

A Framework for the Development of Halal Food Products in Malaysia

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Abstract

The global increase in the Muslim population and the growing awareness of consuming halal food has created an increased demand for new and differentiated Halal food. It is known that the introduction of new products may give company the competitive advantage but it is also noted that failure rates of new food products are high. The generic product development process and food safety rules such the hazard analysis and control points (HACCP) and good manufacturing practice (GMP) are also applicable to halal products. In addition, the manufacturers producing halal food need to meet the halal requirements. The ultimate is to get the halal markings for the product. However, facts from halal certification bodies indicate that many have failed. There is a need to determine what is needed for the successful development of halal food products. This paper attempts to explore the new product development process and its management and how halal issues are incorporated. The intention of this concept paper is to propose a framework for developing halal food products. It may be used by companies that are developing halal products to better manage the product development process and facilitate in getting the halal markings. These provide competitive advantage for the companies.

Keywords

Halal food, product development, conceptual paper, food manufacturers, Islamic country

Introduction

Muslims adhere to strict dietary laws and are allowed only to consume halal food. The Quran has stresses heavily on the consumption of halal foods through numerous verses. One of them is translated as “O mankind, eat from whatever is on earth (that is) lawful and pure” (The Holy Quran 2: 168). In this verse, there are two important Arabic word which is the word Halal (حلال) which literally means allowed, permitted or lawful and the word tayyib (طيب) which means good and pure. This indicates that the concept of halal food also includes aspects of quality, safety, hygiene and sanitation ensuing in the term ‘*Halaalan Thayibban*’ which means permissible and good. In general, the four categories of food and drinks prohibited in Islam are those that are prohibited: (i) by itself-comprises of any food or drink prohibited by a clear text from the Quran, (ii) due to external factors- halal food transform to haram due to haram determining factors (iii) due to harmfulness- any food that harms body or health and (iv) due to impurity and filthiness deteriorating it’s goodness and wholesome (Al-Qaradawi, 1999).

Halal food sector is no longer merely an industry that complies with religious requirements. It is becoming an economic force in its own right domestically and globally. Many countries, although having Muslim as minority but depend on food exports as their country’s income generator are seeing the necessity to be aware about halal and be involved. In fact, country such as China with minority Muslims has an export of \$500 billion for halal market (Dasgupta, 2011). Along with the Muslim countries such as Malaysia, Indonesia and Pakistan that aspires to be the global halal hub, countries with minority Muslims but are food producers are also aggressively working towards becoming the key players in delivering halal products. For example, Thailand is not only complying with food safety standards but are having halal certification as a value-added to their product in an attempt to seize the halal market

and it has been recognised as the halal center in science and testing. The port of Rotterdam is currently being developed as a 'HalalDistriPark' to serve the Muslim community in Europe and in the UK there is a proposal for a Super Halal Industrial Park to be located in South Wales (Waarden and Dalen, 2010).

Many factors contribute to the vibrant activities in the halal food production. The latest publication by the Pew Forum on Religion and Public Life published in 2011 has estimated that in 2010, there are about 1.6 Billion world's Muslim population which constitutes 23.4 % of the world population. It is also projected that it will increase by about 35% in the next 20 years. This signifies an enormous global demand for halal food with an estimated potential demand of USD 800 Billion to USD 1.2 Trillion (Pew Forum, 2011). Other factors include the high purchasing powers from Muslim minorities' countries such as Canada, European Union and America which present opportunities for the halal food market. The rising per capita income of the Muslims in countries in the Asia Pacific, Middle East and North America also provides lucrative markets for the halal food. Halal foods are also attracting the non-Muslims who are looking for food with the additional and value added features of being wholesome, safe, hygienic and contamination-free principles during food production (Global Halal Food Market, 2011).

Kotler (1991) defines innovation to refer to any good, services or idea that is perceived by someone as new. More important, product innovations in food not only focus on the output (that is the food products) but it also include benefits it bring to the customer (Utterback and Abernathy, 1975). Innovations is the heart of the food industry which may start from farmers producing new crops with further developments made possible through work from both the R&D and marketing people (Earle, 1997). It is also indicated that innovations in the food industry are mostly linked to technological changes and to research and development (R&D) (Grunert, et al., 1997), According to Rudder (2001), companies that have the ability to meet customer demands is mostly instigated by technological change and research and development (R&D) activities. The suppliers play a big role in wanting to deliver the new range of new developments in the high tech area like information technology, biotechnology and advanced materials. But, it is also recognised that innovation is by no means initiated via technology push. It is seen that the demand side that is characterised by the changing customer behaviour (including the effects of globalisation of tastes and products), intensifying regulatory standards with regards to health, safety and environment are the contributing factors for innovations in the food industry (Christensen, Rama, & von Tunzelmann, 1996). Issues regarding halal are an additional factor that needs to be considered if a producer wishes to bring an innovative food product for the halal market.

