



Case Study 1 **Khay Hor Charcoal Factory: Challenges of a Sunset Industry**

Giam Kah Hooi¹ & Hasnah Haron²

Graduate School of Business, Universiti Sains Malaysia

Khairun Yahya³

School of Biological Sciences, Universiti Sains Malaysia

Abstract: Charcoal production in Malaysia, once a booming industry in the early 1930s, has suffered a steep decline in volume produced and sales revenue since year 2000. Today charcoal production has been termed as a ‘sunset industry’ – essentially it implies that this is an industry that will in the future be wiped out from the market. This case study explores the issues of the charcoal industry in Matang, a region in Malaysia which produced 70% of the charcoal for export. This paper provides a holistic view of the problems so as to understand better the constraints of developing the charcoal industry in Malaysia, by analysing the case of Khay Hor Holdings, the second largest factory in Matang. The key factors leading to a decline in competitiveness of this industry are analysed and the various threats that hinder its growth are examined from the internal and external perspectives. A number of alternatives are suggested to sustain the business. The successful story of Matang could eventually become an ideal business model to be emulated by other states doing business in this area. It may serve as an eye-opener for local entrepreneurs seeking business opportunities in the charcoal industry.

INTRODUCTION

On 28 March 2011, Mr Chow the factory manager of Khay Hor Holdings - a business co-owned by multiple groups of families - exited from the hour long company meeting with the rest of the owners. He had reported the status of revenue and net profit obtained for the past fiscal year. Naturally, he had been questioned about the decline in

¹ MBA student, Graduate School of Business, Universiti Sains Malaysia, Penang; Email : eric5108@gmail.com (Corresponding author)

² Graduate School of Business, Universiti Sains Malaysia, Penang; Email: hhasnah@usm.my

³ School of Biological Sciences, Universiti Sains Malaysia, Penang; Email: khairun@usm.my

revenue. He had explained, giving relevant facts about the market situation and the multiple issues facing the company which are causing the declining revenue.

One of the major issues faced by the company was the steep competition. A number of their current customers had turned to suppliers in other countries such as Indonesia and Africa which offered a cheaper product with faster turnaround time. Their competitors were using advanced technology to produce the same amount of charcoal, with less combustion time, waste, and pollution during the process. Most of them received grants and subsidies from the government to support the industry.

The second issue was related to the heavy fines from the forestry department for over-cutting greenwood. The licenses given provide for each contractor to harvest only 2.2 ha forest in a year. However, due to close ranging and rapid felling activities, illegal chopping occurred frequently and lately the company has been fined tens of thousands of ringgit in a year.

The last issue related to finding a successor to the business. On taking over the business, the younger generation did not show great interest in pursuing the charcoal operation. They moved on to other fields related to their educational background. This triggered a fear among the owners that the business would eventually come to an end without a successor to manage the business.

Mr Chow had been asked to provide a report on the issues and suggest alternatives that would help to resolve the problems. The management wanted him to explore long term strategic alternatives to sustain the business through identifying opportunities for growth.

At the next meeting, Mr. Chow presented the following facts (see Table 1) about the market situation.

Mr. Chow presented his findings on the company's performance (Figures 1 and 2). He suggested a number of alternatives to overhaul the business operation of Khay Hor Holdings in order to compete successfully with other suppliers in the same industry. As mentioned by Kotler (1999) "The ability to change has become a competitive advantage". Hence, the questions posed during the meeting: Was Khay Hor Holdings ready for change? If change is resisted, will they be eventually forced to exit from the industry? To sustain the business, what were the best alternatives to be adopted by Khay Hor Holdings as their long term strategies?

