Food Technology for Small-scale Economic Activities to Address the Aim of Supporting Rural Entrepreneurs
(Case Study on Food Processing Industries in Malacca State)

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Abstract—Small-scale food enterprises have played a very important role in the Malaysian economy, particularly in terms of employment generation, better income distribution and as a training ground for rural entrepreneurs before they invest in larger enterprises. There are more than 9000 food processing industries in Malaysia, of which 95% are classified as small-scale. This paper reviews the technology of food processing in Malacca State, particularly which carried out by small-scale rural entrepreneurs, often family business, with less than 20 workers. The importance of small-scale food processing industries as a way of raising rural incomes is discussed, and the major constraints faced by such business. These include availability of technology, raw materials, finance and marketing.

Keywords: food technology, small-scale economic activities, food processing.

I. INTRODUCTION

It is usual to discuss small-scale industries in Malaysia as a single group. Small-scale enterprises are defined as those which have shareholders’ funds or net assets of US$200,000 or less (MARDI, 2007). According to the Registrar of Trade of Malaysia, firms that registered with the department were classified into four segments according to the number of employees. First are the tiny or micro-scale enterprises employing less than five workers, these are usually backyard industries; small-scale enterprises employing 5-49 workers; medium-scale enterprises employing 50-199 workers; and the fourth, the large-scale enterprises with 200 or more workers. Another definition of small-scale industry is a company with capital less than RM 250,000.00 and having less than 25 full-time workers.

Small-scale food industries have important linkages to related industries such as the manufacturing of food machinery, and food packaging materials, and suppliers of food ingredients. It as envisaged that small-scale food industries will continue to expand in line with policies and incentives introduced by government. Government incentives to develop small-scale industries will lead to increased efficiency in the food processing industries. The government’s commitment to assist in the healthy growth of the small-medium enterprises (SMEs) is seen in its implementation of the Industrial Master Plan (IMP), which sets the framework and guidelines for the establishment of new industries up to 2000.

Since 1995, there were about 300,000 venture firms in the non-agriculture sector and other economic activities, of which 95% were small and medium enterprises (SMEs). Now there were about 14,000 SMEs (more than 18%) involved in food processing and other activities related to food (Bank Negara Malaysia, 2006). The food-processing sub-sector experienced tremendous growth after the 1980s. The gross production value of this sub-sector stood at RM 10.5 billion in since 1995. The food-processing sub-sector also is responsible for more than one-third of the employment in the non-agriculture sector.

Higher income and changes in lifestyle are expected to change food consumption habits to more nutritious and higher quality products. There is also growing trends the consumption of convenient food product that are ‘easy-to-cook’ and ‘ready-to-eat’. These scenarios will further increase the food demand and the important of food industries. However, one of the several issues affecting food-processing industries in areas of competitiveness, efficiency and resilience are more often caused by lack of appropriate technology. Many businesses in food processing industries in Malaysia have not fully embraced technology innovation. They were still based on traditional technology practices (Amla & Potty, 2006). The importance of small-scale food processing industries as a way of raising rural incomes is discussed, and the major constraints faced by such business, including availability of technology, raw materials, finance and marketing.

II. THE OBJECTIVE AND METHOD OF STUDY

The primary objective of this study is to support the development of small-scale economic activities particularly on processing of food and agricultural indigenous resources. This will be improving extremely food processing technology programs in order to develop better final product.

The main objectives of this research are:

(1) Reviewing the technology of food processing in Malacca State, particularly which carried out by small-scale rural entrepreneurs, often family business, with less than 20 workers.
Identifying the existing of technical problem which faced by small-scale rural entrepreneur in food processing industry

The research is based on a qualitative study. One of the two main qualitative research techniques is individual in-depth interviews. This approach generally uses an unstructured, undisguised format and can produce extremely valuable data if conducted correctly. In-depth interview is an intensive, unstructured personal interrogation in which the interviewer attempts to get the respondent to talk freely about the subject of interest. An individual in-depth interview is used for intensive probing into one person’s feeling about some subject. An interview may last an hour or even longer.