Halal food producers must develop a sound understanding of halal issues. There are various documents that provide practical guidance to producers in meeting the halal food requirements. The Department of Standards Malaysia has developed a halal standard for foods, the MS1500:2004. It listed seven requirements on the preparation and handling of halal food. These are:

- Sources of halal food and drink which include animals (land and aquatic), plants, mushrooms and microorganism, natural minerals and chemicals, drinks and genetically modified food (GMF).
- Slaughtering requirements and process guidelines
- Product processing, handling and distribution
- Product storage, display and servings
- Hygiene, sanitation and food safety
- Packaging and labelling
- Legal requirements

In the second revision, the MS1500:2009 was developed. Two new requirements were included.

The first one is management responsibilities which include:

- Management shall appoint Muslim halal executive officers or establish a committee which consists of Muslims personnel who are responsible for the implementation of internal halal control system
- The management must ensure that the personnel are trained on the halal principles and its applications
- The management shall ensure that sufficient resources (i.e manpower, facility, financial and infrastructure are provided for internal halal control system

The other requirements include:

- Premises which include ensuring that the layout of the premises will protect against cross contamination during or in between processes.

Besides that, the food quality practices are also governed by the Good Manufacturing Practices (GMP) and ISO9000/Hazard Analysis Critical Control Point (HACCP).

In the past, when certification was foreign, Muslim businessmen are responsible for the 'halalness' of their product with many slaughtering their own animals. However, these procedures changes in the late 1990 when halal certification became widespread (Riaz, 2010). As food products are being produced worldwide (including by non-Muslim) food products can no longer be assumed as halal by virtue of it being produced by Muslims. In adhering to measures such as the MS1500:2009, food producers often have to make changes to across their entire production chain, from raw materials through packaging and cleaning systems.

In general, Muslim consumers usually seek for the halal markings or logos and certifications for a sense of security when buying *halal* food. The logos and certification are also used by manufacturers to indicate to their consumer that their product is *sharia* compliant meaning that it has met the Islamic dietary guidelines. There are many organisations in the respective countries that produce the halal certificates.

This paper will discuss the issues involved in the development of halal products. Hence, it begins a review of the concept of halal and its importance across the entire food chain. This is followed by a review of product development in the food industry in Malaysia. The halal certification procedures and guidelines are reviewed. The associations of the halal issues and certification procedures with the product development process are discussed.

Issues on the Halal Food Ingredients and Production

For a food to be halal for consumption there is need to ensure that the food is halal all through the food supply chain and this is not an easy process. Starting from the raw materials, meat and meat related ingredients have always received the biggest attention. Contrary to general believe halal is not just pork free. It also includes the by-product of pork. Other animals that are not halal include carnivorous animals, birds of prey and land animals without external ears. Halal animals and poultry if inappropriately slaughtered or dead before slaughtered, or killed in name anyone other than Allah will be deemed haram which in other word is non halal (Al-Qaradawi, 1999). There are many cases that have been brought to the public attention regarding fraud on meat products. There are many reported incidences that meat that is labelled, certified or sold as halal may not be so. It has been related by van Waarden and van Dalen, (2010) of a TV documentary shot in the Netherlands that out of a sample of 10 Turkish sandwiches that are sold as 100% lamb, only 1 turned out to be what it was pretended to be and alarmingly one was actually made of 100% pork. The Muslim Council of Britain issued a statement warning the Muslim community about chicken supplied by Holland which contains pork as screened by BBC program 'The Food Police' (The Muslim Council of Britain, 2003). From a study conducted by the Local Council Regulatory Services (Lacors) in England, sampling 495 kebabs by 76 councils, it was revealed that six kebabs include pork when it has not been declared as an ingredient and shockingly two of them were actually described as halal (Haines, 2009). Contamination with pork maybe due to human greed as in many countries pork is always much cheaper. Consumers in Muslims countries are not so safe in assuming that no contamination happens during food preparation. It was reported by the Chief of JAKIM that the department did not give accreditations to many hotels' restaurant in Malaysia because it was found that suspect items like alcohol are being used in cooking, chickens were sourced from suspect suppliers and there were mixing of halal and non halal items in stores (Halal Media, 2010).