Table 1. Facts about charcoal production in Malaysia

Total revenue in fiscal year 2010	RM29.7 million
Total allowable areas to harvest under license	167,610 tons of greenwood
Yearly production throughput	45,255 tons of charcoal
Price of charcoal at retail	RM 600 per ton

(Source: Forestry Report, 2011)

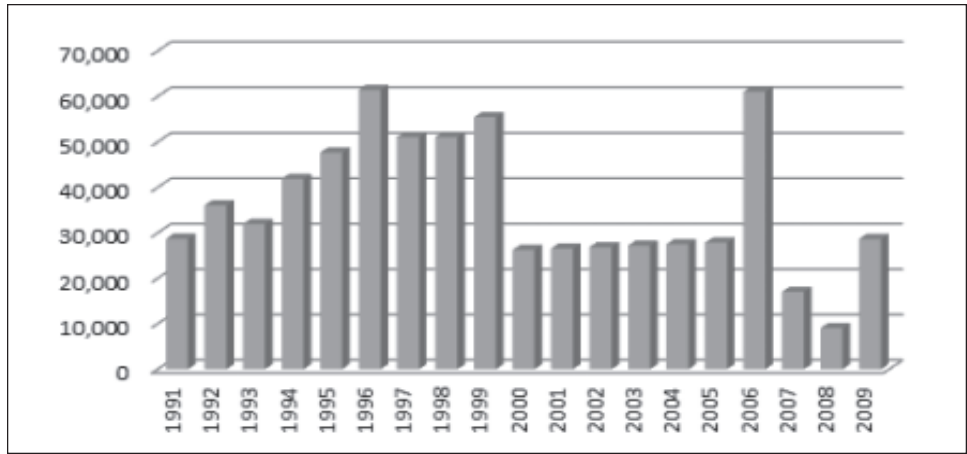


Figure 1. Production of wood charcoal (in tons)
(Source: Company Financial Report 2010)

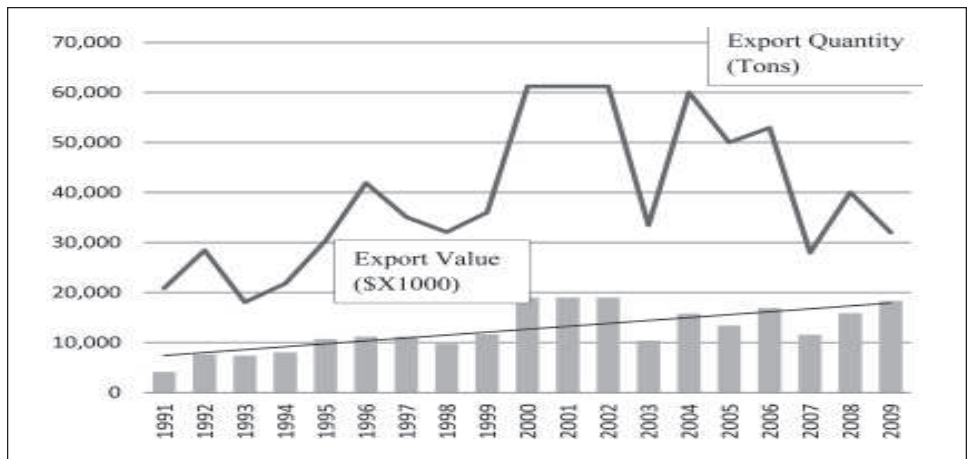


Figure 2. Export quantity and value
(Source: Company Financial Report 2010)

BACKGROUND

The Matang charcoal industry was once a thriving industry during the 1930s. Overall, there were over 100 charcoal makers with 380 kilns in Matang. Matang was responsible for 70% of charcoal produced for export from Malaysia, followed by other states such as Kelantan and Sarawak (Spalding *et al.*, 2010). Today, charcoal production in Matang is considered a ‘sunset industry’ due to its continuing decline in revenue and market share.

Company History

Khay Hor Holdings was established in 1940 by a few family groups. It has been in operation for two generations and has over 60 years of experience in mass producing fresh charcoal to supply to local and foreign markets. The coal industry rapidly boomed because of high demand for cooking, and fuel energy for supporting various modes of transportation such as the steam-engine train and the automotive. In the 1950-70s, charcoal was mainly exported to Singapore and Hong Kong, but exports declined as a result of an increase in standard of living when natural gas began to replace charcoal. In 1990s, they found a new overseas market. There was demand for quality charcoal as the raw material for manufactured products in Japan. As a result, there was a steady increase in exports from 300 tons in 1991 to 12,000 tons in 2010, almost 30% of the charcoal produced annually.

