

Barriers In The Development of The Malaysian Brick Industry

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ABSTRACT

Building materials form the largest input in construction, accounting for about 50 to 80 percent of the total value of construction, and bricks account an average of 15 percent of the material cost. It is the most widely used building material in Malaysia. It serves as the walling materials and plays a major role in the creation and renovation of a built environment. However, a reliable published data on the Malaysian brick industry seems to be not readily available. The aim of this paper is to examine the barriers of brick industry development in Malaysia. A total of 433 brick companies were surveyed of which 102 had responded. These respondents provided the data for the exploratory study, which was descriptive in nature. Of these 102 respondents, a total of 52 fired clay brick manufacturing companies were focused upon. This study revealed that most of the brick manufacturing companies can only be categorized as small sized enterprises. The results also indicated that the barriers in terms technology, energy, institutional, employees, and marketing have mild effect on the industry.

Keywords: *Barriers, Malaysian brick industry, manufacturing companies, survey*

Introduction

Bricks is the oldest manufactured building materials used by mankind. Brickmaking had transformed from a handicraft to a mechanised industry. It comes in various shape, colour, texture, strength and quality depending on the materials and manufacturing methods used. Today, there are more than 1200 varieties of bricks available in the market (Sutton, 2006). Building materials form the single largest input in construction, accounting for about 50 to 80 percent of the total value of construction. Bricks account an average of 15 percent of the material cost (Abdullah & Othman, 2005) and it is the most widely used as walling material. Thus bricks plays a major role in the creation and renovation of the built environment. Food and Agriculture Organization of the United Nations (FAO,1993) reported that the brick industries in some Asian countries faced several constraints. These constraints are related to technology, the institutional environment, the cost and supply of energy, and many other socio-economic factors. The report also described bricks usage in housing and issues related to bricks manufacturing in countries like India, Thailand and Indonesia. However, there was no report on the issue in Malaysia. Reliable published data on the Malaysian industry seems not available. It is quite unfortunate, as brick is the most popular walling materials consumed by the local construction industry. Little information on the supply and demand on the material is available. The Construction Industry Development Board Malaysia report (CIDB, 2004) provided some data on the quantity of exported and imported bricks Association of Brick Manufacturers are inactive and thus could not help in providing useful information on the material. It is timely that relevant data on the brick industry be acquired so that sufficient information towards the development of a strategic framework to enable the sector assess their economic, environmental and social performances, identify areas for improvement in the light of future opportunities and threats as well as set targets and implement action plans to bring about improvement. This study attempts to look into the extent some of the constraints faced by the local brick manufacturers.

Constraints of the Bricks Industry

The brick industry is very traditional and has seen few changes in the past. A hundred years ago and probably even much earlier, bricks were made by hand, dried in the open, used unfired, or were fired in simple kilns such as clamps and scoves, using wood as the main energy source. As reported by several publications (FAO, 1993; Jone, 1996; Mathews, 2005; Maithel et al., 1999; Milberg, 2006), in many Asian countries centuries-old technology is still being used. This is also evident from the fact that most brick makers learned the trade from their forebears and/or from other brick makers. While in developed countries many changes have taken place in the brick industry, the opposite is true in the developing countries. Only a few countries, notably Thailand, Vietnam, Indonesia and Malaysia have changed their methods, mainly with regard to the forming of bricks.

In most countries, the brick industry has had very little support from the national and local governments. In some countries even the ground rules set by government appear to be continually changing, usually without consulting experts in the brick industry. There are taxes and levies (legal as well as illegal) on the raw material in the form of clay, wood-fuel and its transportation. Restrictions on the use of and access to fuel types, etc. are often imposed on the industry without any consultation. It appears as if some governments perceived that the brick industry as a nuisance or burden to development, rather than as an opportunity for creating rural employment, generating income and providing low cost building materials.

Additionally, the industry also faces considerable environmental constraints. The main constraint is the supply of raw materials in the form of clay and fuel. Clay, in many cases, is obtained from land which also has an agricultural value, such as rice fields, etc. With prudent practice, there would not be negative impact on agriculture. Topsoil can be removed and set aside to be returned after clay removal – an option which would have minimal impact on agriculture.

