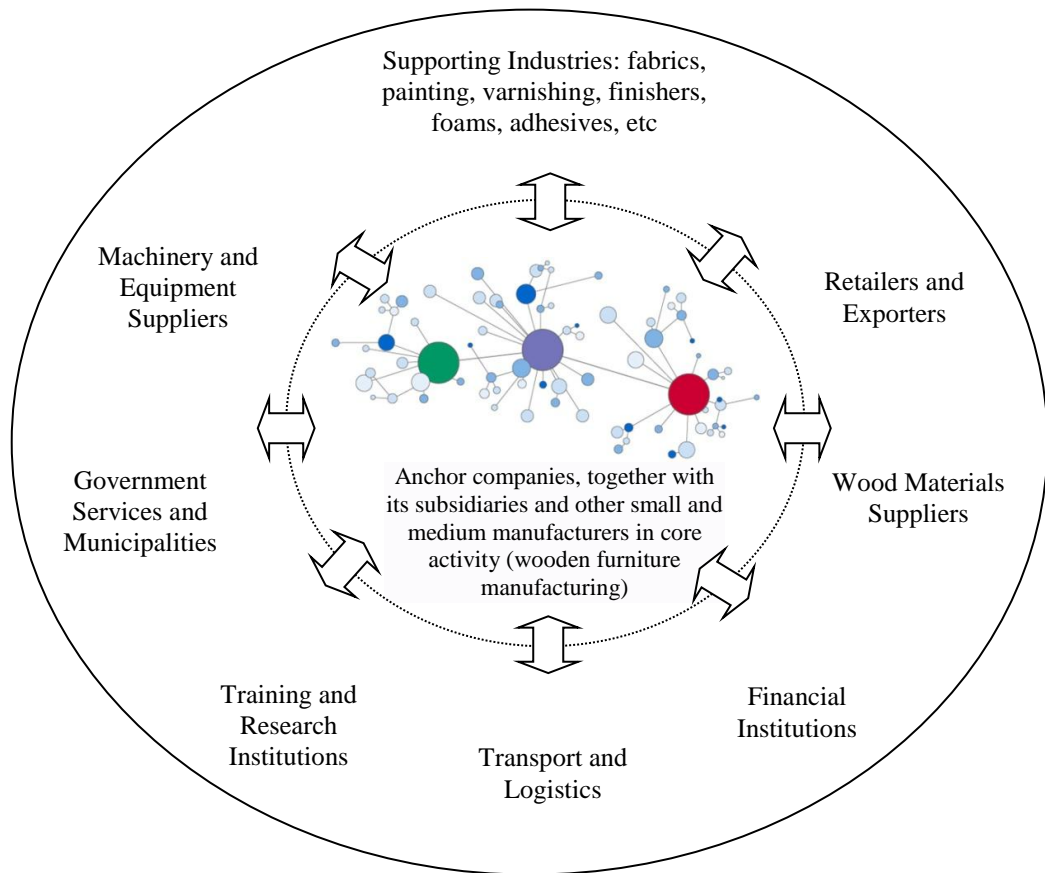
Source: Personal communication, May 7, 2010

### **6.5.3 Actors of Innovation**

As stressed by the SIS, a sector is composed of heterogeneous agents consisting of organisations or individual. The organisations may be firms (such as users, producers and input suppliers); or non-firms (such as universities, financial institutions, government agencies, trade-unions and technical associations). Consumers, entrepreneurs and scientists are examples of individual actors in a sector. A similar composition of actors is reflected in the Muar furniture industry. The achievement of the Muar furniture industry is the result of successful collaboration among various players in the industry. Its edge lies in the abundance of quality materials, stringent quality control and on-time delivery which are built upon the collective efforts of the entire furniture industry. The following sub-section discusses the key actors of innovation in the industry.

Figure 6:4 illustrates the structure of the Muar furniture cluster. Like any other well-functioning industry cluster or innovation systems, the relevant actors work collaboratively to sustain the cluster. These actors are the supporting industries, machinery and equipment suppliers, government services and municipalities, transport and logistics, training and research institutions, financial institutions, wood materials suppliers, and retailers and exporters.