Khay Hor Holdings was one of the 86 others contractors that obtained the license to run the charcoal business. They were the second largest factory in Matang, with total of 6 approved burning kilns and an approved annual allocation of mangrove felling of up to 13.8 ha (Muda & Mustafa, 2003).

In December 2009, Malaysia State Tourism handed over the President's Award to Khay Hor Holdings for taking the initiative to make their tourism products attractive to local and foreign tourists (*The Star*, 19 December 2009). The President's Award is presented to individuals and entrepreneurs for their dedication and passion in promoting tourism and safeguarding the state's natural and cultural heritage.

Current Operations

As the Khay Hor Factory is located near the Reba River, the tree trunks can be easily transferred to the river bank where the factory is located. The tree trunks are chopped by the foreign workers using a chainsaw at the designated lot in the forest and then the logs are allowed to manually float in the river to the factory.

Many of their operations are still done manually, even the monitoring of the transfer of the trunks based on the flow of the tides to other processes such as building the kiln to baking the charcoal. The factory uses the traditional method of baking to reduce the moisture of the green wood log in the kiln to produce the ebony black charcoal.

Organisation Chart

Khay Hor is organised in the form of a partnership between a few family shareholders and an assigned executive director acting as the Factory Manager. The organisation chart is displayed in Figure 3.

Several contractors are hired to undertake the task of harvesting in the forest; they are paid by the number of logs transferred back to the factory. Besides, there are around 20 part time workers who are employed on a periodic basis and paid on an hourly basis i.e., number of hours spent in the factory. The chainsaw operators are

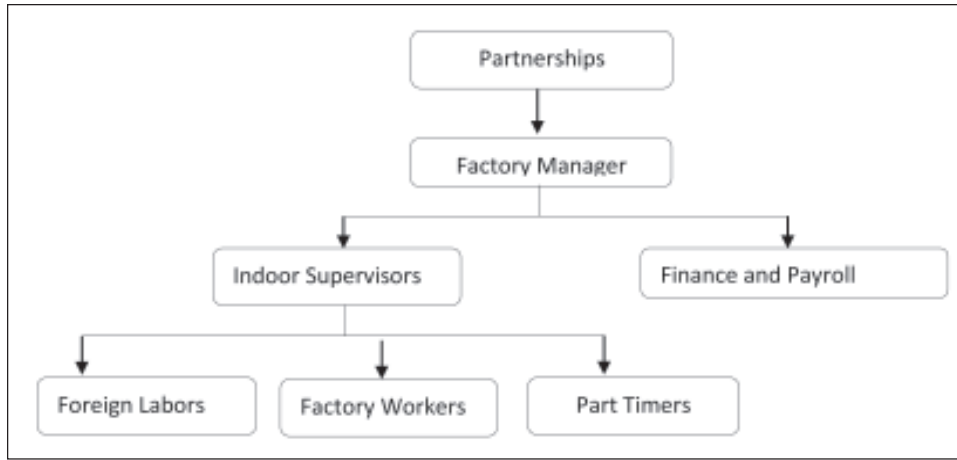


Figure 3. Organisation chart (Source: Company Profile)

paid based on tonnage delivered to the landing. Both factory workers and part time workers require basic knowledge and are given relevant training to avoid unnecessary injury and accidents in the factory.

Charcoal Products

According to Mr Chow, even in the current financial distressed state, he could see potential in the charcoal industry. Charcoal has been widely utilised in the pharmaceutical industry to produce dietary supplements for gastric patients as it absorb gases and toxins to help heartburn, flatulence and indigestion.

The cosmetic industry has been utilising charcoal to produce fresheners for face mask and beauty products. Besides, it is widely used in the filtering products where the active charcoal acts as an agent of adsorption to remove organic chemicals, chlorine, lead, unpleasant tastes and odours in effluents or coloured substances from gas or liquid streams (FRIM, 2006). Charcoal may be activated to increase its effectiveness as a purifier. Activated charcoal readily adsorbs a wide range of organic compounds dissolved or suspended in gases and liquids. Charcoal is often used to purify water to remove bacteria and the undesirable taste.