At present the small scale cottage and village producers are having difficulty surviving. From the small amount of evidence available (FAO, 1993) it appears that the prices of inputs are increasing at a faster rate than the returns from the sales of the bricks. Small producers are not only being charged more for their inputs than the large producers but, in some cases, are having much more difficulties in obtaining reasonable quality materials and fuel. Larger industries, which sometimes buy the unfired bricks from the small cottage level producers, in general are not in a position to, or will not, increase the price they pay for these *green* bricks.

During the recent past the brick industry has faced competition from several other building materials. These included cement and soil/cement blocks. For instance, in Thailand cement blocks have been able to attain a major share of the housing and office building market in only 15 years. A main reason why cement blocks have attained a large market share, not only in Thailand, but also in India and Indonesia and other countries is may be because cement blocks are more uniform in size and stronger. This comparison may not be accurate because many manufacturers of cement blocks do not give proper attention to the mix ratio as well as to the curing of the blocks, and this result in weak blocks. However, even though concrete blocks may not be as strong as fired bricks, they have a large price advantage.

In most of the countries covered, fuel accounts for a major part (about 40% on average), of the costprice of bricks and is therefore a serious constraint to brick manufacturers. The cost of fuelwood varies from country to country was as low as US\$ 10 per ton in the southern part of Thailand in 1989, but may be as high as US\$ 80-100 per ton, as was the case on the free market in Nepal (Maithel et al., 1999). The patterns of energy supply are complex and diverse. Besides fuelwood, rice husks and other agricultural residues, sawdust, coal (of varying types and grades), and oil may all be used to fire bricks. The choice of fuel usage by individual brickmakers depends more on the price and availability than on its suitability for particular kiln types.

Research Methodology

The population defined for this study consists of brick manufacturing companies located in Malaysia. The units of analysis are the brick manufacturing companies from Malaysia, with a representative from each company being the respondent. An introduction letter, information sheet, consent letter, and a letter explaining the details of the research were mailed to the respondents.

The population size from the sampling was 433 brick manufacturing companies. The same numbers of structured questionnaires were administered by mail. Of these numbers, 102 completed questionnaires that were returned and usable. This 23.56 percent return rate was acceptable in this method of survey research (Kerlinger, 1973). Table 1 shows the distribution of questionnaires according to states.

Table 1: Distribution of Questionnaires According to States

State	Frequency	Percent (%)	Clay Brick Manufacturers Responded		Clay Brick Manufacturers Registered with MIDA*	
			Frequency	Percent (%)	Frequency	Percent (%)
Selangor	28	27.5	10	19.6	13	15.3
Johor	16	15.7	10	19.6	34	40
Penang	11	10.8	8	15.7	2	2.4
Sarawak	11	10.8	11	21.6	5	5.9
Perak	10	9.8	6	11.8	9	10.4
Pahang	6	5.9	-	-	4	4.7
Kelantan	1	1.0	-	-	2	2.4
Terengganu	9	8.8	4	7.8	2	2.4
Kedah	5	5.9	-	-	3	3.5
Negeri Sembilan	4	3.9	2	3.9	2	2.4
Sabah	1	1.0	-	-	7	8.2
Melaka	-	-	-	-	2	2.4
Total	102	100	51	100	85	100

*Malaysia Industrial Development Authority

Due to the usage of exploratory study in this research, the questionnaires were constructed using the literature available, coupled with the issues that are constantly raised during discussions with the industry players. In questionnaire evaluation stage, a pilot study was performed, where a sample population of 30 brick manufacturers in the northern states was given a complete set of questionnaires. The usable response rate was 80 percent.

Respondent Profiles

The companies surveyed were mainly, i.e. more than 60 percent of companies, have less than 50 workers while only 3 percent of companies surveyed have 101 to 250 workers. Based on the company type, all the respondents are local companies or have been incorporated locally. It can be observed that about 40 percent of the brick manufacturing companies have capital investment less than RM 1 million for the past financial years. Only 14 percent has more than RM 10 million to RM 50 million of investment capital. In terms of geographical location, more than 27 percent of the companies found in the survey were located in Selangor, followed by Johor and Perak with more than 15 and 9 percents, respectively. Only one company from Kelantan and Sabah responded, and no company from Melaka responded to this study. It follows the distribution of the number of factories in the states. Selangor, Johor and Perak which are known to have high quality clay. They are also the centres of other ceramic industries as pottery and roof tiles. Another characteristic of the companies surveyed is factory location from the closest town. The survey found that more than 70 percent of the brick factories are located nearby a town. Those located away from town normally located by the clay quarry. From informal interviews carried out, the cost of transportation may take up to five cents per unit. Location of brick factories nearby to town is considered a strategic move because towns are areas of development.