Meat and meat products may be the most highly regulated segment with regard to halal requirements (Riaz & Chaudry, 2004) with many halal websites to inform and enlighten the Muslim community at large of the of issues regarding halal meat. It is found that a majority halal meat customers trust the local shops more than the supermarkets as the shops are manned by Muslims as opposed to supermarkets (Ahmed, 2008). An animal, whose meats are permissible to be eaten, may become non halal if it is not slaughtered according to the Islamic ritual. It is alarming to note that as much as 90 % of the meat and poultry sold as halal in the UK may have been sold illegally and not slaughtered according to the Muslim requirements (Ahmed, 2008). It is reported that most animals are being stunned before having their throats slits, just like in the main stream food production which make them non halal

There are various websites that debate on the issues of stunning. Although, these incidences were reported in non-Muslim countries, the Muslim countries were also not spared of these perturbing issues as many are importing meat from non-Muslim countries such as New Zealand and Brazil. To ensure that imported meats are halal, the authorities in many countries have obligate guidelines to ensure that the meat is not contaminated. For example, in Malaysia, halal markings or certifications for meat are given only when JAKIM are satisfied with the examination that cover all aspects of preparation, slaughtering, processing, handling storage, transportation, cleaning, disinfection and management practices.

Other than meat and poultry products, alcohol and intoxicants and also blood and blood by products are also non halal (Al- Qaradawi, 1999). The relatively vibrant activity in the halal food production has brought about the need to address other food ingredients such fish and sea food, dairy products, cereal and confectionaries and questionable ingredients such as gelatine and enzyme. Rias and Chaudry (2004) discuss in more detail the various halal raw materials. Food producers also need to be aware of the sources of these common foods. For example, gelatine can be either halal (if taken from seaweed) or haram (if taken from bones of non-halal animals) and so are cheeses that are made using rennet taken from non-halal cow's stomach.

Moreover, there are an increasingly large number of ingredients directly added to food which needs to be certified halal. For example, in EAFUS (Everything Added to Food in the United States) list there is listed over 2000 substances as additional ingredients for food (FDA, 2011). The list of halal and non-halal ingredients for Malaysia can be obtained from malaysiahalalfoods.com.

As mentioned earlier, the concept of halal and tayyib prohibit Muslims to take food that harms body or health and those that have impurity and filthy deteriorating its goodness and wholesome. Food cannot be passed as halal if there is any indication that it poses a health risk. (Pointing & Teinaz, 2004), has reported the increased in food crimes in the UK involving the sales of rotten meat that is unfit for human consumption which also include passing these meat as halal meat and this conspiracy has been around for period of more than 10 years. The concept of tayyib in Islam fits with the UK food law and EU General Food Law in terms of the health risk associated to consumptions. For example, the UK food Safety Act 1990 has indicated that meat that is filthy, smelly and extremely unwholesome is not fit for consumption. This condition violates not only the Syariah (Islamic) law but the Safe Food law and the meat could not be halal (Pointing, John, 2011). Other food law, for example, the hazard analysis and critical control points (HACCP) requirements is also associated to the tayyib concept. (Riaz & Chaudry, 2004) stressed that HACCP which address food safety issues are still relevant and can be used to identify halal control points. But, it would need to be complemented with the halal compliances.

A food is halal if it is halal all through the whole food production chain. Ensuring that the ingredients used are halal is not adequate. These efforts must continue to ensure that the raw materials go through a process that will make them to remain halal right up to the table. During production, contamination with non halal elements can render a food non halal such that the cutlery and utensils used in preparing halal food must also be free of non-halal ingredients. For instance, in the process, alcohol based cleaners and sanitizers are not permitted nor are labelled adhesives containing gelatine. Again, adhering to MS1500, GMP and HACCP ensures that the food production complies with the halal, health and safety requirements.

Issues on the halal food development process

The perception of new product differs with products. Chrysochoidis (2008), defined newness in food development to include:

- The use of new ingredients
- The use of new machinery
- The use of new controls in the food production processes

For the case of halal food production, the above classes qualify food development to be regarded as new.