The other target primary data include observations and documents on the food processing system. The data collecting also spend an extended period of time, almost 3 weeks on site and interact regularly with 20 owners of small-scale enterprises in food processing as a case study. According to Leedly, P.D. & Ormrod, J.E (2005), by identifying the context of the case, researcher draw conclusions about the extent to which it’s finding might be generalized to all conditions of the research area.

III. LOCATION OF THE STUDY

Under Small and Medium Industries Development Corporation (SMIDEC, 2006), there are about 34 companies registered in Malacca that involved in food processing and other activities related to food. The State Government of Melaka, through its several agencies played an important role in planning and implementing development and economics activities. Melaka has one of the best infrastructure networks in Malaysia. This includes the best infrastructure like telecommunication, roads and highways that link the state to its neighbors’ and outside world, airport domestic flights, small port which act as feeder port to Port Klang etc.

One of the policies of the State Government of Melaka regulates that manufacturing industries must be located at the industrial areas. Industries operated in no-industrial land are illegal industries and will book by the relevant local authority. Investors intending to locate their industries in Melaka can obtain the industrial land either from public developer or private developers.

Small-scale food enterprises exhibit certain characteristics, which distinguish them from their large-scale counterparts. They are usually organized as a family business, or have a single proprietor. The location of enterprises in Melaka tends to be evenly distributed in three districts as below:

1. Melaka Tengah;
2. Jasin;
3. Alor Gajah.

They are found in both rural and urban areas among those districts, although some have already been relocated in small and medium industrial areas. Those industries operating in rural areas comprise of backyard or cottage industries managed by family members assisted by village folks who works part-time.

IV. LITERATURE REVIEW

The government sees the small-scale economic activities as an important domestic engine of growth, contributing significantly to the Malaysian economy. Small-scale industry is a dynamic and fast growing sector with respect to Malaysian economy. These ‘owner-operator’ enterprises can easily change or adjust their production system or management style, since they do not have through a complex decision-making process by a Board of Directors and shareholders, as in the corporate companies. Due to their low investment capital, these small-scale economic activities can efficiently adjust their production according to market demand, and still maintain their low production cost.

In term of employment, the Fourth National SME Development Council Meeting (2006) concludes that small-scale industry accounted for 55% of total workforce of business establishments in the agriculture, manufacturing and service sectors. The Meeting also indicates that most Small-Medium Enterprises (SMEs) are still very small, where 81% are micro enterprises operating with less than 5 full-time employees. According to the history of SMEs of Asian countries has shown that SMEs including micro enterprises form the backbone of the economy.

Many researches finding reinforced the need for aggressive efforts to be undertaken in a strategies and coordinated manner to support the expansion of SMEs and strengthen their capacity and competitiveness, given their significant potential to contribute to the nation’s economy. Hence, it is recognized that a strong, dynamic and efficient SME sector will determine a sustainable economic development.

The dilemma currently faced by Malaysia’s small-scale enterprises pertains to the need to stay competitive, locally and globally within the rapidly changing economic environment. The small-scale enterprises dilemma stemmed from the fact that they have not fully embraced technology innovation. Many businesses are still based on traditional management practices (www.smeinfo.com.my, 2007). The future of Malaysian small-scale enterprises lay in the need to move up the value chain to create new quality products, new distribution channels, and optimization of operational productivity and efficiency. These involve the use of appropriate technology.

The National SME Development Council endorsed the National SME Development Blueprint 2006 that includes a...
total of 245 programs that will be implemented in 2006 to accelerate the development of small-scale enterprises. These programs are aimed at strengthening the enabling infrastructure to support SME development. The development of small-scale industries in Malaysia is aimed to reach a level where they can compete for access to the global supply and production chains. In addition, programs will also be undertaken to assist SMEs to adopt higher levels of technology and upgrade their products, as well as to provide advisory services to SMEs (www.npc.org.my, 2007).

A review of the literature on food industry suggests that several factors play very important roles in the technological success of the firm in the industry (Avermaete et al., 2006). An enterprise must bring together at each productive point people with the right technological knowledge, equipment with the right technological capabilities, and material suitable for the purposes and the techniques to be applied. Thus, people, equipment, facilities, and processes in the enterprises must embody sufficient technological knowledge and flexibility to select wisely among alternatives technologies available for each step in the process, to adapt technology to meet local circumstances and changes in local circumstances, and ideally to develop new technology when appropriate and necessary.