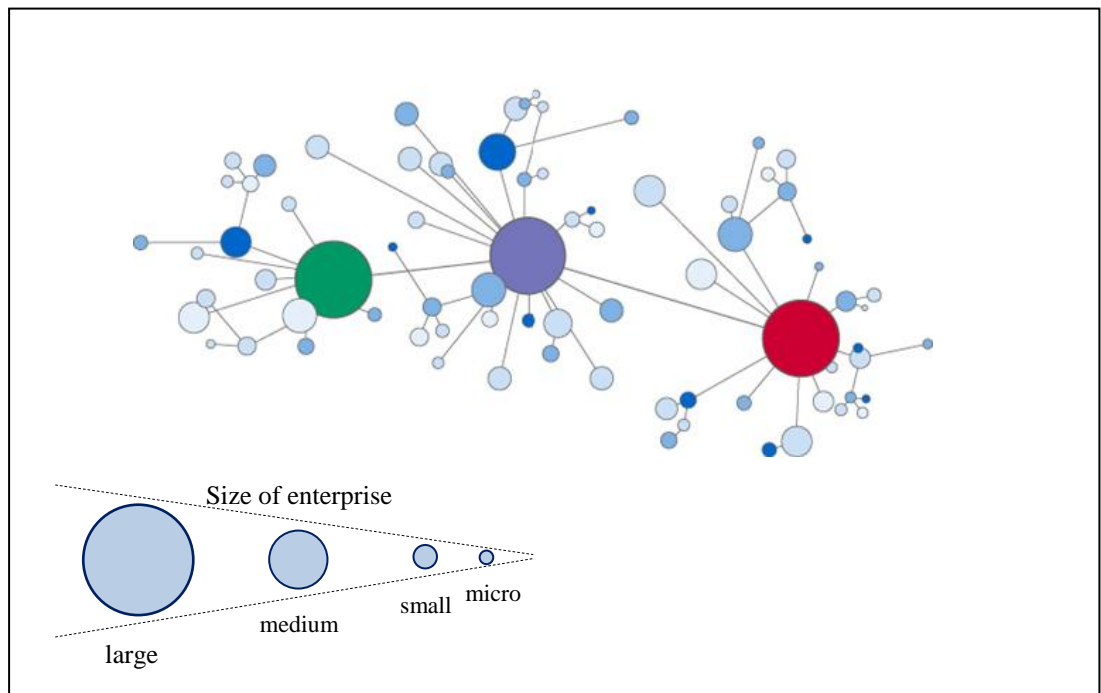
Figure 6:4 Structure of the Muar furniture cluster



- a) *Furniture Manufacturers* - As mentioned in the beginning of this chapter, the majority of the manufacturers are local owned small and medium-sized. Due to the intense competitive market, there are only a few micro-sized manufacturers that can survive. There are, however, currently seven public listed enterprises or consortiums in Muar. These main anchors of the industry are able to secure big orders from overseas buyers. The SMEs are also able to secure orders from the foreign retailers, or functions as parts and components suppliers to the large enterprises through sub-contracting projects. Figure 6:5 illustrates the composition of furniture manufacturers in Muar.



Figure 6:5 Composition of Furniture Manufacturers in Muar



- b) *Furniture Support Industries* - The wooden furniture industry in Muar is supported by a wide array of supporting industries, such as coating, varnishing, finishers, fabrics, foams, adhesives, glass and mirror, and wood products (such as wood dowel, round rod etc.). Coating is one of the crucial parts of furniture making. The mixing of the colour pigment is an extremely complicated task because it requires taking into account the quality of paint and the structure of the wood. Crystal Coatings Sdn. Bhd., Lien Yeu Cermin (Muar) Sdn. Bhd., Vistawood Industries Sdn. Bhd., and Ming Seng Wood Products Sdn. Bhd. are examples of the supporting industries that serve the Muar furniture industry.

- c) *Machinery and Equipment Suppliers* - There are numerous machinery and equipment suppliers in Muar, among others are Goldinjaya Engineering Trading and Services Sdn. Bhd., HongJing Machinery, HongLiong Machinery Sdn. Bhd., Sin Ching Machinery Sdn. Bhd. These companies supply a wide range of imported, new or reconditioned wood working machines and tools from China, Taiwan, Italy and Germany. The machines commonly supplied are finishing line system (such as tow line conveyor system, pallet conveyor system, overhead conveyor system, and auto electrostatic coating system), dust extraction system (such as dust collector system, and dust filter), and wood working machines (such as high speed moulder, multiple spindle, moulding edge sending machine, and rip saw machine).
- d) *Retailers and Exporters* - Most of the furniture enterprises are still classified as OEMs; they are the suppliers of the finished products or semi-finished furniture to their buyers, who are mostly overseas retailers. These retailers are either large multi-store retailers such as IKEA, or small-scale retailers. Some of the Muar furniture enterprises, particularly those large and medium-sized, have formed subsidiaries for the purpose of marketing their products.
- e) *Wood materials Suppliers* - As the furniture industry in Muar is basically wood based, it depends heavily on the availability of rubber wood logs. Most of the rubber wood in Muar is secured from its neighbouring districts (such as Segamat and Batu Pahat) or states (such as Malacca, Negeri Sembilan, Pahang, and Kelantan). The main wood materials used are high and medium density fibreboard, particle board, veneer and plywood. Imax Resources Sdn. Bhd.,

W&V Marketing Sdn. Bhd., and Cheay Enterprises Sdn. Bhd. are examples of wood materials suppliers in Muar.

