Chapter 5

Prospects, Challenges and Potential of injection Moulding Business

This chapter is introduced to examine additional elements and identified prospects and challenges in the injection moulding sector.

1. Prospects

The prospects of the injection moulding sector is strongly related to the manufacturing quality, technology competence, competitive cost factor etc. we shall discussed each of them in detail;

(i) High Quality manufacturing capability

After more than 40 years of manufacturing experience, the plastics industry in Malaysia has developed into a highly diversified industry in terms of products and markets served. Today, the industry has become an important supporting industry to other key industries in Malaysia, especially the electrical and electronic industry, the telecommunication industry and the automotive industry.

Malaysia is also one of the main exporters of high quality plastic products such as tableware, kitchenware and other household products in this region.
In Selangor, most of the custom moulders have attained or in the process of getting the international quality standard such as ISO, UL or QS 9000. These companies have been supplying plastic parts and components to many reputable multi-national companies operating in Malaysia such as Motorola, Matsushita, Sony, Siemen, Alcatel etc.

For many years, some of the leading custom moulders have exported their moulding services to the ASEAN region, as well as to the developed countries like United State, Europe and Japan via international purchasing office (IPO) in Singapore and Malaysia.

(ii) Technological competence

The plastic manufacturers have been upgrading their technology by utilising advanced and sophisticated machines, investing in factory automation and acquiring of new technology through technology transfer. Manufacturer believe that investment in technology innovations will result in cost savings and improvement in product quality that would eventually enhance their competitive edge.

Today, plastic moulding is so advance that the injection moulding process is able to produce highly precision engineering plastic component within tolerance level of a micron. Micro precision moulding part is demanded in application like plastic gear in watch. The industry also offers the gas-assisted injection moulding technology, which is required for moulding a 29-inch television plastic casing. Three colour injection moulding machine is available for production of automotive tail lens and big injection moulding machine is available to produce car bumper & plastic pallet. Some of the leading custom moulders especially those Teir-1 vendors for Proton have invested heavily on laboratory equipment which will enable them to carry out in-house R & D activities.

(iii) Manufacturing flexibility

The diversity of the market served, advanced technology acquired throughout the years, accumulated experience by skilled workforce, the ability to design new products and the ability to meet the fast changing markets have helped making Malaysian plastic industry competitive. With these accumulated competencies,

Malaysian plastic manufacturers would be able to provide manufacturing flexibility to meet the future challenges.

(iv) High growth sector

The plastics industry is one of the fastest growth sectors within the manufacturing industry. For many years, the plastic industry has further improved itself by broadening its customer base, marketing ability, professional business practices and producing well accepted product range. All these help in strengthening its ability to maintain a sustainable growth in the future.

(v) Accessibility of locally produced raw materials

The petrochemicals industry in Malaysia has expanded rapidly in the late 1980s. Now, it is having an annual production capacity of about 1.1 million metric tonnes of the major raw materials including PP, PE, PS, ABS, PVC and PET. This quantity is sufficient to meet the local needs. The stable supply and the convenience in delivery of locally produced raw materials are added advantages to the plastics industry as these would assist the manufacturers in meeting the delivery deadlines for their finished products. The local raw material producers also played a significant role in assisting the producers to upgrade their technology, enhance their ability to use the new materials, and improve product quality and new product design.

(vi) Foreign participation

The high growth of the manufacturing sector and the plastics industry has attracted the interest of foreign investors from Japan, Taiwan, the United State and Germany, especially in high-end technical product. Their participation had contributed to the development of the industry especially in technological advancement, development of niche markets and, the promotion of exports.

(vii) Conducive investment climate

Various incentives are offered by the Government to promote this industrial sector, including financial incentives for promoted manufacturing activities, e.g., industrial technical assistance fund, export credit re-financing, R & D and skills training. In addition, the polymer industry has been identified as one of the realm of advanced materials under the Second Industrial Master Plan. The plastic industry is one of the sub-sectors within the polymer group. Due to its strategic role in the nation's industrialisation programme, the Government is giving priority to the development of the advanced materials sector through a more concerted and focused programme in R & D, development of specialised skills and supporting facilities.

(viii) Increasing new applications of plastics

The current per capita consumption of plastics in Malaysia is only 50kg, which is considered low compared to the average per capita consumption of 100 – 150 kg in the developed countries. With the country's rapid industrialisation process, there will be more new applications of plastics in the emerging industry sectors like telecommunications, medical and pharmaceutical appliances, aerospace, construction, etc.

There is also a global trend that plastics are replacing traditional materials like metal, glass and ceramic. With the development of engineering plastics, more new applications are being developed. For example, metal pump housing use in the chemical industry was replaced by plastic pump housing whenever it was possible.

(ix) New markets opportunity

Removal of tariff barriers through AFTA will provide excellent opportunities for the Malaysian plastic manufacturers to explore more non-traditional markets such as ASEAN region provide we are competitive.