V. FINDINGS AND DISCUSSION

The technology of small-scale food processing industries in Malacca State

Small-scale food processing enterprises exhibit certain characteristics, which distinguish them from their larger-scale counterparts (Chee, 1989). Small-scale food enterprises usually organized as a family business or have a single proprietor. The location of the enterprises tends to be evenly distributed. They are found in both rural and urban areas, although some have already been relocated in industrial areas. Almost all small-scale food enterprises operate under a simple organizational structure, consisting of the manager-owner and assisted by a few workers.

The utilization of food commodities and resources in Malacca can be describes as bellows:

a. Meat processing: in small processing, meat made into various traditional food products such as meat floss, dried curried or spiced meats, and meatballs. While most meat is consumed fresh, that is, prepared in the kitchen, meat processing industry has experienced a rapid development in recent years because of increased consumer demands and availability of new processing technologies. Meat processing technique today has been developed from several thousand years of culinary arts. Thus, it is not surprising that the principle of processing technique for commercial is, by and large, done on a disproportionately large scale with higher degree of automation. Figure 3 shows the results of processing procedure observation, used by small-scale enterprises which produce meat and fish products.

![Figure 2. Conceptual Framework](image-url)
Raw meat materials destined for processing must be inspected for wholesomeness and compliance with sanitation requirements. It must be kept at refrigerator temperature, and under no circumstances should the temperature exceed 15°C. To enhance the product flavor characteristic and appearance, a variety of additives are incorporated into the ingredient of product formulations.

FMB-60 is Automatic Meat Ball and Fish Ball Forming Machine. By can changing the forming mold, FMB-60 makes beef balls, pork balls, fish balls and squid balls etc. The capacity depends on the water content of material. Speed Production and the size of the forming mold (unchangeable).

b. Fish products: fish are processed into snack called “keropok” (dried fish crackers), fish balls, salted dried fish and fermented fish. The most popular of fish product in Malacca is processed into snack called “keropok lekor”. The crackers are made by mixing minced fish meat with sago flour, tapioca flour, salt and monosodium glutamate. Fish first deboned and mixed with tapioca flour (Manihot utilissima) or sago flour (Metroxylon sagu).

Salt (2%), water (25-35%), and sometimes sugar (1%) are added, mixed, and kneaded. The dough is stuffed into cylindrical casing (25 cm long and 4-6 cm in diameter). The rolls are then steamed or boiled for 90 minutes. After being cooled, the rolls are sliced (3-5 mm thick) and dried. For initial drying, a temperature range of 40-50°C Celsius is deal. A final temperature range of 65-70°C Celsius should be used in order to maintain a moisture content of 10%.

c. Fruits and Vegetables: tropical fruit and vegetables processing is a rapidly expanding industry and become an important source of export revenue in Malaysia. Banana, mango, pineapple, leeches, and papaya products are particularly important tropical items with commercial significance in the international trade. Figure 6 is a specific flow chart of processing procedure for fruit and vegetables.

There are many kinds of products made from subtropical fruit and vegetables, for example apples, mango, citrus fruits, dates, grapes, plums, prunes, strawberries, and more in the world market. Such products include fruit concentrate and pulp, fruit juices and also dehydrated fruit, confectionery jelly, fruit nectar, pickled fruit and many others.

Dried fruit product is available in many forms like: whole, slices, pieces, bars, powders, flakes, or leathers.
Techniques such as sun-drying, spray drying, tunnel drying, cabinet drying, fluidized-bed drying, drum drying, vacuum drying, foam-mat drying, osmotic dehydration, and freeze-drying have been established as commercial processes for some time. Dried fruits are more concentrated forms than products preserved in other ways. They are less costly to produce and require less storage space than canned or other preserved fruits. It can readily be seen that the cost of transportation will be much less for dried than for canned, frozen, or fresh fruits. For these reasons, dried fruits are usually considerably less costly to the consumers than the equivalent quantities of canned, frozen, or other preserved fruit products. Fruits products such as pineapples for dried products, pickles, jelly, confectionery, fruit juice and cordial drinks. Jackfruit and guava are processed by being dried, pickled, or made into jam and fruit drink. Bananas are widely used in snack food production, including banana crackers with various flavors. Durian is processed into various traditional food products such as durian cake, tempoyak, dodol. Coconut produced nata de coco and “kerisek”, is widely used in traditional cooking.

