TRACING OF HALAL MEAT SUPPLY CHAIN WITH CLOUD TECHNOLOGY FOR ENHANCING CONSUMER SATISFACTION

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Introduction

The world's population by the sharing of religious group, the second huge religious group is Muslim which was estimated around 1.6 billion or 23 percentage of the world's population (Hackett et al., 2012) and it continues growing up through the birth-rate from 1.1 billion in 1990 to 1.6 billion in 2010. They also forecast that Muslim population will be one per three world person which is estimated around 2.2 billion in 2030 (Pew Research Center's Religion & Public Life Project, 2011) while Halal supply is still not enough for their demands (Lever and Miele, 2012). This situation is one of the reasons that push Halal food supply chain as a critical. Halal food is the religious requirement of Muslim community. It is the principle for Muslim's diet and Halal food is accordance to Halal (permissible – Syariah compliant) and Toyyiban that means wholesomeness (healthy, safe, nutritious, quality) (Alqudsi, 2014). Thus Halal food is difference from the conventional food that has not concerning only of safety and cleanliness which are the basic requirement of food but it is also lawful which is the requirement that made Halal food is unique. Halal food is served to Muslim consumers as the permitted food but for non-Muslim Halal food is recognized as an alternative benchmarking for a safety, hygiene and quality assurance under the production of Holistic Halal Assurance Management System. Nowadays, Halal food is concerned and more aware (Ambali and Bakar, 2014) especially on Halal meat segment. Nakyinsige et al. (2012) added that Muslim consumers are concerning about a number of issues on meat and meat product because meat products are a risky segment of Halal status breaching. Accordingly to Omar and Jaafar (2011), they explained that Halal supply chain is a process that must be Halal started from the source of supply until reached to the customer hands. It means that making Halal food is not focused only just the production but the whole supply chain from the farm and retain the purity of Halal until delivered to the consumer. Moreover, it is effortlessly for adulteration and frauds upon a technological advance in the meat processing industry due to monetary benefits (Nakyinsige et al., 2012). Thus, Halal meat product is the critical segment which the risk of cross-contamination can happen on the whole Halal meat supply chain such as in a part of raising animals, slaughtering, production, and distribution. Therefore, ensuring the purity of Halal meat product, the auditing is needed to carry out. From the Muslims' point of view, Halal status is the criteria for a decision making to choose one food product over the others (Nakyinsige et al., 2012). The importing countries and domestic markets, the verification of Halal control, and the assurance are important to guarantee the reliability and to create the trust for the consumer (Spiegel et al., 2012). Although the auditing was done to verify the purity of Halal, the transparency and traceability of relevant information are significant for both assuring in Halal meat product history and the investigation case. Spiegel et al., (2012) mentioned widely accepted audit methods should be established and the obtained audit information should be transparent and traceable for all actors in the supply chain. Furthermore, Halal food consumers become more aware and concern on the integrity of Halal status. They also curious about all the activities involved along the supply chain (Zulfakar et al., 2012; Ambali and Bakar, 2014). A various channels which provide information of Halal food product to the consumer come from product's label and advertisement. The consumers are restricted of Halal food product's information only from those channels. In fact, the consumers deserve to access more information to make the suitable decision for buying food. Thus Halal traceability system should be further developed (Spiegel et al., 2012) in order to satisfy the consumers by the transparent of information. Consequently, Halal food market in this scenario, there are various meat products which were increased by the consumer's lifestyle. Currently in the competitive society, people spent their life hastily. This results to the change of consumption needs such as the instant food, processed food and ready-to-eat food. As these kinds of food, there are multi-ingredients foods that are cause of

complicated product labels which is made difficulties to expose clearly information. In contrast, more complicated information resulted more clearly for consumer's perceptions. Therefore, traceability system which can provide the location of product's ingredients integrated with cloud technology represented by web application can be a channel for providing Halal meat product's information which was mentioned that is a complicated and critical segment of Halal food by the characteristics of traceability system and the advantages of web application on cloud that could provide clear and reliable information to satisfy consumer in perspective of information transparency.