- f) *Government Services and Municipalities* - The Muar furniture industry works closely with the MFPC, which was established in 2003 by the MPIC. MFPC carries out programmes which include the promotion and development of new markets, enhancement of design capabilities and capacities, collection and dissemination of market information and trade statistics to the industry. MTIB, a statutory body accredited to the MPIC which was established in 1973 by an Act of Parliament promotes and coordinates the overall development of the timber industry. One of the programmes of MTIB that directly benefits the Muar furniture industry is the establishment of the Furniture Resources Centre located in WISDEC Banting. The centre allows the industry to obtain updates on the latest developments in furniture design and manufacturing. Besides, in order to maintain and improve the quality of Malaysia's furniture products, the FTL was established under FRIM to provide standard test services to the furniture manufacturers.

The national policy directions of the furniture industry are set out in the National Timber Industry Policy (NATIP) 2009 - 2020 by MPIC and MTIB. NATIP will guide stakeholders and industry players on the trend of development which is most feasible for the industry to embark on. At the state level, the state government of Johor is important in planning and monitoring the spatial and physical development for the Muar furniture industry, especially in allocating land for industrial purposes and providing basic infrastructure such as road access to the industry. In this regard, the State Department of Town and Country

Planning is responsible for drawing up the State Structure Plan, which defines the policy and proposal for the development and use of the land in a state. The local authority, that is, MPM prepares the District Local Plan to control and monitor development at the local level and detail the land use plan that incorporates the national as well as the state development policy. The Muar furniture industry works closely with MPM to solve problems related to industrial land, illegal factories, foreign workers and environmental issues. Recently, the State Government of Johor approved the Muar Furniture City Project, a permanent exhibition for the industry, which is located in Tangkak.

g) *Industry Association* – The MFA, established in 1982, currently has about 300 members and is the largest furniture association in Malaysia. The MFA helps unite the manufacturers and acts as an arbitrator when disputes arise, especially during the early days when there were too many newcomers into the industry. Realising the importance of exhibitions and trade fairs, the MFA has organised many furniture exhibition such as EFE, Johor Furniture Exhibition, and Muar Furniture Export Exhibition. These exhibitions have attracted many overseas buyers and helped the industry to make inroads into the international market. The MFA also represents the Muar furniture industry in dealing with the government and local authorities over certain issues such as foreign workers policy and land for industrial use.

h) *Training and Research Institutions* - There are numerous institutions that provide training and research facilities to the furniture industry. These institutions are formal school and vocational centres, institutes of higher learning, government agencies, furniture associations and companies, and professional

and private institutions. Table 6:4 lists the training centres for the industry in Malaysia.

Table 6:4 Training Centres for the Furniture Industry in Malaysia

Type	Descriptions
Formal school and vocational	There is a subject being taught in elementary schools called “Living Skills” or “ <i>Ilmu Kemahiran Hidup</i> ”, industrial arts in the secondary school and many more in the vocational schools. There are also furniture related courses conducted in the technical colleges such as <i>Institut Kemahiran MARA</i> , <i>Institut Kemahiran Belia Negara</i> , polytechnics, technical schools and others. Skill-based training in these institutions is based on the National Occupational Skills Standards (NOSS), developed by the Department of Skills Development, Ministry of Human Resources. Upon completion of these courses, the trainees would be awarded with the relevant Malaysian Skills Certificate.
Institutes of higher learning	The institutes of higher learning offering degree courses related to wooden furniture industry are UiTM and UPM. The other fields related to furniture studies are industrial product and interior design.
Government agencies	MPIC through MTIB has WISDEC in Olak Lempit, Selangor. WISDEC provides high content of practical knowledge to the wood-based industry, such as the application of CAD in furniture design, machining technology and operation of wood working machine.
Professional and Private	There are also professional and private institutions involved in the furniture-related subjects. They include Malaysia Institute of Art in Kuala Lumpur, Malaysian Furniture Design Centre, Cheras, Kuala Lumpur and Limkokwing School of Arts and several others.