It is generally recognised the emergence of new product development (NPD) is a process that begins with a concept and ends with the launch of the product. Stanton et al. (1994), identified six phases in the sequence of the NPD process as idea generation, screening of ideas, business analysis, prototype development, test marketing and commercialisation. In food product development, ideas come from various means including; brain storming,

attributes listing and need identification (Ilori et al., 2000). The ideas screening stage is to identify and concentrate on those with greater potentials. The process of business analysis is to identify product features, estimate market demand and product profitability (Ilori et al., 2000). Technical evaluations are conducted and the product is then tested on the market before commercialisation.

According to the Utterback-Abernathy model (1975), product development process undergoes three phases: fluid, transitional and specific (called mature phase). The fluid phase is for the development of radical new products proving new functionalities and very few competitors. In the transitional phase the products have already been accepted by the customer and the process of process innovations are becoming more important (Callahan, 2007). And finally, the specific phase focuses of efficiency and cost minimisation in order to sell at the lowest price possible.

In the halal food production, halal issues are of main consideration. Customers wants the existing products but with the halal markings. Thus, throughout the halal food development process, halal issues have to be considered. These include identifying the potential halal markets, cost of obtaining halal ingredients and time taken to obtain halal certifications. Ilori et al. (2000) identifies that competitor’s behaviour and actions can cause major problems when (i) competitor disrupt or counter the research and (ii) they can take advantage of the time lag caused by test marketing. As for halal food, the long-time taken to obtain accreditations can cause major setback to the companies’ plan.

The reasons for success and failures in NPD have been widely researched Cooper (1979) identified three most important factors that contribute to new product success. These are:

- Marketing and managerial strategy;
- Strength of marketing communication and launch effort; and
- Market need, growth and size

The changes in the requirements for halal products and the growing market needs and the increasing size of the market are all contributors to product success.

Issues on the halal food accreditations

Principally, every country has different standards, requirements and different regulatory bodies that oversee the halal issues with some being national and others being private bodies. Table 1 show the different bodies that are responsible for halal accreditations in the different countries.

Table1: Examples of Accreditation bodies in various countries

Country	Accreditation bodies
Malaysia	Malaysia Department of Islamic Development (Jabatan Kemajuan Islam Malaysia-JAKIM)
Indonesia	Indonesian Council of Ulama (Majlis Ulama Indonesia-MUI)
Singapore	Islamic Religious Council of Singapore (Majlis Ugama Islam Singapura-MUIS)
Thailand	The Central Islamic Committee of Thailand for Thailand
US	Many including IFANCA (Islamic Food & Nutrition Council) and ISA (Islamic Services of America)
UK	HFA (Halal Food Authority) and the HMC (Halal Monitoring Committee)
Australia	Many including Halal Certification Authority-Australia and Australian Halal Authority and Advisers

Generally, in the Muslim countries, the government plays the major role of ensuring halal food reaches the shelves. For example, the Malaysia Department of Islamic Development (Jabatan Kemajuan Islam Malaysia-JAKIM), and the Indonesian Council of Ulama (Majlis Ulama Indonesia-MUI) in Malaysia and Indonesia respectively are establishment that are responsible for the nation Islamic affairs and hence are also responsible for national halal certification. In countries with minority Muslims, the system varies. In some countries there is a sole custodian for halal certification such as the Islamic Religious Council of Singapore (Majlis Ugama Islam Singapura-MUIS) for Singapore and The Central Islamic Committee of Thailand for Thailand. In others, there may be a few such as in the

USA there is IFANCA (Islamic Food & Nutrition Council) and ISA (Islamic Services of America) and in the UK there is the HFA (Halal Food Authority) and the HMC (Halal Monitoring Committee) which are non-profit making organisation. In Australia there are as many as 13 accreditation bodies that give out halal accreditations. Whatever form is the bodies, the acceptability of the certificates depends upon the country of import or the Muslim community served through such certifications (Riaz, 2010). As such, products exported to Malaysia and Indonesia can be issued halal certifications only if the issuing body of the halal certificate is listed on the approved list of JAKIM and MUI respectively. Both JAKIM and MUI are serious in making sure that the halal certificates from other organisations are credible. For example, MUI only approved 5 from the 40 organisations that issues halal certificate from the U.S. Whilst JAKIM has delisted 13 leaving only 3 approved organisations. Thus, most important, to seize the halal market share, it is vital that these halal accreditations are accepted globally.