Literature review

Important of Halal Meat Supply Chain

Since a food chain becoming longer and more complex, Muslim consumers are taking an interest on the ingredients of their food which is increasingly imported across the world (Bonne and Verbeke, 2008; Spiegel et al., 2012). Several ingredients such as mixtures, fragrances, and savours are needed the laboratory testing which can help them find the forbidden they could not see by a general auditing. For example, pork fat can be used in making bread as a sub-stance of emulsifier (Spiegel et al., 2012). Bonne and Verbeke (2008) explained that Halal production cannot be measured analytically, including animal welfare, the ritual slaughter method, treatment and separation of Halal animals, cleaning and disinfection, separation of Halal and Haram food at all stages of the Halal food supply chain, and low concentrations of Haram contaminants. They result in the authenticity issue mentioned that Muslim consumer is the need to determine whether the meat products from Halal species have not been mixed with a cheaper non-Halal species, or a similar material (Nakyinsige et al., 2012). Form the above issues related to Halal meat product reveal that Halal meat supply chain is very delicate and should be concentrated from the origin of Halal animals segment to the store shelves, since the losing of Halal status could be happened even in unobvious activities. Besides, Halal meat product is covering the origin, species, production system, slaughter procedure, and the processing method of the meat. All these characteristics are invisible and could not be verified by the consumers during the pre-purchase stage (Nakyinsige et al., 2012). Moreover, Bonne and Verbeke (2008) defined that Halal Control Points (HCPs) as steps following Halal food supply chain for reducing and avoiding risks of losing Halal status. As such Halal breeding, animals bred for meat must be acceptable species and the breeding of animals should be Halal as well (feeding naturally or vegetarian diet). The HCPs third to seventh are the critical points in slaughter process which are the animal welfare. To start with stunning, Islam supports that animals deserve humane treatment during the before, during, and after slaughter process. The stunning in the Islamic dietary laws does not prohibit; they are only forbidden to consume blood and dead animals, but they support humane handling. However, most of Muslims oppose the stunning since they believe it is strictly prohibited by Islamic rulings. Next, the knife used in the slaughter must be sharp to avoid cruelty and help the animal did not feel any pain while doing a slaughter with or without stunning. Fifth, a slaughter person must be a sane adult Muslim. Sixth, the animal should be slaughtered by cutting from the front part of the neck, severing the carotid, jugular, trachea, and esophagus. Seventh, the invocation, the slaughter person must invoke the name of Allah immediately while cutting. The usual formula is ''In the name of Allah; Allah is the greatest''. Eighth, packaging and labeling for Halal meat need to be labeled properly as Halal and it must be evaluated by a reputable supervisory organization for all Halal control points. Ninth, retailing, distribution and retailing of Halal meat is also a critical issue, in order to aware cross-contamination. There are three distribution channels including the Islamic butchers, the supermarkets, and the farms or slaughterhouses. All of nine Halal control points have been presented the concerning along with the Halal meat supply chain unquestionably. Nevertheless, Omar and Jaafar (2011) emphasized the critical meat segment of Halal supply chain in the food industry. They mentioned that it is important and needed to concern from Halal animal feed dimension to ensure only Halal things were fed to the animals, then a proper slaughtering to meet the vital requirement accordance to the Sharia Islamic principles, and proper segregation to avoid a turning back to non-Halal caused by a contamination. Thus, Halal meat is the significant segment to focus on. Meat is an important ingredient of almost Halal food especially in processed food and instant freezing food which are demanded from the current market to respond the hastily lifestyle. Besides, the various conditions of properly slaughter and production of Halal meat and the risk of easily transforming to non-Halal in every single phase of Halal meat supply chain as well.