*Source: Adapted from JETRO (1999) and MPIC (2009)*

- i) *Transport and Logistics* - Muar district is connected to the North-South Highway via exits at Tangkak and Pagoh. The Empress City, which is the heart of Muar business and administration activities, is located at the junction between the federal and state roads from Yong Peng, Labis and Tangkak. Hence, Muar district is easily accessible to major cities such as Johor Bahru, Batu Pahat,

Kluang, Kota Tinggi and Segamat. The majority of the Muar furniture manufacturers use the Johor Port which is located at Pasir Gudang in the southwest of Johor in Peninsular Malaysia for their shipping. The Port is about 100 km from Muar and conveniently reached and connected by the North-South Highway. The Johor Port offers comprehensive services to the furniture exporters, which includes terminal services, storage and warehousing.

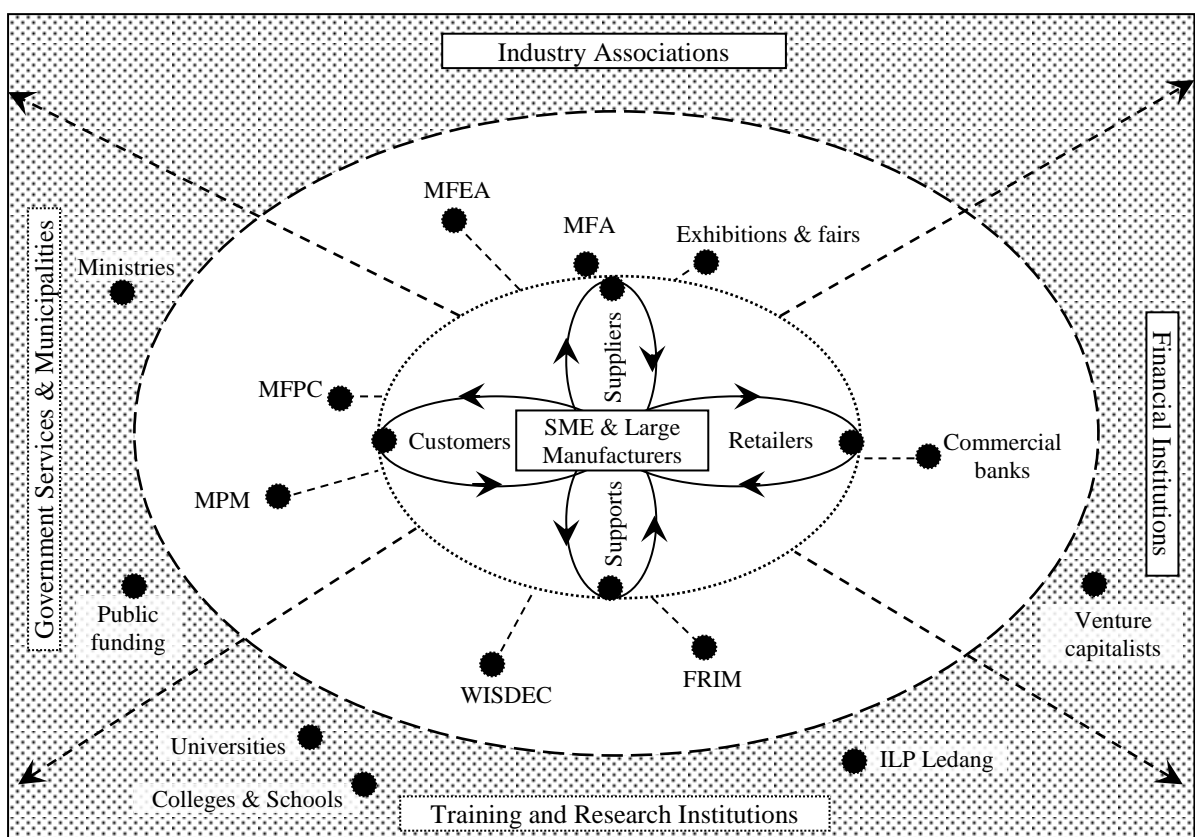
- j) *Financial Institutions* - Most of the commercial banks in Malaysia have regional branches in Muar. They provide loans for business development to the furniture manufactures. According to a representative from MFA, the regional branch managers have confidence in the Muar furniture entrepreneurs as most of them have a clean record with the banks.

#### **6.5.4 Networks of Innovation**

As discussed in Chapter 2, both technological product and process innovation are complex and interactive continuous processes which involve a series of alternating stimulus-response exchanges among the prominent actors in the system. Thus, a reasonably sound linkage between the firms and various innovation actors such as customers, suppliers, competitors, government machinery, research laboratories and financial institutions, is crucial to determine the overall performance of a firm's innovation capabilities. In the case of the Muar furniture industry, the linkages play a crucial role in establishing co-operation and partnership with alliance parties, sourcing external knowledge and information as well as funding for technological innovation.