Despite the importance of halal issues, not all countries see it as their responsibilities to protect the religious security of their citizens, for example the Netherlands (Waarden & Dalen, 2010). This may be due to the fact that halal certifications procedures are costly endeavours. It involves costly laboratory methods and expertise to test for the 'halalness' of food, inspections and constant monitoring that involves more experts and manpower. Although, halal certification is not mandatory in many countries, a competitive advantage is gained over companies with no halal certifications. This is especially so if the companies wishes to penetrate the lucrative Muslim community in many countries. Thus, it not surprising that many prominent international food outlets such as McDonald, KFC and Pizza Hut have become key players in the halal industry. Strong brands food producer such as Nestle are also taking steps in ensuring that their products are halal. To compete, small companies also need to seek accreditations. However, as in the case of Malaysia, there are many companies especially the SMEs that do not seek accreditations due to limited resources regarding standards (Raja Adam, 2012). In Indonesia, it was found that there a lot of producers that are producing halal food but do not place the halal labels or markings on their product whilst, some are using the halal labels without legal accreditation from the authorised body (Rasyid, 2010).

Due to the longer food value chain and advanced ingredients, halal accreditations can also be a lengthy process as there are more checking points and the success rate is not encouraging. It is cited that from a total of 4237 application for halal certification from the Malaysian halal certification body JAKIM in 2011, only 1674 were certified (Habib, 2012). This may be due to incomplete documentation as the halal certification for each ingredient (in some cases there are more than 50 ingredients in a product) needs to be provided by the companies. It is also noted that despite all the proper documentation, companies end up waiting for up to six months for their halal certification (Habib, 2012). The lack of manpower and expertise on JAKIM side has been mentioned as the contributing factors. Shahbaz (2012), found that other than the role of the obligatory bodies to provide halal standardisation and guidance, top management commitment and willingness are barriers to obtaining halal certifications.

The Malaysian food industry

The food industry is a major economic contributor to many countries creating wealth and employment in the growing, production and selling sector. In the European Union (EU), which is the largest exporter and importer of food and drink worldwide, its food industry is the single largest manufacturing sector in terms of turnover and employment accounting for 13.5 % total country's employment with total revenue of €954 billion (CIAA, 2010). This is also the case in many emerging economies such as China, Brazil, Malaysia and Indonesia. In Malaysia, the contribution of the food processing industry to the country's total manufacturing output has increased from 6.1% in 1996 to 9.9% in 2005 during the Second Industrial Master Plan (IMP2) period of 1996-2005. This figure is projected to increase as the government has laid out several strategic trusts in the Third Industrial Master Plan (IMP3) for the period 1996-2020 with the intention of expanding the food industry. Malaysia foresees that there is a great potential for developing and promoting the halal hub. The local food processing industry in Malaysia is dominated by the small and medium enterprises (more than 80%) and as well as foreign companies that has invested and is known as Multinational Corporations (MITI, 2006).

The key areas of the Halal Industry in Malaysia can be categorized into five (5) components such as following:-

- Food Products : Livestock, Processed Food & Beverages, Food Retailing
- Pharmaceutical, Cosmetic and Personal Care: OTC, Drugs/Vaccines

- Additives & Ingredients: Food Products, Non-food Products.
- Lifestyle: Apparels, Restaurant & Hotels.
- Services: Logistics, Standard, Auditing & Certifications, Research and Technology Development

The food industry is further divided into the different industrial branches or category. The Malaysian Investment Development Authority (MIDA) has divided them into:

- Fish and fish products,
- Livestock and livestock products which include dairy products such as milk powder, ice cream and fermented milk, fruits
- Vegetables and cocoa.

The Small and Medium Industries Development Corporation (SMIDEC) has added another category which is the convenience food. But, in terms of halal food product, this will involve many more categories. A check the list of halal products sold in Malaysia can be obtained from the website <http://malaysiahalalfood>. The foods are listed under fourteen different categories which in addition to the products listed by MIDA and SMIDEC, it also include categories such as frozen food, seasoning and spices and packaged cooking sauces. Although, Malaysia still remains a net importer of food including cereals and dairy products, this products will be processed and exported. With many varieties of product listed in the halal categories, there are opportunities for SMEs to penetrate the halal hub market.