Survey Findings

The selected results of the survey are presented within the following two topics: constraints of brick manufacturers; and performance and productivity of brick production operations.

Constraints of Brick Manufacturers

As evident from several publications (FAO, 1993; ILO, 1984; Jone, 1994; Mathews, 2005; Maithel et al., 1999; Milberg, 2006), the brick industry is facing several constraints. These constraints are related to the technology, the institutional environment, the cost and supply of energy, and socio-economic and financial factors, etc. However, there are also factors outside the industry which play a role. These include institutional and policy constraints and competition from other building materials such as cement based building materials, etc.

Based on these issues arising, the respondents for the study were asked to evaluate whether the following barriers have impact on the brick production and distribution of their companies:

- i. Technological barrier
- ii. Institutional barrier
- iii. Energy resources barrier
- iv. Employee barrier
- v. Market barrier

Table 2: Barriers of Local Brick Manufacturers

Barriers	N	Mean
TECHNOLOGY BARRIERS		
TB Traditional Method in Production Process	102	2.0686
Lacking of standard in production	102	2.6275
Lacking of research and R & D	102	2.6373
INSTITUTIONAL SUPPORT BARRIERS		
Little Assistance from the Government	102	1.4706
Lack of Cooperation from Brick Procedures (association)	102	2.627
Lack of Information and knowledge access to other countries	102	2.4412
ENERGY RESOURCE BARRIERS		
ERB High Firing Fuel Cost Usage	102	3.1176
ERB Current Kiln with Low Efficiency	102	2.2157
ERB Low Quality Firing/Burning Fuel for kiln	102	2.6667
HUMAN RESOURCE BARRIERS		
Less attraction for workers to joint brick industry	102	3.4314
Lack of expertise and basic knowledge of brick industry	102	2.8333
Current number of worker insufficient	102	3.0784
MARKETING BARRIERS		
Competition with other building material	102	2.7353
Brick prices are not competitive	102	2.7745
Lack of knowledge of current market	102	2.4314

1: No effect 2: Little effect 3: Moderate effect 4: High effect

As for technological barrier, the result of the study (Table 2) indicated that traditional method in production process has little effect on the brick production and distribution of the manufacturers (2.07). The mean score for *lacking of standard in production* is 2.63. This indicates that this factor has a slightly higher impact on the production and bricks distribution of the manufacturers. As for the technological barrier – *lacking of R & D*, the study also found that it has almost a moderate effect on the production and distribution of the manufacturer (2.64). This is not surprising since brick-making has a long history and producing the normal type of brick has become a trade. Researches into new materials are normally carried out at universities. Except for the use of PFA and GGBS as additives to clay, the use of other materials has not shown promising effect (Abdullah, 1994).

Table 2 also shows the result of the survey relating to institutional support for brick manufacturing industry. The result revealed that lack of cooperation from brick procedures (association) and lack of information and knowledge access to other countries were the two constitutional barrier that have a mild effect (between little effect to moderate effect) on the production and distribution of the brick manufacturers – mean score between 2.44 to 2.63. Besides that, the government support is considered to give the lowest impact to the manufacturers and this is the reason why this traditional industry can survive without the government involvements.

As for the energy resources barriers, the study found out that *high firing fuel cost usage* do have an impact on the production and distribution capability of the manufacturer. The impact was reported to be moderate to high with mean score of 3.12. The results from the other two factors in energy resource barrier shown a mild effect on the production and distribution capability of the manufacturer – mean score of 2.22 and 2.67 respectively.