Figure 6:6 depicts the linkages between the Muar furniture manufacturers with the selected key innovation actors. The furniture manufacturers, both SMEs and large enterprises are at the center of the “network universe”. They are linked closely to their immediate business environment such as customers, machinery and material suppliers, retailers and exporters, and supporting industries. The outer layer of the figure captures the linkages between the furniture manufacturers and other innovation actors including the industry association, government services and municipalities, financial institutions, and training and research institutions. Whilst some of the actors have established close relationship with the manufacturers, others lie outside of the manufacturers’ attention.

Figure 6:6 Networks of innovation in the Muar furniture industry



The relationship between the SMEs and large Muar furniture manufacturers is symbiotic and mutually beneficial. Through the sub-contracting arrangement, the large enterprises rely on the SME in terms of parts, components, and semi-finished furniture. For the SMEs, establishing a close relationship with the large enterprises enables them to survive in the competitive market. In fact, one of the dominant assets of the furniture industry in Muar is its social capital in the form of cooperative spirit, trust and loyalty among the industry practitioners. The manufacturers have strong sense of community and no problem in sharing their knowledge, technical know-how, even business opportunities with others. This is mainly because Muar is a small town and most of the manufacturers have been there for generations. They know each other and their trustworthiness is high. All the furniture manufacturers, regardless of whether they are large or SMEs work collectively for the success of the industry.

As predicted, the furniture manufacturers form a close partnership with their immediate business environment, i.e. suppliers, customers, retailers, and support industries. The suppliers provide what is needed in the furniture manufacturing process, such as machinery and equipment, and wooden materials. Retailers are crucial for marketing purposes while the customers are the product recipients of the furniture manufacturers. The supporting industries such as fabrics, painting, vanishings, finishers, foams and adhesives provide support in terms of adding value to the value chain of the furniture manufacturing. All these four pillars of the immediate business environment are crucial. The absence of any party will lead to the failure of the industry.



In terms of the industry association, the linkage with the MFA is most significant. Through the MFA, the manufacturers have on numerous occasions worked with furniture associations and organisations from other countries to develop the local industry. The exchange programs and the interaction promote advancement in management skills, technology, as well as design, and have helped the industry become more competitive. For instance, in 2001, the MFA worked with the German Furniture Dealers Association to discuss the development of the industry in terms of the design of the products, sales trends and trading information. In 2003, it saw the association interacting with the Ghana authorities to promote bilateral trading. The MFA sent a delegation to Western China in 2005 to study the development of the furniture industry. The MFA hopes to promote more of these international exposures in the future so that its members can be kept updated on the latest developments around the world. On the other hand, furniture exhibitions and fairs have become the main channel for the manufacturers to obtain the latest information on developments in the market. EFE which is organised under the umbrella of MFEA is the most important exhibition and fair for the Muar furniture industry.