Consumer Satisfaction

The awareness issue of Halal meat product could be the cause from Muslim consumers is concentrating on the origin of the ingredients, which imported from aboard, used for cooking their food (Bonne and Verbeke, 2008, Spiegel et al., 2012). Despite consumers need to ensure that the status of

the ingredients or the mixtures is made from Halal permission sources, they cannot be completely sure that the meat they are going to purchase is Halal. They have no choice but they still purchase it as a face value (Alqudsi, 2014). Interestingly, in general, the awareness refers to one exists as an individual with private thoughts about the state of something. Therefore, in the context of Halal, the awareness means having experience of something and/or conceptualized as the informing process to increase the level of consciousness toward for what is permitted for Muslims consumption. For example, awareness describes human perception and cognitive reaction to a condition of what they eat, drink and use (Alqudsi, 2014). Moreover Ambali and Bakar (2012) pointed out the awareness of the Muslim and non-Muslim consumers as describing their perception and cognitive reaction to products or foods in the market. Accordingly, increasing the level of consciousness, perception and cognitive, the focusing on the process of information transparency is significant. A study done by Ambali and Bakar (2012) concerning about the sources of Halal awareness shown that the interesting source is exposure; the educating can help people exposing and making the right choice for their daily consumption. People can be educated in everyday life through channels of communication; newspaper, television, radio, and internet which play the important role by providing the information and exposure. Besides, their understanding about Halal is based on their exposures; seeing and hearing, through advertisements. Thus, the exposure can serve as a source of awareness on Halal related to Muslims' consumption. Omar and Jaafar (2011) suggested that encouraging consumers to consider Halal, the information is needed to be disseminated. Ambali and Bakar (2012) also emphasized that the decision to purchase Halal meat is based on the information provided by Halal butchers. Hence, the information can influence consumer purchasing or consumption decisions. For example, if there are two kinds of Halal meat product and both kinds of product have the difference brand, the brand providing a clearer and more reliable information can get more opportunity to be selected (select = to carefully choose). Furthermore, the individual and environmental factors that have impacted specific properties such as marketing, information, situation, and food determine the consumers' attitude and behavior towards food (Ambali and Bakar, 2012). There is a relationship between exposure (providing information) and the consumption (purchasing decision). Whenever their knowledge or experience is matched with a permission from their religious (Sharia and/or Toyyiban principle), this process will result the increasing of positive perception or cognition, reliability, and trust. In the same way, if the product can ensure and satisfy their customer that it is Halal, this product will be purchased.

Tracing of Halal Meat Supply Chain Technology

The issues of information are highly competitive in the current business scenario including a supply chain of Halal. As Bahrudin et al. (2011) stated that a technology is one of the biggest revolutions in supply chain on reducing costs and for completing the necessity of modern supply chain world, tracking and tracing technology are counted. Especially in Halal meat supply chain which is needed ensuring as the most important issue. The obtained audit information should be transparent and traceable for all actors that Halal traceability system should be further developed to confirm the absence of Haram contaminants in a case of unclear information on the documents used for deciding upon Halal approval (Spiegel et al., 2012).

(1) Traceability and Tracing technology

Tracing is the ability to trace back and forward by using the tracking technology along with the supply chain, for instance, from the consumers to the producers, or from the suppliers to the producers. The ability of tracing can provide the history of a product and can afford to the related problems such as monitoring, informing and updating data, or a product's status (Bahrudin et al., 2011). Furthermore Opara (2003) emphasized about the advantages of tracing. The instant products can be traced back to their raw materials and the original producer as well as the previous handlers in the chain. In the same way, forward traceability is also essential to guarantee the location of the products and facilitate their recall when safety and quality standards have been breached. That is an essential feature of food quality management system. Thus, Halal meat supply chain can be gained the benefits of tracing of the transparency identifying the farm where it was grown, the origin country of animals, the locations of food ingredient, or the source of contamination. It is likely to increase consumers' trust in a term of the proven transparency of meat history. Additionally, Bahrudin et al. (2011) suggested that Radio Frequency Identification (RFID, which is the technology for tracking Halal supply chain, is a technology based on wireless communication in radio frequencies to uniquely identify tagged the object or people. This technology offers the integration with the other systems, or the enterprise support systems, in order to solve a problem or serve some specific purposes.