PROBLEMS AND DISCUSSION

Khay Hor Holdings was experiencing great financial difficulties that challenged its viability as a business. A major challenge was stiff competition resulting in lesser demand for its product. This was compounded by the activities of the green environmentalists who were against the emission of carbon monoxide (CO) during the burning process as they considered it to be harmful to the environment. Under these circumstances, it was tough for Khay Hor Holdings to remain in business.

Mr. Chow presented the following concerns during the meeting:

Steep Competition

Mr. Chow stated that business has been difficult as profit margins are getting smaller as there is no floating market price based on market demand. The price has been fixed and maintained for the past five years and so far only two local distributors are dealing with the export of charcoal. The price of charcoal is determined by dealers who function as central distributors of all charcoal production in Matang region. Price control has had the effect of lowering their profit margin while operation costs have increased with time.

Many of their existing customers have turned to other suppliers from Indonesia and Africa as they were able to offer a lower price and lower turnaround time. This has seriously lowered Khay Hor's revenue and market share. These competitors were using new technologies to produce high volume throughput, with more effective combustion process and less waste. The adoption of these technologies contributed to higher economies of scale and hence they were able to lower the price. In addition, there was no government subsidy for running the business. They have approached the Small and Medium Industrial Grants (SME) through the government funding authority, but were rejected without a valid reason.

Heavy Fines

The Forestry Department of Perak had reported the destruction of the mangrove ecosystem functions along Matang Forest due to heavy harvesting activities. Mitigating measures to preserve the forests and ensure the 30-year rotations are properly maintained led to the imposition of heavy fines on contractors who over-fell or caused injury to adjacent trees as a result of indiscriminate or irresponsible felling (Muda & Mustafa, 2003).

A fine of RM 150 per tree is a large sum of money but payment of such hefty fines is sometimes unavoidable. The felling process is often outsourced to foreign workers who use chainsaw and axe to cut the tree. They are not trained professionally and occasionally due to a poor working environment, they are exposed to great danger and harmful creatures underneath the swamp. They have to be quick and ensure the required number of trees are floated back to the factory before sunset. Therefore, injuries and irresponsible felling does happen and factory owners have to bear the consequences.

Lack of Interest by Next Generation

The charcoal production floor is old and exposed to great heat and dust. The children of the current factory owners prefer white collar jobs as compared to running charcoal production which requires an extensive amount of strength and energy. These children are mostly university graduates, professionals in their own right and not many are willing to continue working with the family business.

Highly Polluted Working Environment

Matang has seen the presence of many researchers who had reviewed the degree of pollution caused by charcoal production. Local institutions such as Universiti Sains Malaysia and government-linked agencies have highlighted their concerns on the emission of CO₂ to the environment. The factory has a zinc rooftop to avoid humidity; however, the design has the potential to cause severe discomfort to the human breathing system from prolonged exposure to the highly carbonised air from the production floor. The surroundings of the factory are filled with smoke and dust, combined with great heat. This explains why the children of the owners are not interested in following their parents' footsteps and to continue with the business.

ALTERNATIVES

It is obvious that the challenges of Khay Hor Holdings originate from both internal and external sources. Based on the literature and data collected, this paper would like to recommend a couple of alternatives that would help to increase the competitiveness of the business.

Engagement with the Government

The review indicated that the Malaysian government had demonstrated little interest in the development of the charcoal industry. In fact, Malaysia has been focusing on the development of other core agricultural products such as natural rubber, palm oil and sugar cane after World War II. Much of the research and development (R&D) funding has been allocated to these sectors.

In order to sustain and ensure growth of the charcoal industry, Khay Hor has to negotiate with the government as they had played an important role in recognising and sponsoring the charcoal industry in the Malaysia Economic Plan. Government funding for charcoal research, tax exemption to the industry, lower export duty, new regulations to protect the welfare of the charcoal producers etc. are some of the initiatives required to support this industry (Muda & Mustafa, 2003).

Mergers and Acquisitions

The SWOT analysis indicated that a major weakness was related to the limited licenses per year for building kilns that had been issued by the Forestry Department. Although the limitation of kiln licenses is a constraint to business expansion, Khay Hor could identify opportunities for acquiring smaller factories or seek mergers to enlarge the market share. There could be some smaller licensed factories that may want to exit the market due to the charcoal industry being a sunset industry. This could provide a good opportunity for Khay Hor to acquire these companies. However, this may trigger risks to their current business, especially if Khay Hor has to take a financial loan to buy up smaller factories.