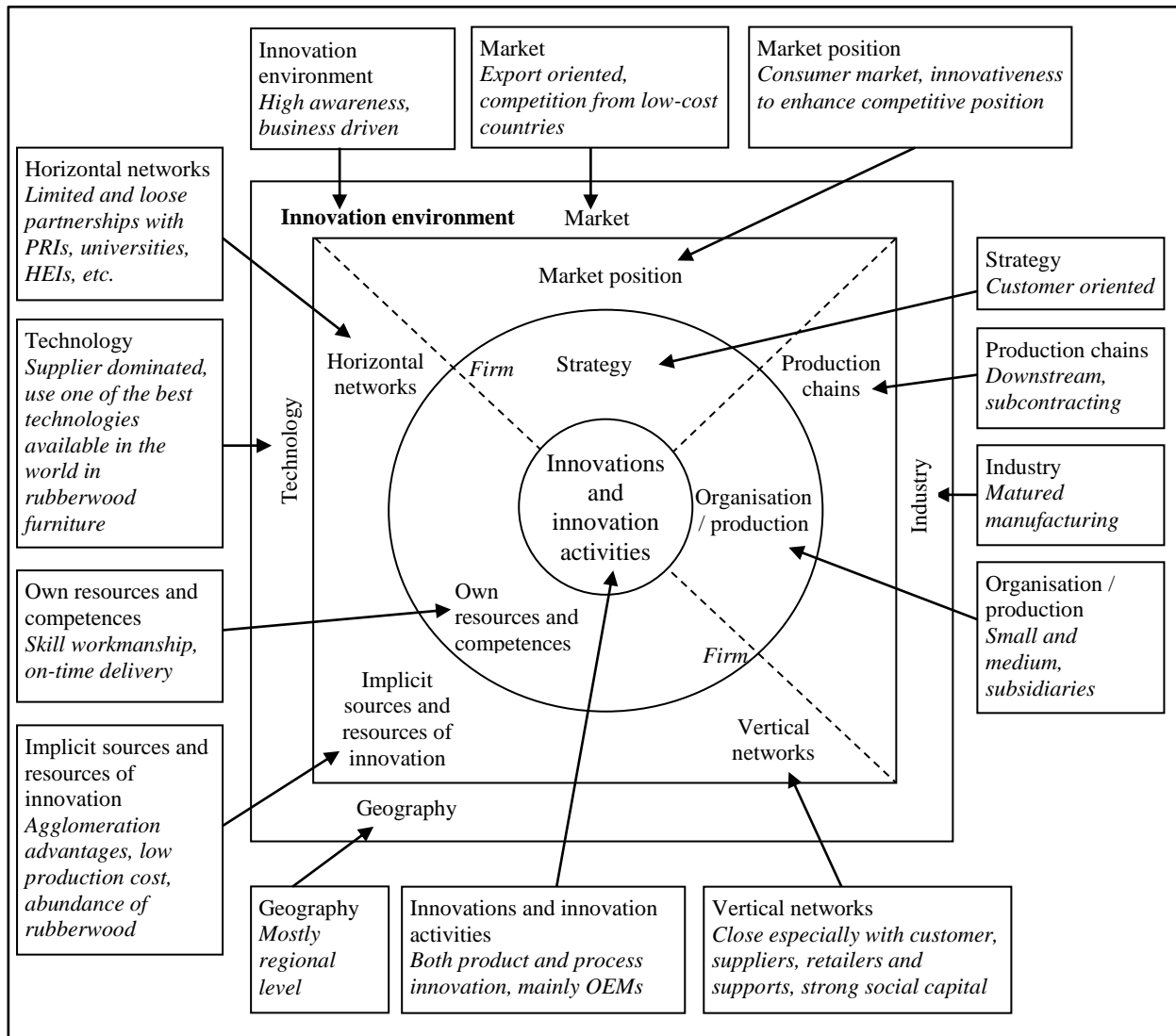
As for links with government services and municipalities, the Muar furniture manufacturers work closely with the MFPC because it has been actively helping the industry in seeking and penetrating the global market. As for the MPM, as the basic infrastructure for the industry activities is under their jurisdiction, the furniture manufacturers have no alternative but to maintain close links with the MPM. However, there seems to be no significant linkage between the ministries and the furniture players. The industry feels that the ministries do not understand their needs. Among the examples constantly cited are the issue of foreign workers and land policies. In terms of

public funding for the purpose of technological capabilities upgrading, although there are numerous grants and soft loans made available by the government agencies such as SME Corp., MOSTI, MITI, etc., the industry appear to show little interest in those facilities.

As most of the furniture manufacturers opt to train their staff through in-house on the job training, their relation and collaboration with the training and research institutions is distant. The few facilities that they utilise are the FTL of FRIM, and WISDEC. Universities, colleges and schools, and even the ILP Ledang that is located next to Muar district do not attract their interest. Besides being reluctant to release their fulltime employees to attend those training courses and programme, the furniture manufacturers also believe that the programmes which are heavily grounded on the concept of “automation and computerisation” do not suit their needs. The most critical need of the industry is product designers. However, such a programme is not available in most of the training centres.

In summary, the key characteristics of the technological innovation patterns of Muar furniture manufacturers as discussed in this section are illustrated in Figure 6:7. The figure shows that the innovating firms are surrounded by the four main elements of the general innovation environment – market, industry, technology, and geography.

Figure 6:7 Key characteristics of Muar furniture manufacturers



Source: Adapted and modified from Kautonen (2006)

## 6.6 Hampering Factors

Like any other industry, the Muar furniture industry is currently facing various problems that could hinder its advancement in technological innovation capabilities.