(x) The growing economy

Despite the expected slow down in the Malaysian economy in the next two to three years, industrialists are optimistic that it would resume sustainable growth after the consolidation period. During the crisis, weak companies may shut down their operations, innovative companies may find a new business opportunities, and merger may take place. The industry as a whole will go through the consolidation period. After the crisis is over, Malaysia will continue to be a good choice for foreign investors due to its political stability as compared with neighbouring countries. Meanwhile, a weak Malaysian Ringgit with inflation rate under control mean Malaysian resources are relatively cheap for foreign investors; labour cost, land, and local service product are as attractive as before.

(xi) Lower production cost as compared to United State markets

According to the *Plastic Technology's* survey in the United State, the custom moulding's processing cost in the north America market increased every quarter by 4 – 5 % since Jan 1997. According to the *Plastic Technology's* report in May 1998, the current processing cost for 100 MT clamping force machine inclusive of the operator cost ranges from RM 48 – 320 per hours (US$ 12 – 80 per hours), the average cost is RM 156 per hours (US$ 39 per hours). Further checking with a few Malaysia moulding companies revealed that the present custom-moulding rate for 100MT clamping machine inclusive of operator cost ranges from RM 25 – 35 per hours. Such a low production cost will enable local companies to be competitive in exporting moulding services to United State.

xii) Lower mould cost in Malaysia as compared to develop countries

The result of Hewlett-packard's case study (please see figure 9) clearly indicates that Malaysia has the competitive advantage on the tooling cost. The development time for the mould fabrication is also very competitive. This is an advantage for injection moulding company to fabricate mould locally whenever it is possible.

Figure 9: Global tooling costs + lead-times

Tooling supplier	Tooling Cost US$	Test cost US$	Design time hours	Construction time hours	Total time hours	Lead time weeks	Aggressive lead-time weeks
USA midwest 1	349,900	2300	600	6400	7000	36	32
USA southeast	330,000	2000	650	5225	5875	25	23
USA midwest 2	280,000	5000	800	5600	6400	16	14
USA midwest 3	250,000	2000	180	3000	3180	22	20
USA west coast	239,000	N/A	360	2960	3320	19	16
USA south central	237,000	5000	550	3350	3900	14	11
USA south west	198,435	1400	145	3028	3173	20	20
Average value	269,191				4693	22	19
Singapore 1	180,000	6000	550	4250	4800	14	12
Japan	170,000	1500	200	720	920	10	6
Taiwan 1	148,800	7000	550	3000	3550	14	12
Singapore 2	138,000	4500	200	1800	2000	12	10
Hong Kong	132,000	N/A	300	3500	3800	20	17
Taiwan 2	110,000	1800	70	2400	2470	20	17
Malaysia	80,971	4117	150	1200	1350	16	15
Average value	137110				2699	15	13
Germany	308,000	N/A	1000	6000	7000	28	23
Portugal 1	144,000	1700	500	3300	3800	24	23
Ireland	126,923	734	275	1800	2075	18	16
Portugal 2	125,000	3000	430	3450	3880	15	12
Poland	64,828	N/A	1500	5000	6500	31	16
Average value	153,750				4651	23	18

Note : The data is based on a study by Hewlett-packard. Comparison are for an H-P inkjet printer enclosure mould. All the toolmaker worked from the same specification.

Source : Plastic technology, April 1998. Volume 44 number 4.

2. Challenges

The negative factors in the injection moulding sector are shortage of skilled labour, lack of mould making skills, lack of R & D, small domestic market, competition form low cost countries, and negative perception of plastics. The detail discussion is as follows;

(i) Shortage of skilled labour

The plastics industry is one of the many industrial sectors in this country that is seriously affected by the shortage of skilled labour. The industry is quite labour intensive in nature, with the majority of workers being skilled and semi-skilled. Under the present economic situation, regional head-hunter may find that our skilled labours are relative cheap and people are also willing to work in neighbouring countries like Taiwan, China or Singapore for higher income. As the nature of the industry required a relatively big pool of skilled labour, shortages of skilled labour may limit the future growth of the plastics industry.

Skilled labours need time to be trained. In Malaysia, the only higher learning institute that offers polymer technology course is USM. The majority of the skilled labourers currently available in the market obtained their skill by accumulating of working experience in the industry.

When the industry experienced double digit growth rates in the pass few years, many experienced staff were given promotion to the managerial level. The supply of skilled labour was simply not sufficient to meet the demand due to high business growth rate. In addition, natural loss in manpower, i.e., senior staffs retired, some skill staffs with entrepreneurs spirit started their own business and others switch job to some other industries.

Despite shortage of skilled labour, many employers are still reluctant to send their workers for skills training. Some employers reasoned that they could afford

to forego the working hours as this may affect their operations. While the others believed that after training employees would leave for other job or demand for higher wages.

(ii) Lack of mould making skills

The plastics industry still depends heavily on imported moulds. It is estimated that about 60% of the moulds used are imported. There is limited number of mould makers in the country who are able to manufacture sophisticated moulds that are competitive in term of cost and quality.

Mould making is a skill. A good mould maker required at least 5 years mould making experience to be able to design and fabricate a good mould. To acquire the ability to manufacture a sophisticated and precision mould will require many more years of experience.