A basic RFID system consists of three components: transponders (tags), antennas and readers, and a host computer loaded with the necessary software to fully utilize RFID's capabilities (Kima and Garrisonb 2010). There are three types of RFID tag. To begin with, passive RFID tags which have no power source and require an external electromagnetic field for starting a signal transmission. Second, active RFID tags which contain a battery and can start signals once an external source which has been successfully identified. Third, semi-passive RFID tags which require an external source to wake up but have a higher significant forward a link capability providing a greater range (Chawathe, Krishnamurthy et al. 2004).
There are different shapes and sizes of RFID reader and it is worked on different frequencies from 100 kHz to 5.8 GHz. The higher range of frequency is the higher reading range capacity. Also, the size of the tag's antenna determines the ability to read the signal at the certain distances. In the case of many tags are in range of the reader and the protocols have been developed to read the tags sequentially by allowing only tags with the appropriate serial number to respond (Bahrudin et al., 2011).

Add-on / **Stage**	**Syariah Law**	**Radio Frequency Identification (RFID)**	**Integrated System**
Raw Material	Livestock being feed with good, clean, permitted and legal nutritious food. Slaughter according to Islamic guidelines	Active	Monitoring System
Inbound Logistic	Monitoring the flow of inbound vehicle (truck/ container). If needed, doing samak to certain truck or container.	Semi Passive Active	Monitoring System Inventory System
Warehouse	Monitoring Halal product from mixed with non-halal product. (ex: segregate by zoning)	Passive Semi Passive	Monitoring System Inventory System
Production	Repackaging by production house, using Halal equipment and worker practice the concept of hygiene permitted by Islamic law.	Passive Semi Passive	Monitoring System Inventory System
Storage	Monitoring the Halal product from mixed up with non-Halal product.	Passive Semi Passive	Monitoring System Inventory System
Outbound Logistic	Monitoring the flow of inbound vehicle (truck/ container). If needed, doing samak to certain truck or container. Need to do segregation in the container if the product is non-Halal and Halal product.	Semi Passive Active	Monitoring System Inventory System
Retail and Shop	Maintained the freshness, cleanliness and product safety to be sold.	Passive Semi Passive	Monitoring System Inventory System
Customer Service	Look up for any complaint from customer. To enhance/ improve service quality.	Passive	Inventory System Customer Portal Website

Table 1: The detail of category in technological Halal supply chain framework (Bahrudin et al., 2011)

Bahrudin et al. (2011) compared and proposed the suitable types of RFID for using in Halal supply chain to achieve the specific objective of each stage showing on the table 1 the technological Halal supply chain framework which is obtained upstream and downstream management. The table describes the detail of implying RFID technology for the suitable specific stages and Sharia law compliance. From the suitable RFID technology types in the specific stages on Halal supply chain,

started from raw material stage which is concerned about feeding of livestock until the stage of customer service. At this point, the integration between a traceability system methodology and web application on cloud service can be the solution for enhancing consumer satisfaction by providing the convenient channel and the meet of modern lifestyle (connecting to the internet at all time) to prove the transparency of Halal meat at the whole supply chain.