Conceptual Model for halal food production

Figure 1 shows conceptual model for successful development of halal food products. The success of the product development process in the model is a product that is profitable and obtains the halal certification. Market environment and technology push encourage manufacturers to focus on halal food production. . Allyson (2000), found that manufacturers launch new products in reaction to consumer demand. This is maybe one of reasons for the launch of new halal food products. Talib et al. (2010), in their study, encourage manufacturers to be halal oriented and be more innovative at improving their operations. The MS1500:2009 also has indicated the increased capital investments needed in providing appropriate and trained personnel (or halal specialist) and providing premises that will help ensure that the halal requirements can be adhered during the processing, handling, packing and distribution of the halal food product. Thus, the model emphasise the top management interest, commitment and support to pursue halal accreditations. By obtaining the halal certification from JAKIM, manufacturers are getting the assurance that their ingredients, its preparation, processing, hygienic and sanitation procedures have not only meet the halal standards but also satisfy with HACCP and GMP standards. Bodies that issues the halal certificates also need to give support in terms of policies and procedures thus expediting the accreditation application process.

Conclusion

There is a growing market for halal food providing economic potentials for many food producing countries. Many countries including those with minorities Muslim such as Thailand and the Philippines are aggressively investing in the halal food production. The local manufacturers must also seize this opportunity. The local manufacturers have an added advantage in its effort to comply with halal requirements and other requirements such as GMP and HACCP as the Malaysian halal standards and halal certification is recognised and accepted worldwide. The manufacturers should strive to gain industry leadership in the world halal market. Top management plays an important role as he must be willing to invest for halal accreditation purposes. Companies that are involved in food production need to use product development agenda capped with halal accreditations as a competitive weapon and for some companies it is necessary for their survival. Companies need to focus on being a demand focussed industry (demand for halal products).