d. Noodles: people around the world are familiar with noodles and have their own way of making, preparing, and eating them, be it with a fork or a pair of chopsticks. An increasingly popular type of a noodle is the instant noodle. These noodles, which are made primarily from wheat flour, go just as well with sandwiches as they do with Oriental entrees. For that matter, they make a great snack all by themselves, since each package comes with package filled with seasoning, spices and artificial flavorings.

Figure 8. Noodle Machine

The general processing of noodles making is shown by Figure 8. The plant capable of producing popular “Chinese fast foods” was designed to produce instant noodles automatically and sanitarily. The processing methods and machinery used in manufacturing instant noodles were developed in Taiwan more than 25 years ago. The plant is inexpensive to establish and operate, since only a few pieces of semi-automatic equipment need be purchased and unskilled laborers are capable of handling the machinery. The instant noodle making plant outlined in this study is one of several dealing with the production of fast foods made from various types of pasta.

Figure 9. Instant noodle making plant outlined

Instant noodles appear to have originated in Japan in the 1950s and, today, are produced in over 80 countries worldwide. Convenience and affordability are important factors contributing to its increasing popularity. Consumption has risen steadily since 1995 in several Asian countries including Indonesia, Thailand, Philippine, South Korea, Vietnam, Japan, and Malaysia (USAID, 2007). The increasing consumption of noodles has led to concerted efforts to explore the feasibility of using instant noodles as a vehicle for micronutrient fortification. While several technological and implementation challenges remain, the instant noodles appears to have the potential to be an effective food vehicle for micronutrient fortification.

The food processing industries in Malacca generally is small-scale in size and practice traditional technologies such as pickling and snack food production. This is because of financial constraints, which means that they cannot afford applicable technologies, and a lack of technical information. The production levels are usually limited and their marketing growth is usually slow. This slows down the returns which are needed for reinvestment and expanding the industry. More often, these factors do not favor bank and finance institutions in providing loans needed. The processing methodology and equipment is often crude and has been used over many years. Efforts to mechanize, improve the efficiency and modernize the operations have been insufficient. Production efficiency in many of the SME is therefore low due to the various laboratories operations. Entrepreneurs with an elementary school education tend to be less receptive to new technologies compared to their counterparts who have a college education. This has made it difficult to transfer new technology and improve productivity.
The technical problem of small-scale food processing industries in Malacca State

Activities in food production and processing cover the major elements, such as procurement of raw materials, major technical improvements of production and processing, and distribution. All these major elements would allow one to develop an integrated approach to food production and processing, with alternatives for diverse stages of technological development for specific basic need. Food technology is the application of food production to the selection, preservation, processing, packaging, distribution, and use of safe, nitrous, and wholesome food (Wikipedia the free encyclopedia, 2006).

Beside technological problem, in order for the food industry to compete in the market, to be established and successful in the operation, those SME in Malacca have to face several constraints as below:

a. Raw materials:
The raw materials are of substandard grades because of inconsistency in supply and availability. These also usually affect the production flow and packaging set-up. Proper hygiene and sanitary practices are often neglected. SME food industries have been known to indiscriminately use chemicals such as preservatives, stabilizers, coloring materials and non-nutritive sweeteners in food preparations. Vegetable and fruits as raw materials are normally seasonal and perishable. There are usually insufficient vegetables for processing. They lack a proper post harvest handling system for fruit except on commercial farms.

b. Competitive market:
Many SME food enterprises are all processing much the same type of products, such as sauces, snacks, beverages and bakery products. These are all items which require a low initial capital investment and a low level of technology. Because of the number of firms involved, they face stiff competition in terms of their market share.

c. Quality problems
The product quality of SME food enterprises is inconsistent, due to a lack of facilities for quality control or awareness of the need for these, and due to poor manufacturing practices. The poor quality of food products is the major problem faced by food processors. It is attributed to factors such as lack of understanding of proper quality control and good manufacturing practices. This results in short self-life and unacceptability of the products.