(2) Cloud technology

Cloud computing revolution has surrounded by the ICT industry and added new concepts. Cloud application is one of the new concepts developed and designed to be hosted by software as a service (SaaS), which is one of a cloud computing service delivery models. (Elsanhouri et al., 2012) According to National Institute of Standards and Technology (NIST) stated a definition of cloud computing that is "a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources such as networks, servers, storage, applications, and services that can be rapidly provisioned and released with minimal management effort or service provider interaction." Moreover, five essential characteristics of cloud computing also described as below:

- On-demand self-service. A consumer can unilaterally provision computing capabilities, such as server time and network storage, as needed automatically without requiring human interaction with each service provider.
- Broad network access. Capabilities are available over the network and accessed through standard mechanisms that promote use by heterogeneous thin or thick client platforms (e.g., mobile phones, tablets, laptops, and workstations).
- Resource pooling. The provider's computing resources are pooled to serve multiple consumers using a multi-tenant model, with different physical and virtual resources dynamically assigned and reassigned according to consumer demand. There is a sense of location independence in that the customer generally has no control or knowledge over the exact location of the provided resources but may be able to specify location at a higher level of abstraction (e.g., country, state, or datacenter). Examples of resources include storage, processing, memory, and network bandwidth.
- Rapid elasticity. Capabilities can be elastically provisioned and released, in some cases automatically, to scale rapidly outward and in ward commensurate with demand. To the consumer, the capabilities available for provisioning often appear to be unlimited and can be appropriated in any quantity at any time.
- Measured service. Cloud systems automatically control and optimize resource use by leveraging a metering capability at some level of abstraction appropriate to the type of service (e.g., storage, processing, bandwidth, and active user accounts). Resource usage can be monitored, controlled, and reported, providing transparency for both the provider and consumer of the utilized service.

Cloud offers three service models including: Software as a Service (SaaS), Platform as a Service (PaaS) and Infrastructure as a Service (IaaS) (NIST, 2012).

- Software as a Service (SaaS). The capability provided to the consumer is to use complete application functionality that running on a cloud infrastructure. The consumer does not manage or control any cloud infrastructure (network, servers, operating systems, storage, or even individual application capabilities).
- Platform as a Service (PaaS). The service provided to the consumer is to deploy consumer-created or applications on the cloud infrastructure by using programming languages, libraries, services, and tools supported by the provider. The consumer does not manage or control the cloud infrastructure (network, servers, operating systems and storage) but has a control over the deployed applications and possibly configuration settings for the application-hosting environment.
- Infrastructure as a Service (IaaS). The capability provided to the consumer is a full computer infrastructure (processing, storage, networks, and other essential computing resources). The consumer also has a control over operating systems, storage, and deployed applications.

Methodology

The aim of this paper is to focus on PaaS which is suggested to choose for using in the proposed framework. Therefore, PaaS offers the services which support the deploying application on the cloud infrastructure. This feature of the service model PaaS serves the convenient on scalability which developers mostly do not concern. Moreover, PaaS is flexible to use the infrastructure services without concerning about the complexities, or the technical details as using services for developing another service to provide one more service.

From the figure 1, the integrated traceability system of Halal meat supply chain with cloud technology framework shows that Halal meat supply chain applies with RFID technology according to the technological Halal supply chain framework that was proposed by Bahrudin et al. (2011) and integrated this tracking system into a web application for the tracing ability on PaaS that supports the application running on cloud technology.