Listed below are selected critical factors that are currently faced by the industry:

- a) *Image of the industry* – As the industry is often perceived as a 3Ds industry, i.e. dirty, dusty and dangerous, attracting the younger generation who would act as a new driving force is a major problem. Most of the younger generation are not interested in working in the production line of furniture manufacturing. Instead, they prefer to work as salespersons, marketing personnel, engage in administrative work, or join other industries such as the semi-conductor, electrical and electronic sector that have better working environment. In other words, they appear to fear of being looked down upon, and the preference is for comfortable conditions rather than labour-intensive jobs. The issue of salary is not a key factor that detracts the younger generation to participate in the industry as most of the furniture workers are able to earn monthly salary of RM1,500, which is, if not less, comparable to what they earn in the local semi-conductor and electrical firms.
- b) *Over reliance on foreign workers* – While there is a general agreement on recognising the government's move to reduce dependence on foreign labour and to help local workers find employment, it is indeed difficult to find local workers to fill up the vacancies in the industry. Presently, about 60 percent of the workforce in Muar furniture industry workers is from Nepal, Myanmar and Bangladesh. Some of the foreign workers have even been trained to become supervisors in the factories. The over reliance on foreign workers is a risk for the development of the industry, particularly if the immigration policy of the country is inconsistent.

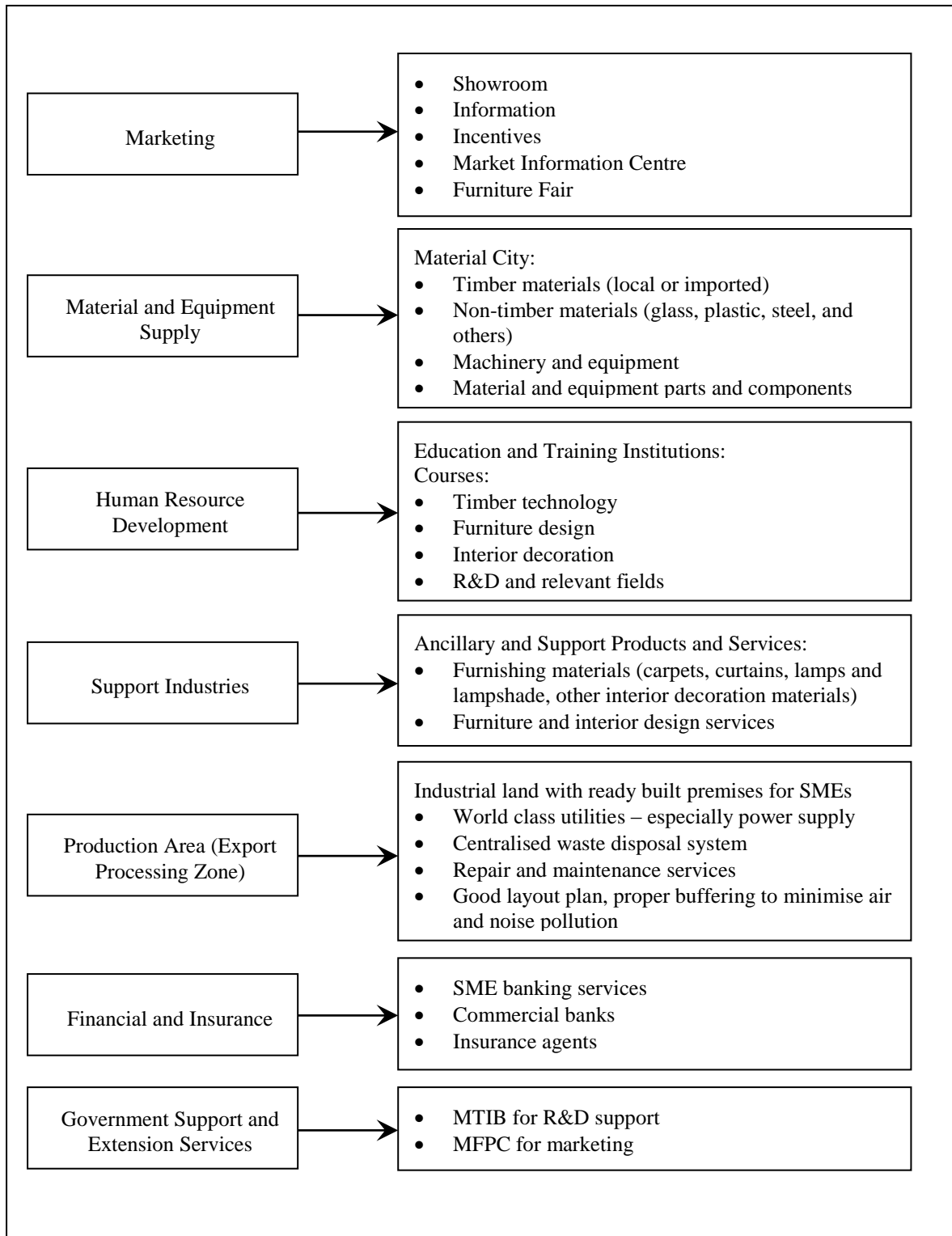
- c) *Immigration policies and levy* - With the aim to encourage the intake of local workers and reduce the reliance of foreign workers in the manufacturing sector, the government has recently proposed to double the levy on foreign workers. While the existing levy of RM1,800 is borne from the workers' wages, the new levy system will cause the industry to bear the entire doubled levy for their workers. With the overnight doubled levy, many manufacturers who cannot afford it may resort to hiring more illegal foreign workers. This in turn results in creating more social problems.
- d) *Lack of industrial land* – There is 30 percent shortage of industrial land in Muar. As a result, the relocation of the illegal furniture manufacturers operating on the agricultural and residential to the industrial zone is hampered. The limited industrial land has hindered the upgrading of the small enterprises. Many of them have to set up their factories on the illegal land which does not have proper roads and fire safety facilities. In addition, the process of converting the agricultural and residential land to industrial land is very time consuming.
- e) *Lack of own brand and design* – Although Muar furniture is well-known in the world market, the majority of the manufacturers are still in the OEM category. One of the factors that contribute to this is that the manufacturers are not interested in developing their own design. For them, it is not worth investing their money and time to develop their own brand or design because it would be easy for others to imitate their works. Moreover, the market is short of design talents. As some of the interviewees emphasised, the market is flooded with marketing and sales personnel, but not designers.