Such a strategy seems practical when we look at the situation in other developing countries. For example in Africa, the Malawi Charcoal Project was implemented from year 1986 to 1989 as a special component of the Energy I Project from the World Bank. It focused on merging the semi-industrial production of charcoal to transform itself as the largest charcoal production programme implemented in Sub-Saharan Africa (Seidel, 2008).

Improved Marketing Plan

The production volume of most charcoal burners is so small that it does not make sense for them to organise distribution and marketing themselves. Thus, the products are sold to transporters, who also take care of the wholesaling. Charcoal is sold through a variety of channels, sometimes involving a complex system of wholesalers and retailers (Muda & Mustafa, 2003). Only a small amount of charcoal is sold at the production site. A heavy dependency on the wholesaler has led to charcoal pricing being insensitive to market demand and therefore lacks forecast demand analysis (The True Value of Charcoal, 2002).

A suggestion for Khay Hor Holdings would be to engage the Malaysia Producer Society or Foreign Trade Ministry to work with Charcoal Manufacturers Association (FCPA) to seek new market segments and explore new product opportunities associated with high quality charcoal. On the other hand, they could work hand-in-hand with organisations such as FELDA or the Ministry of International Trade and Development (MITD) to begin looking into the potential of charcoal as a raw material under the fields of chemistry, health, beauty industry and medical products (Muda & Mustafa, 2003).

Import of New Technology

According to Porter (2008), research on supply-side economics of scale indicates that when organisations produce at high volumes, they gain economically as they enjoy lower costs per unit because they can spread fixed costs over more units, and through employment of more efficient technology.

Traditional methods of charcoal production are messy. As production is often in batches, they produce inconsistently low yields and only use the volatile fraction of the pyrolysis process to arrive at the final charcoal product. The efficiency of the production kilns used in many parts of Matang was a mere 19% (conversion of calorific value in the wood to that remaining in the charcoal) and there was low adoption of more efficient methods. Adopting better kiln preparation methods could increase efficiency by 30% or more (The True Value of Charcoal, 2002). The following diagram shows the difference between a traditional kiln (Figure 4) compared to a modernised kiln (Figure 5).

Khay Hor should adopt a continuous system which utilises the combustion of the pyrolysis process to ensure that the hydrolysed charcoal avoids further oxidation. In a commercial operation based on this system, considerable heat energy will be available



Figure 4. Traditional kiln used in Matang. (Source: <http://chestofbooks.com/crafts/scientific-american/sup3/images/KILN-FOR-BURNING-CHARCOAL.png>)



Figure 5. Typical industrialised kiln. (Source: http://www.satglobal.com/comp_p10s.jpg)

for drying the feed stock or for any other required purposes. A continuous production method facilitates mechanisation.

Further, a technology kiln will reduce the combustion period significantly which normally is considered the critical path of the entire production of charcoal. Apart from that, adoption of new technology such as a more effective transportation mode for the transfer of the billets to the manufacturing sites will be the key to ensure 24/7 supply instead of depending on the seasonal tide of the river. Furthermore, the application of machinery or a good instrument to measure temperature could result in the control of temperature and boost production.

The adoption of new technologies mentioned above could help to resolve one of the internal threats which is the lack of interest among the successors. A modernised structure for the business will enable the professionally educated children of the owners to utilise their knowledge gained from university or colleges and contribute to the growth of the business.

Product Diversification

The collection of raw distillate as a by-product from the conversion of greenwood to charcoal is currently being attempted by some charcoal kiln operators. The raw distillate consists of pyroligneous acid, commonly known as wood vinegar, which can be used to cure skin diseases (Muda & Mustafa, 2003). It is a liquid generated from the gas and combustion of fresh wood burning in an airless condition. When the gas is cooled,

it condenses into liquid. Khay Hor and some charcoal operators have been involved in the collection of raw distillate with the largest concentration of such activity being in this area (Muda & Mustafa, 2003). Other benefits of wood vinegar are still under investigation, but importers such as Japan and Germany have been buying wood vinegar for research and development so as to explore its potential functionality. This could be another untapped market that needs to be explored further.