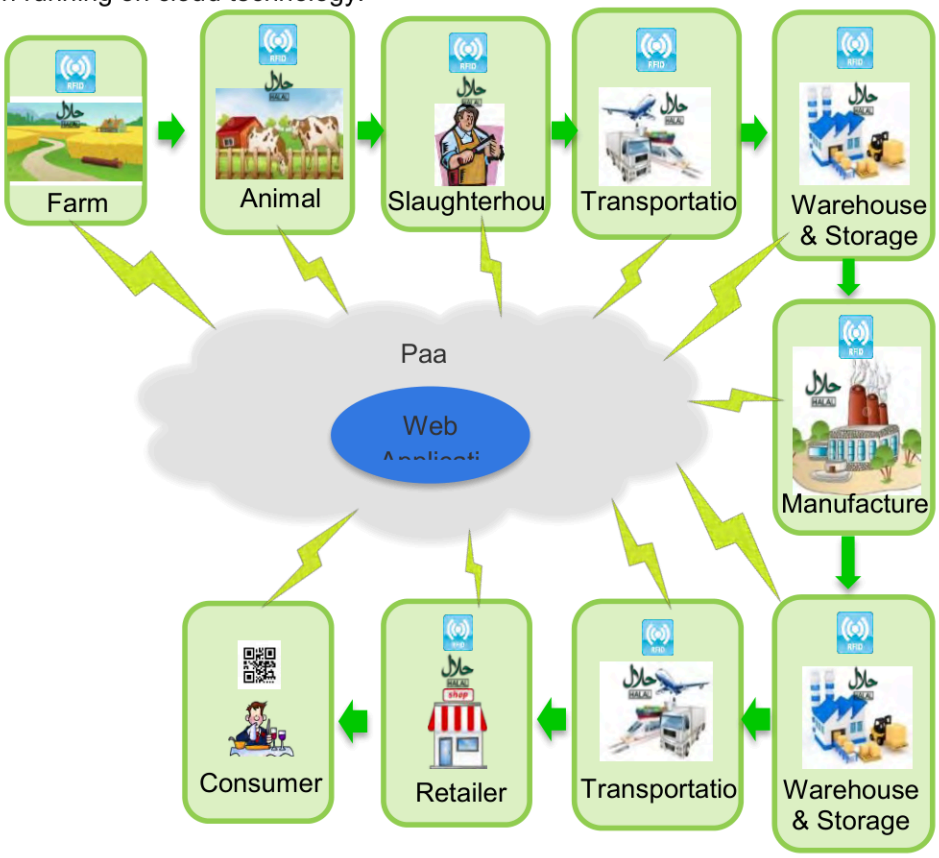

Figure 1: The integrated traceability system of Halal meat supply chain with cloud technology framework

Stages	Radio Frequency Identification (type)	Technology
Farms and Animal farms	Active (for monitoring)	RFID, Web application on cloud
Slaughterhouse	Active (for monitoring)	RFID, Web application on cloud
Manufactures	Passive (for monitoring), Semi Passive (for inventory)	RFID, Web application on cloud
Warehouse & Storage	Passive (for monitoring), Semi Passive (for inventory)	RFID, Web application on cloud
Transportations	Semi Passive (for monitoring), Active (for inventory)	RFID, Web application on cloud
Retail	Passive (for monitoring), Semi Passive (for inventory)	RFID, Web application on cloud
Consumers	-	Quick response code (QR code), Web application on cloud

Table 2: The classification of RFID and technologies for traceability in Halal meat supply chain

Table 2 the classification of RFID and technologies for traceability in Halal meat supply chain shows the suitable category of the RFID that proposed by Bahrudin et al. (2011) for each stage of Halal meat

supply chain and the technologies that support the tracing of information relevant Halal meat product. This integration is combined the notable of RFID that is the efficient technology for tracking and tracing solution on supply chain. It is a promising technology that is intended to replace the conventional barcode system by enhancing the ability of automatic identifying, tracking, and trace products throughout the supply chain. It also support related problems including monitoring, informing and updating data or product status (Bahrudin et al., 2011) and cloud technology with a real time updating, a one channel communication throughout the supply chain (from farm to fork), reduce time and investment (cost and resources), no limitation for accessing (anytime, anywhere and any device) and consumers can get the convenient channel for accessing to product's information, history, even giveback an opinion and etc.