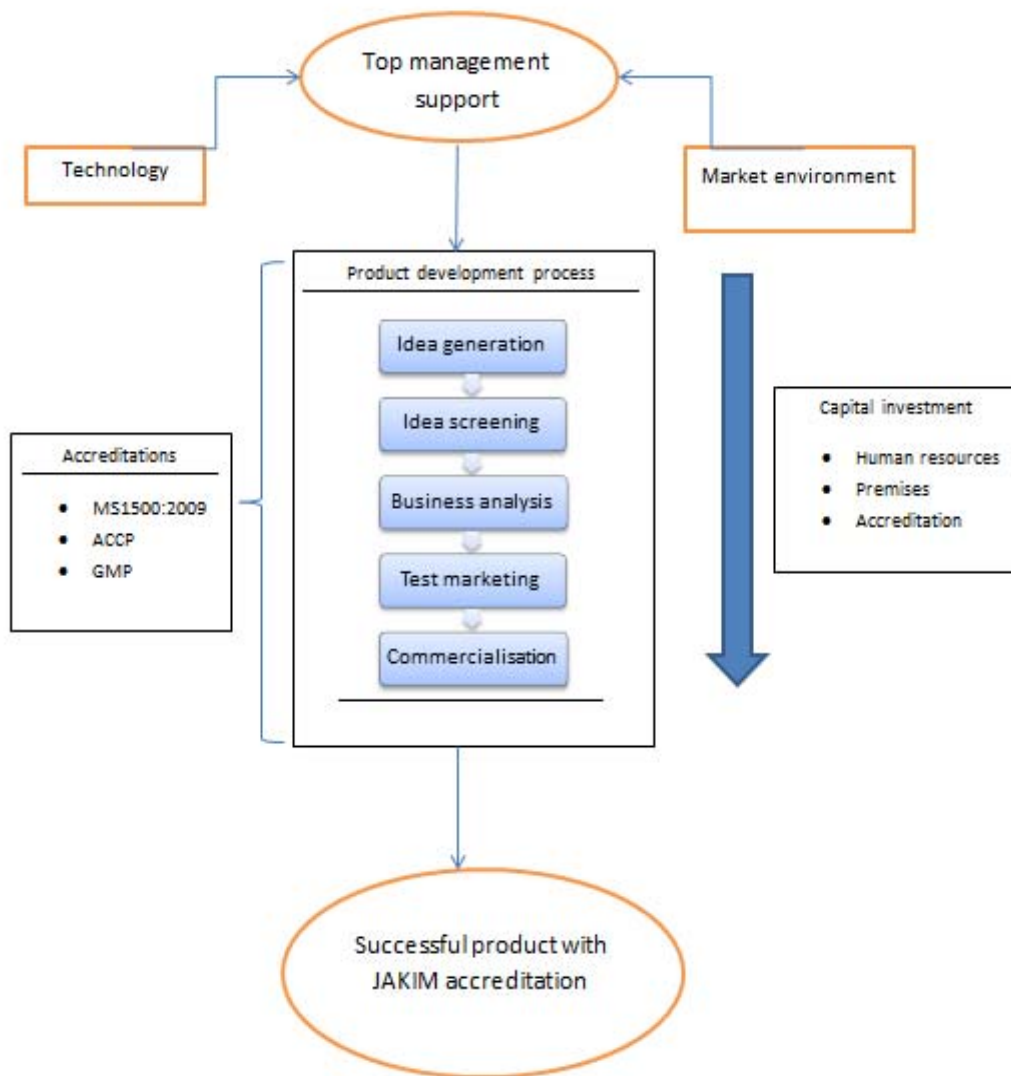


Figure 1: Conceptual model for successful development of halal food products

References

- Al-Qaradawi, Y., *The Lawful and the Prohibited in Islam (al Halal Wal Haram Fil Islam)*, Trans: Ahmad Zaki, Hammad, American Trust Publications, Indianapolis, US. 1999.
- Christensen, J.L., Rama, R. and Tunzelmann, N.V., *Innovation in the European food products and beverages industry*, Industries studies of innovation using CIS data, EIMS Project no. 94/111, European Commission, DG XIII, Luxembourg, 1996.
- Chryssochoidis, G., (2008), Innovativeness and NPD processes/practices in the Greek food industry, *EuroMed Journal of Business*, vol. 3, no. 2, pp 202-222.
- Cooper, R.G., Identifying industrial new product success- project NewProd, *Industrial Marketing Management*, vol. 8, issue 2, pp. 124-135, April 1979.

- Dasgupta, S., *China makes dent in halal market with 1/8th of India's Muslim population*, The Times of India, 21st Sept., 2011, Available at: http://articles.timesofindia.indiatimes.com/2011-09-21/china/30183710_1_halal-china- countries (accessed 23 Jan 2013)
- Earle, M.D., Innovation in the food industry, *Trends in Food Science & Technology*, vol. 8, May, 1997.
- FDA, U.S. Drug and Food Administration, EAFUS (Everything Added to Food in the United States), Nov. 2011, Available at: <http://www.fda.gov/Food/IngredientsPackagingLabeling/FoodAdditivesIngredients/ucm115326.htm> (accessed 23 Jan 2013).
- Global Halal Food Market, May 2011, Available from <http://www.ats-sea.agr.gc.ca/inter/4352-eng.htm> (accessed on 21 August 2013).
- Grunert, K.G., Harmsen H., Meulenberg M., Kuiper E., Ottowitz T., Declerck F., Traill B., Göransson G.: A framework for analysing innovation in the food sector. In: Product and process innovation in the food industry (Eds.): Traill, B. and Grunert K.G., Blackie Academic and Professional, London, 1997.
- Habib, S., *Halal cert a passport to success*, Available at: www.thestar.com.my. 15 April 2012 (accessed on 2 July 2013).
- Halal Media, 70% Ramadan buffets in Malaysian hotels suspected Haram, 24 Aug. 2010, Available at: <http://halalmedia.net/70-percent-ramadan-buffet-in-malaysian-hotels-suspected-haram/> (accessed 10th May, 2013).
- Haines, L., Doner kebab: Death Wrapped in pitta bread, The Register, 27th Jan, 2009, Available at: http://www.theregister.co.uk/2009/01/27/doner_kebab_survey/ (accessed 10th May, 2013).
- Ilori M.O., Oke, J. S. and Sanni, S. A., Management of new product development in selected food companies in Nigeria, *Technovation*, 20, pp 333-342, 2000.
- JAKIM (Jabatan Kemajuan Islam Malaysia), *General guidelines on the Slaughtering of animals and the preparation and handling of halal food 2001*. Available at: <http://Halaljakim.gov.my/> (accessed on 30 August 2013).
- Kotler, P., *Marketing management: Analysis, planning, implementation and control*, 7th edition, Prentice Hall, Inc, New Jersey, 1991.
- MITI, Ministry of International Trade and Industry, *IMP3: Third Industrial Master Plan (2006-2010)*, Chapter 3: Development of the Halal Industry, 2006.
- MS1500:2004, *Malaysian Standard: Halal food production, preparation, handling, storage and general guidelines*, Department of Statistics Malaysia, 2004.
- MS1500:2009, *Malaysian Standard: Halal food production, preparation, handling, storage and general guidelines, 2nd revision*, Department of Statistics Malaysia, 2009.
- Pew Forum, The future of the Global Muslim Population- Projections for 2010-2030. Analysis, January 27, 2011, Available at: <http://www.pewforum.org/The-Future-of-the-Global-Muslim-Population.aspx> (accessed on 24 August 2013)
- Pointing, J., Should Halal conform to state law? , *The Halal Journal*, 40, pp 42-45, 2011.
- Pointing J., and Teinaz,y., Halal meat and food crime in the UK , *Proceedings of International Halal Food Seminar*, Islamic University College of Malaysia, September, 2004, available at: <http://eprints.kingston.ac.uk/17670/1/Pointing-J-17670.pdf> (accessed on 20 August 2013).
- Raja Adam, Z., *Malaysian SMEs urged to get halal accreditations*, Business Times, New Strait Times, 22 Feb 2012, Available at: http://www.btimes.com.my/Current_News/BTIMES/articles/haloki/Article/print_html (accessed 12 Mei 2013).
- Rasyid, T. H., Raising the Awareness of Halal Products among Indonesian Consumers: Issues and Strategies, *Indonesian Journal of Agricultural Economics (IJAE)*, vol. 1, no. 1, Jul, pp 20-38, 2010.
- Riaz, M.N, *Fundamentals of halal foods and certification*, 1st Jan 2010, Available at: <http://www.preparedfoods.com/articles/article-fundamentals-of-halal-foods-and-certification-january-2010> (accessed 11 Mei 2013).
- Riaz, M.N., and Chaudry, M.M., *Halal food production*, FL:CRC Press, Boca Raton, 2004.
- Rudder, A., New food product development: strategies for success? *British Food Journal*, vol. 103, no. 9, pp 657-670, 2001.
- Shahbaz, M., Obstacles and barriers in halal certification, *1st International Conference on Halal Food Control and Exhibition*, Riyadh, 12-13 Feb., 2012.
- Stanton, W.J., Etzel, M.J., and Walker, B.J., *Fundamentals of marketing*, 10th ed. McGraw Hill, Inc. New York, 1994.