Company Rebranding

In order to sustain the business, Khay Hor should illustrate and promote a new business image through corporate rebranding. They should continually invest in technologies and best practices to make their products and services the true measure of their quality. The first point to be noted in the corporate branding exercise is to ensure that all products manufactured comply with applicable safety and regulatory requirements. The liquid effluents from the medium and large scale charcoal operations are trapped in large settlement ponds and allowed to evaporate so that this water does not pass into the local drainage system and contaminate the streams (Chong, 2006). This measure will ensure the protection of the ecosystem.

Planting more trees around the factory has been practised for decades. It improves air quality from pollution of the CO₂ gas emanating from the chimney. Natural shrubs such as *Alnus* and *Salix* found in the vicinity of the streams absorb CO₂ gases (Chong, 2006). This will reduce the greenhouse effect and result in less acidic rainfall to the neighbourhood river system.

In order to add value to the product, Khay Hor has to improve the effectiveness of the current business management systems to meet the ISO standards. Internationally recognised ISO certification such as ISO 14001: 2004 Environmental Standard production will add value to the brand and image of the organisation. The ISO certificate serves as a tool to build the competitive edge that will enable the factory to succeed in today's competitive market and or even well into the future. This will serve as a further attraction for customers who seek green and environmental products.

CONCLUSION

The charcoal industry was at its peak during the 1960s when charcoal was the primary source of fuel and energy. The industry then declined following the emergence of other sources of energy. The end result was the crowning of charcoal industry as the 'sunset industry'. Though this industry continues to be important to the economy, it is losing favour with investors.

This paper suggests a series of improvements for the charcoal industry in Malaysia, but more specifically in relation to Khay Hor Holdings as the pioneering factory. In practice, it requires interaction between the government, charcoal association and factories themselves in order to successfully deploy these plans to modernise the industry. Industry and Government should form a new partnership to steer the realisation of the strategy. There is a need to advocate and deploy resources throughout the

sector to optimise synergies among the players. The charcoal export business is lucrative and for this reason more entrepreneurs should invest in charcoal manufacturing.

In conclusion, Khay Hor Holdings aims to look forward to a brighter future. Despite the existence of several challenges to its operations, it has to adopt new technologies. A quick and effective change, based on its strong foundation and excellent track record, will allow it to stay ahead of other competitors and emerge as the winner in the market.

DISCUSSION QUESTIONS

1. What are the main issues relating to current methods of charcoal production that has led it to be termed as the 'sunset industry'?
2. Should Khay Hor Holdings continue with the business or exit from the industry?
3. To sustain the business, what are the best alternatives that Khay Hor Holdings should adopt?

REFERENCES

- [1] Chong V.C. (2006). Sustainable utilisation and management of mangrove ecosystems of Malaysia. *Aquatic Ecosystem Health & Management*, 9(2): 249–260.
- [2] Forestry Report (2010). *Perak Forestry Report*, March 2011.
- [3] FRIM (2006). MFRDB Annual Report, Forestry Research Institute Malaysia, 24p.
- [4] Kotler, Philip (1999). *Marketing- How to Create, Win and Dominate Markets*. New York: Free Press, pp. 5
- [5] Muda, Azahar & Mustafa, Mohd Shah Nik (2003). *A Working Plan for the Matang Mangrove Forest Reserve, Perak*. Perak State Forestry Department. 5th Edition.
- [6] Porter, Michael E. (2008). The five forces that shape the strategy. *Harvard Business Review*, January, p.26.
- [7] Seidel, André. (2008). Charcoal in Africa - Important, Problems and Possible Solution Strategies. Deutsche Household Energy Program for GTZ GmbH.
- [8] Spalding M., Kainuma, M. & Collins L. (2010). *World Atlas of Mangroves*. London: Earthscans, 117p.
- [9] The True Value of Charcoal (2002). Economic and Environmental Implications of Increased Consumption of LPG in Tanzania. Tanzania: Association of Oil Marketing.