Conclusion

Accordingly, Islam is a religion governed by rules and customs. Muslims are supposed to make an effort to obtain a good quality of Halal food. It is the religious obligation consuming only Halal food (Alqudsi 2014). Moreover, the increasing awareness of Muslims all over the world on their obligation to consume food, based on Islamic dietary requirements (Ambali and Bakar, 2012) and the critical segment in Halal food is Halal meat. When Halal meat requires the complex condition according Sharia and Toyyiban and more increases especially consumers' lifestyle changed. Halal meat supply chain is a significant segment not only the issue of needs concerning in Halal meat supply chain procedure itself but demands from the current market where the consumption of processed food or instant freezing food responded their hastily life. Since, the meat which is a main ingredient is always complex in its history, the solution is the transparency. The transparency is the essential factor which can (1) increase the positive perception and cognition, and (2) build trust of the product by (1) providing the reliable and clear information, (2) facilitating the access of the channel contained the necessary information as well as (3) the exposure source of Halal awareness which is being a requirement for traceability system in Halal meat supply chain.

These result the combination between *RFID technology* being used for Halal meat tracking system in the specific procedure of each stage in Halal meat supply chain and the *web application on cloud technology* being used for tracing the information related to Halal meat product through the whole supply chain. Furthermore, the advantages of both tools can fulfill the lack of reliable source and response to the modern lifestyle which reveal the essential of internet.

Therefore, the framework of tracing of Halal meat supply chain with cloud technology for enhancing consumer satisfaction attempts to show the importance of the unique requirement of Halal and the necessary of technology. According to Ambali and Bakar (2012), the consumption of Halal which is not only an obligatory in serving Allah but obedient to Halal shows that material and ingredient are not harmful to health. Since, Allah permits them only what is good for human existence, the hygienic, safety and cleanliness are strongly emphasized in Islam via Halal. Technology then, is become to be necessary in the modern scenario and has to be concerned as a critical issue along with their religious.

Further, empirical studies which emphasize on the development and deployment stages can be carried out to validate the needs of tracking and tracing system of Halal meat supply chain on the cloud technology.

References

Abubakr, T. (2012), "Cloud app vs. web app: Understanding the differences", TechRepublic, available at: http://www.techrepublic.com/blog/the-enterprise-cloud/cloud-app-vs-web-app-understanding-the-differences/ (accessed 27 June 2015).

Afendi, N.A., Azizan, F.L., Darami, A.I. (2014), "Determinants of halal purchase intention: case in perlis", International Journal of Business and Social Research (IJBSR), Vol. 4, No. 5, pp. 118–123.

Alqudsi, S.G. (2014), "Awareness and Demand for 100% Halal Supply Chain Meat Products", Social and Behavioral Sciences, 130, pp. 167–178.

Ambali, A.R. and Bakar, A.N., 2014. "People's Awareness on Halal Foods and Products: Potential Issues for Policy-makers", Social and Behavioral Sciences, 12, pp. 3 – 25

Bahrudin, S.S.M., Illyas, M.I., Desa, M.I. (2011),"Tracking and tracing technology for halal product integrity over the supply chain", Electrical Engineering and Informatics (ICEEI) 2011 International Conference on. IEEE, pp. 1–7.

Bonne, K. and Verbeke, W. (2007), "Religious values informing halal meat production and the control and delivery of halal credence quality", Agriculture and Human Values, 25, pp. 35–47.