- Talib, Z., Zailani, S., and Zainuddin Y., Conceptualizations on the dimensions for halal orientation for food manufacturers: A study in the context of Malaysia, *Pakistan Journal of Social Sciences*, vol. 7, no. 2, pp 56-61, 2010.
- The Holy Qur'an: Text, Translation and Commentary (English edition), Abdullah Yusuf Ali, Tahrike Tarsile Qur'an, U.S. Edition, 2005.
- The Muslim Council of Britain, Pork in Halal chicken, Available at: http://www.mcb.org.uk/index.php?option=com_content&view=article&id=1666&Itemid=93 , 27 Feb., 2003 (accessed 11 March 2013).
- Utterback, J.M. and Abernathy, W.J., A dynamic model for process and product innovation, *Omega*, vol. 3, no. 6, pp 639-656, 1975.
- Waarden, F van and Dalen R. van, Hallmarking Halal, *3rd Biennial Conference of the ECPR Standing Groups on Regulation and Governance*, University College Dublin, June 17-19, 2010.

Biography

Norizah Mohamed is a senior lecturer at the School of Electrical & Electronic Engineering, Universiti Sains Malaysia. She graduated from Loughborough University of Technology (Electronic, Computer and Systems Engineering). She pursues her MSc (Technology Management) from Liverpool John Moores and then her EngD (Engineering Management) from Universiti Teknologi Malaysia. She completed her thesis in product development and supply chain within the automotive industry. She has since been interested in product development in the halal food industry during her 9 months sabbatical leave at Loughborough University in the year 2012. She is currently teaching Engineering Mathematics and Engineering Management courses at her institution.

Chris Backhouse is a Professor of Product Innovation at the School of Mechanical & Manufacturing Engineering, Loughborough University, UK. He holds the position of Director of Internationalization Strategy within the Vice-Chancellor's Office. He is responsible for progressing the University's internationalization agenda as described in the University's Strategic Plan – "Towards 2016". His research activities include organization structures in Manufacturing, Operations Management, Motivation, Performance Management and Supply Chains. His external activities include as a Guest Prof at Shanghai Jiao Tong University, Editor in Chief: Proceedings of the IMechE, Part E, Journal of Process Mechanical Engineering, Editorial Board: International Journal of Product Development , Editorial Board: International Journal of Industrial and Systems Engineering. He has also received numerous awards such as IEEE Manufacturing Divisional Premium 1998.