Malaysia is a developing country. For the last 10 years, our mould makers were too occupied in manufacturing simple mould either for local consumption or for export. Under such a situation, there was really no need for the local mould makers to venture into manufacturing sophisticated mould. Without a further upgrading the mould making skills, majority of mould makers would not be able to produce the quality mould.

However, as our labour cost was increased in the last two years, manufacturing of simple mould was no longer viable for our mould makers. Since then, the trend was changing as more mould makers were investing in CNC (computer pneumatic control machine) and CAD/CAM (computer aided design / computer aided manufacturing machine) to upgrade their mould manufacturing technology.

(iii) Lack of R & D (Research and Development)

In general, there is a lack of interest amongst plastic manufacturers to conduct R & D, as they do not see the immediate returns. A successful R & D will bring value added to the plastic product or bring economic value to the plastic industry. A successful R & D Plastic product would fetch a better margin from the market.

(iv) Small domestic market

Malaysia, with a population of 21 million, has a relatively small domestic market compared to most of the other ASEAN countries. This has limited the development of new products. In addition, producers become less competitive as they do not enjoy the economy of scale.

(v) Competition from low cost countries

The regional and global trade liberalisation provides opportunities as well as threats to the plastics industry. Malaysia may no longer consider as a low cost producing country if it faces intense competition from other low cost emerging economies including China, Indonesia and Vietnam. The removal of tariff barriers will intensify the competition in the country and in the export market.

(vi) Negative perception of plastics

Plastics are wrongly perceived as the main cause of environmental pollution. The increased use of plastics in the region has attracted frequent criticism from the public as well as pressure from the Government to control the usage of plastics. There is a lack of concerted effort to address the pollution issue through the proper disposal of plastics and the design of an effective waste and recycling system. According to Prof. Anton Weber of BASF, thermoplastic is a combustible organic waste that should not be dumped at all. Unlike inorganic material, thermoplastic contains energy. One kg of PE contains 99% of energy produce by burning one kg of petrol. As a matter of fact, more than 50% of our electricity is

produce by burning petrol. Like Singapore, we can use the incineration plant to generate electricity.

Overall, the plastic injection moulding sector will face attractive business opportunity in the long term due to increasing new applications and new market opportunities. Our industry has the necessary technology and local raw materials to sustain the competitiveness in the long term. Putting more emphasis on human resource development program is crucial to produce more skill labour for the industry.

3. Potential of Thermoplastic Injection Moulding Business

So far, we can see that plastic moulding companies in Selangor had explored the business potentials in packaging industry, household products, plastic plates, plastic chopstick, plastic socket and plug, plastic furniture and other simple applications.

In the electrical and electronic industries, local companies are already producing various plastic components like the plastic casing for TV, computer, audio video products, internal components like the printed circuit board holder, mechanical parts, connector, relay, variable switches, transformer bobbin, capacitor housing, etc. In developed countries, electrical companies had integrated multi-pieces metal chassis to a one-piece injection moulding parts. The printed circuit board was converted from thermoset material (non-recyclable polymeric material) to thermoplastic material (recyclable material). Thermoset components like plug & socket had also been converted to thermoplastic injection moulding parts.

In the automotive industry, we have companies that are manufacturing big plastic parts such as car bumpers, dashboard, pillar trim and smaller plastic parts such as door handle, mirror housing, accelerator pedal, air filter housing etc. The leading automotive manufacturers like Toyota, General Motor and Volkswagen are already converting metal components to plastic components, e.g., engine mounting, engine air-intake manifold, cylinder head cover, wiper arm, quarter fender etc.

In the construction sector, we have companies manufacturing plastic cistern, plastic water-tap, plastic pipe joint, plastic basin, etc. In Europe, plastic manufacturers are already starting to promote plastic house. The roof, wall, whole kitchen set, door can now be made of durable plastic materials.

Why is there a trend for replacing conventional metal components to plastic components?

The reasons are very simple;

(i) Thermoplastic is a light weight material, as such, the end product will be lighter. In the transportation sector, lightweight vehicle meant lower petrol consumption. When a vehicle consumes less petrol, it will also produce less carbon dioxide in emission. Carbon dioxide is identified as the main pollutant that causes the green house effect, which leads to global warming. From experience metal parts generally weight at least 100% more than corresponding plastic parts.

(ii) Injection moulding is a simple production process as compared to metal process. A complicated plastic part may require only a single injection moulding process. Metal process may require multi-steps and may need anti-corrosion treatment. Take a chair for example, a plastic chair may require only a single step in the injection moulding process. A metal frame chair will require many processing steps like cutting metal rod, bending rod, welding, corrosion treatment, painting and decorative treatment. In mid 80's, we still see a lot metal frame chairs. In the 90's, plastic chairs had replaced metal frame chairs. These plastic chairs are very popular in coffee shop or public area.

(iii) Cheap raw material cost coupled with a relatively simple injection moulding process make the thermoplastic injection moulding parts simply cost less as compare to over engineered metal components. As a result plastic components promised good return of investment.

According to a report by the *Modern Plastic*, every year there are thousands of new grade plastics being introduced into the United State market, and more innovative applications being discovered by people. Plastic is still at its development stage, and there is no limit for plastic application and new business opportunities, the only limit is the human mind.