Chawathe, S. S., Krishnamurthy, V. et al. (2004). "Managing RFID Data", the 30 th VLDB Conference, Toronto, Canada, pp. 1189-1195.
Elsanhouri, A.E., Ahmed, M.A. and Abdullah, A.H. (2012), “Cloud Applications Versus Web Applications: A Differential Study”, *The First International Conference on Communications, Computation, Networks and Technologies*, pp. 31-36.
Hackett, C., Grim, B., Stonawski, M., Skirbekk, V., Potancokova, M., Abel, G. (2012), "The global religious landscape: A report on the size and distribution of the world’s major religious groups as of 2010", Pew Research Center's Religion & Public Life Project, available at: http://www.pewforum.org/2012/12/18/global-religious-landscape-exec/ (accessed 18 November 2014).
Kima, S. and Garrisonb, G. (2010), "Understanding users’ behaviors regarding supply chain technology: Determinants impacting the adoption and implementation of RFID technology in South Korea." *International Journal of Information Management*, Vol. 30, pp. 388–398.
Kumar, A. (2014), "A study on Cloud computing in libraries", Asian Journal of Multidisciplinary Studies, Vol. 2, pp. 7-10.
Lever, J. and Miele, M. (2012), "The growth of halal meat markets in Europe: An exploration of the supply side theory of religion", Journal of Rural Studies, 28, pp. 528–537.
Mell, P. and Grance, T., (2011), “The NIST Definition of Cloud Computing”, National Institute of Standards and Technology, available at: http://csrc.nist.gov/publications/nistpubs/800-145/SP800-145.pdf (accessed 09 December 2014).
Mentzer, J.T., DeWitt, W., Keebler, J.S., Min, S., Nix, N.W., Smith, C.D., Zacharia, Z.G. (2001), "Defining supply chain management", Journal of business logistics, Vol. 22, No. 2, pp. 1–25.
Meuwissen, M.P., Velthuis, A.G., Hogeveen, H., Huirne, R.B., (2003), "Traceability and certification in meat supply chains", Journal of Agribusiness, Vol. 21, pp. 167–182.
Nakyinsige, K., Man, Y.B.C., Sazili, A.Q. (2012), "Halal authenticity issues in meat and meat products", Meat Science, Vol. 91, pp. 207–214.
Omar, E.N. and Jaafar, D.H.S. (2011), "Halal supply chain in the food industry-A conceptual model", Business, Engineering and Industrial Applications (ISBEIA), 2011 IEEE Symposium on. IEEE, pp. 384–389.
Opara, L.U. (2003), "Traceability in agriculture and food supply chain: a review of basic concepts", Food, Agriculture & Environment, Vol. 1, pp. 101–106.
Pahim, K.M.B., Jemali, S., Mohamad, S.J.A.N.S. (2012), "Notice of Retraction The importance of training for Halal logistics industry in Malaysia", Humanities, Science and Engineering Research (SHUSER), 2012 IEEE Symposium on. IEEE, pp. 1635–1640.
Pew Research Center's Religion & Public Life Project, (2011), “The Future of the Global Muslim Population Projections for 2010-2030”, available at: http://features.pewforum.org/FutureGlobalMuslimPopulation-WebPDF.pdf (accessed 19 November 2014).
Talib, M.S.A., Johan, M.R.M. (2012), "Issues in halal packaging: a conceptual paper", International Business and Management, Vol. 5, No. 2, pp. 94-98.
Tieman, M. (2011), "The application of Halal in supply chain management", Journal of Islamic Marketing, Vol. 2 No. 2, pp. 186–195.
Tieman, M. and Ghazali, M.C. (2014), "Halal Control Activities and Assurance Activities in Halal Food Logistics", Social and Behavioral Sciences, Vol. 121, pp. 44–57.
Van der Spiegel, M., van der Fels-Klerx, H.J., Sterrenburg, P., van Ruth, S.M., Scholtens-Toma, I.M.J., Kok, E.J. (2012), "Halal assurance in food supply chains: Verification of halal certificates using audits and laboratory analysis", Trends in Food Science & Technology, Vol. 27, pp. 109–119.
Yakovieva, N. (2009), "Sustainable benchmarking of food supply chains", working paper [2009-02], George Perkins Marsh Institute, Clark University, April 2009.
Zulfakar, M.H., Anuar, M.M. and Talib, M.S.A. (2014), "Conceptual Framework on Halal Food Supply Chain Integrity Enhancement", Social and Behavioral Sciences, Vol. 121, pp. 58–67.
Zulfakar, M.H., Jie, F. and Chan, C. (2012), "Halal food supply chain integrity: from a literature review to a conceptual framework", available at:http://www.academia.edu/1253378/Halal_food_supply_chain_integrity_from_a_literature_review_to_a_conceptual_framework (accessed 24 June 2015).