Realising the problems faced by the Muar furniture manufacturers, the Johor state government recently initiated the “Muar Furniture City” project. The project, located in Tangkak, is expected to propel Muar towards international stardom. An overview of the project is presented below.

## **6.7 Muar Furniture City**

Upon completion, Muar Furniture City will serve as the permanent exhibition center for not only for the Muar district, but the Johor furniture industry. The project which covers an area of 300 acres is jointly developed by the investment arm of the Johor government and the MFA. According to a representative from MFA, as it is always a difficult task for an enterprise to establish its own brand in the global market, the Muar Furniture City which is seen as a collective effort of the Muar furniture community will be one of the best opportunities for them to establish their brands. At the end of the day, what is expected from this project is that “Muar Furniture” will become its own brand in the global market, comparable with Italian furniture. The development of the Muar Furniture City is based on the concept of regional industry linkages (personal communication, May 6, 2010). Figure 6:8 details the major components and facilities of the project.

Figure 6:8 Major components and facilities of Muar Furniture City at Tangkak



Source: State Government of Johor

## 6.8 Summary

This chapter analysed the information gathered from the case study of Muar wooden furniture industry. The analysis was guided by the three building blocks of SIS, namely the technological and knowledge domain, actors and linkages, and institutions. Generally, the results of the study indicate that technological and knowledge capabilities of the industry are internationally competitive. The quality of the products, skill of workforce, and on-time delivery of the industry has been well recognised by the international buyers. However, like most of the furniture industries in the developing countries, the Muar furniture industry is facing difficulties in establishing its own design and branding as most of the enterprises are still in the OEM category. The lack of design and branding talents in the market, as well as the weak commitment of the manufacturers in pursuing the advancement in designing and branding capabilities seems to be the key factors for this incompetency.

Actors in the immediate business environment, such as the manufacturers, buyers, suppliers, and retailers, are the main innovation agents to the SIS in the Muar furniture industry. Linkages and interaction amongst these actors is an essential feature for the dissemination of knowledge and the success of innovation. This is particularly observable in the symbiotic and mutual benefit relationship between SMEs and large manufacturers. Also, the success of SIS in Muar won't be possible without the strong social capital of the Muar community. As a small town, the cooperative spirit, trust and loyalty among the Muar people is strong. In fact, most of the furniture practitioners have known each other since their earlier generations.



Like other industries, the furniture industry in Muar is facing numerous challenges and problems in their quest for technological innovation advancement. In this regards, factors related to cost and market are their main concerns. Additionally, the public system in the Muar furniture industry should be reconfigured towards the needs of SMEs, to make sure availability government programmes and supporting facilities are fully utilised by industry. The on-going Muar Furniture City project which is planned by the Johor government and MFA seems to be an effective platform to bridge the communication gap between the government and the industry. It is also the hope for the future of the Muar furniture industry, especially in establishing “Muar Furniture” as a global brand. Above all, government agencies need to be aware of the dynamics of this industry, as demonstrated in this thesis, so that they can listen intelligently and understand the genuine concern of SMEs as well as other key actors in the SIS.