d. Food packaging
Some SME still produce goods packed in low-quality packaging material with a rather unattractive packaging design. They have lack of awareness of the important of product presentation. Many good quality products do not sell well because of poor packaging and presentation.

e. Lack of industrial sites
Many small-scale food enterprises operate as backyard industries located near the owner's house. They need better premises with a proper drainage and sewage system. The industrial sites offered are too expensive for them to afford.

f. Lack of finance
This is a common problem facing small-scale food entrepreneurs. Financial institutions have more confidence in big industries, while small-scale industries have little collateral. They also have problems in preparing a project paper to show the viability of their business and its future plans.

g. Management
Most small-scale food enterprises are managed by the owners, who do not know modern techniques of management, including book-keeping and maintaining proper records. They are not innovative and motivated. They tend to be satisfied with what they have achieved.

h. Lack of small-scale food processors' associations
There is no association of small-scale food processors, or if such an association exists it is inactive. The lack of any organization to safeguard the interests of its members has led enterprises to compete among themselves for the same market share by lowering their selling prices.

To overcome the problem for developing of SME in food processing industry, the Institute of Technology Management and Entrepreneurship – Universiti Teknikal Malaysia Melaka (UTeM) through Entrepreneurship Development Department, has formulated an integrated approach to develop the small-scale entrepreneurs. The Entrepreneurship Development Department status that places emphasis on the development of small-scale industries will be in terms of processing, marketing, and technical assistance on technology transfer for SME particularly on food processing industries. The aimed of that program is to increase the value added of SME product.

Entrepreneurship Development Department has core activities that consist of:

a. Education:
The department offers a wide range of entrepreneurship-related courses which open to all community of Malacca and the region, including: Business Plan, Development of Industrial Human Resources, Management of Technical Pollution, Management of Quality Control, Strategy of Development of Entrepreneurial Spirit, Industrial Leadership toward Globalisation, Strategy of Development of Employee Creativity, Management Conflict.

b. Outreach:
To raise awareness and interest in entrepreneurship among Malaccan communities, the department has pioneered a wide range of outreach activities, e.g. Technopreneur Seminar; Business Plan Presentation; Enterprise Launcher to help and to promote jumpstart business product; Small Enterprise Forum.

c. Research:
The department conduct research on key issues of technology entrepreneurship and innovation, in collaboration with leading researchers and government state institutions. The department seek to understand the underlying forces and factors that drive the dynamics of birth and growth of technology enterprises, and to identify the best venturing practices for success in the global marketplace.
Department of Entrepreneurship Development has developed the Technopreneurs Club. There are 72 entrepreneurs under Technopreneur Club. The objectives of the club are to expand and rationalize assistance, including technical assistance of technology transfer for SME. Moreover, the integrated program of Department of Entrepreneurship Development is to strengthen the institutions, increase their supply of credit, especially long-term credit with soft-term conditions, and also improve conditions of financial and technical service.

VI. CONCLUSION

The SME in food processing industries in Malacca generally is small-scale in size and practice traditional technologies such as pickling and snack food production. This is because of financial constraints, which means that they cannot afford appropriate technologies, and a lack of technical information. The production levels are usually limited and their marketing growth is usually slow. This slows down the returns which are needed for reinvestment and expanding the industry. More often, these factors do not favor bank and finance institutions in providing loans needed.

The results of these studies, undoubtedly, in order to meet the challenges of technology innovations and obtain economies of scale, food processing industries in Malacca have gradually changed their pattern of production. In the past owner of food firms relied heavily on their traditional village management. But technical and economic development now call for larger primary banks, integration into a regional or national banking system, larger dairies, and modern, centrally located enterprises for processing, transformation, and marketing.

SME in food industry have played a very important role in Malacca economy, particularly in terms of employment generation, better income distribution and as training ground for entrepreneurs before they invest in larger enterprises. SME food industries also have important linkages to related industries such as the manufacture of machinery, and food packaging materials, and suppliers of food ingredients. It is envisaged that SME food industry will continue to expand in line with policies and incentives introduced by the government.

REFERENCES