Among all the barriers to brick production and distribution, employee barrier was reported to be the highest. *Attraction for workers to join the brick industry* was reported to have quite a high impact with the mean score of 3.43 as shown in Table 2. The respondents for the study agreed that the current number of workers are insufficient and moderately affecting their production and distribution capabilities, - mean score 3.08. As for the issue on lack of expertise and basic knowledge of brick technology among workers, the study revealed that, it has a mild effect on the manufacturer's production and distribution – mean score 2.83.

The result on marketing barriers given by the manufacturers is also included in Table 2. All the 3 issues related to market barrier have shown a mild effect and the production and distribution capabilities of the manufacturer. The mean score for *competition with other building material; brick prices are not competitive; and lack of knowledge of current market* was 2.74, 2.77 and 2.43 respectively. This indicated the presence of high variability of score given by the respondents on all these barriers.

Performance and Productivity

This section describes the result on the brick manufacturers' response on their evaluation on the performance and productivity measures of the production line. Several constructs were developed for the manufacturers to evaluate the performance measure of bricks production operations. Each items were measured on the scale of one as inferior and five as superior. The result of study is given on Table 3.

Table 3: Manufacturer Evaluation on Performance and Productivity Measures of Brick Production Operations

Items measured	Mean	Std. Deviation
Product Quality as Perceived by Customers	3.73	.733
Level of Scrap and Rework	3.60	.693
Conformance to Design and Standard Specifications	3.73	.760
Setup Time (time to prepare plant)	3.51	.728
Throughput Time	3.44	.606
Customer Response Time	3.63	.716
Downtime for Production Areas, Plant, and Others	3.49	.625
Company Profit	3.60	.679
Decreasing Inventory Costs	3.36	.899
Plant Productivity	3.60	.721
Worker Productivity	3.46	.840

All items are significant of $P < 0.01$. Note: $N = 102$

The items were measured on the scale of 1 to 5. (1 = inferior; 2 = worse; 3 = same; 4 = better; and 5 = superior)

All items measured as in Table 3 showed that the manufacturers rated their production operation as moderate to better performances. For example on product quality the mean score is 3.73 with standard deviation of 0.733. Other items such as level of scrap and rework, set-up time, throughput time, customer response time company profit, plant productivity, and worker activity all showed almost similar results. Judging from these responses of all the items measured, the brick manufacturers are getting better but they have not reached the level of superior performance which means that there is still room for improvement.

Conclusion

Clay brick manufacturing and construction have a long history. The material has long been used by mankind and undoubtedly it will still be as an important material for the future. The survey presented here provided some insight on the status of our brick industry that can be beneficial to the existing and new players in brick manufacturing. This would assist the relevant authority to address the aspects of the technology, the institutional environment, the cost and supply of energy, socio-economic and financial factors, institutional and policy constraints and competition from other building materials.

Basically, all of the brick manufacturing companies are owned by local enterprises. Most of them are categorized as small sized companies operating on low labor force with low paid up capital. However, there are few large companies that manufacture bricks not only for local consumption, but also for the export markets. Most of the brick factories are located in the states that are also known for other ceramic industries such as Johor, Perak, Selangor, and Sabah. Brick factories are normally located by the clay quarry sites situated within the vicinity of the town areas, where most of the construction projects are.

In terms of constraints faced by the brick manufacturers, the findings are as following:

- i. Technological barrier has a mild effect on the production and distribution of brick manufacturers in Malaysia. This finding is as expected as brick manufacturing is not a new industry.
- ii. Technology usage, except for fuel, and technology adoption in this country is high.
- iii. Institutional barrier also has a mild effect on the production and distribution capability of the Malaysian brick manufacturer except the government support that has a lowest impact to the industry.
- iv. The energy resources barrier, specifically the *high firing cost usage* did have a high negative impact on the production and distribution capabilities of the country's brick manufacturers.
- v. The human resource, the employee barrier posed a high impact on the production and distribution capabilities of manufacturers.
- vi. The market barrier has mild effect on production and distribution capabilities.

In terms of brick production and productivity, the manufacturers rated their production operation as moderate to better performances. Other items such as level of scrap and rework, set-up time, throughput time, customer response time company profit, plant productivity, and worker activity all showed almost similar results. Judging from these responses, of all the items measured, the brick manufacturers are getting better but they have not reached the level of superior performance which means that there is still room for improvement

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