

## CONTEMPORARY HAJ CROWD MANAGEMENT – AN ISLAMIC PERSPECTIVE

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### ABSTRACT

This paper attempts to deal with three specific aims. Firstly, to inquire into the concept of Islamic crowd management; secondly, to delve into the contemporary hajj crowd management; and thirdly, to analyze the contemporary hajj crowd management vis-à-vis the concept of Islamic crowd management. These aims are based on the premise that hajj is an Islamic affair and the management of hajj – one aspect of which is the hajj crowd management – logically has inevitably to be Islamic. This premise entails with a significant question. In actuality, how far this premise is prevailing in contemporary hajj crowd management? This question necessitates an investigation into the concept of the Islamic crowd management, the form of the existing hajj crowd management, and the compliance or contradiction of the existing hajj crowd management with the actual concept of the Islamic crowd management. In this paper, the investigation is based on secondary data resulted from library research, while the analysis is undertaken through a textual analysis. The findings exhibit natures of an Islamic concept of crowd management, inadequacy of the existing hajj crowd management vis-à-vis the Islamic concept of crowd management, and the need to base the hajj crowd management on Islamic tasawwur (worldview) itself.

**Keywords:** Islamic crowd management, Hajj crowd management, Pilgrimage

## INTRODUCTION:

The personnel involved in managing hajj must have tried their best to provide a smooth, safe, and effective way in managing all aspects of hajj pilgrims. One of the most critical aspects that necessitate a serious attention is the crowd management of the hajj pilgrims. ‘Crowd’ here refers to gathering of a huge number of human beings that creates a compact and crowded situation, and may entail with all sorts of risks and threats (Lofland, 1985:3; Musse and Thalman, 1997:39; Brown and Lewis, 1998:649; and Sharma, 2000:298). Being a limited space, that holds hundreds of millions of pilgrims at the specific time especially in Arafah, Mina and Mekah, the pilgrims and their movements inevitably have to be carefully, skillfully, and effectively managed. Otherwise, disasters such as human stampede and health problems originating from the crowd are inevitable<sup>1</sup>. In other events like sports, politics, and entertainment, even fights could also occur.

Due to the above mentioned reasons, one may not reject the importance of crowd management in any case (Imran Khan, 2013), hence the emergence of various forms of crowd management is the need of the hour. Fruin, (1993), for example, proposed that all organizers, or any organization that is involved in crowd management to use FIST which contains four elements. Firstly, be alert at all time of the threats and risks of the crowd; secondly, having knowledge in crowd types that intend to be managed; thirdly, continuous monitoring; and fourthly, give a serious attention on time. Soo Chin Pin, Fazilah Haron, Siamak Sarmady, Abdullah Zawawi Talib and Ahamad Tajudin Khader (2010) suggest TRIZ Theory (in Russian, *Teoriya Resheniya Izobretatelskikh Zadatch*), which includes compartmentalization principles, nesting principles, pre-action principles, dimensional movement principles, and feedback principles. There are various studies conducted such as by Mohammad Yamin, M. Mohammadian, X. Huang, and Sharma (2008), Mohammad Yamin (2009), Mohamed Mohandes (2010), Alnizari (2011), Al-Hashedi A. H., Muhammad Rafie Mohd Arshad, Hasimah Hj Mohamed, and Ahmad Suhaimi Baharudin (2013), Nabeel Koshak and Akram Nour (2013), and Mohammad Rahami Roslan, Noor Asmawati Samsuri, Mohd Kamal A Rahim, Mohd Afiq Abdul Majid and Mohd Hazmi Mokhtar (2013) which suggest the use of Radio Frequency Identification (RFID) – a technology that is able to automatically identify and detect human beings, objects, businesses, and incidents using radio frequency (Finkenzeller, 2003; Hodges and McFarlane, 2005; Landt, 2005; and Hossain and Prybutok, 2008).

However, the hajj crowd management should not be similar to the crowd management adopted in sports, political, and entertainment events. Unlike the crowd at sports, political, and entertainment events, the hajj pilgrims are all Muslims. The ultimate aim of all activities of each Muslim is for the sake of Allah Subhanahu Wa Ta'ala (SWT) to accomplish the pleasure of Allah SWT (*mardhatillah*), through implementations that are not in contrary to shari'ah (Yusuf al-Qaradawi, 1996). Since hajj is an Islamic religious activity, like any other Islamic activities, the hajj crowd management, logically, should be based on a concept that emerges from within Islamic epistemological and philosophical underpinnings, namely the Islamic crowd management itself (Muhammad Syukri Salleh, 2003). But what is meant by Islamic crowd management? How does the hajj crowd being managed now? How far does the current hajj crowd management system is in compliance to the Islamic crowd management?

This paper attempts to seek for answers to these three questions. In doing so, the paper is divided into three main sections. Firstly, the concept of Islamic crowd management; secondly, the current practice of crowd management; and thirdly, the contemporary hajj crowd management system vis-à-vis the Islamic crowd management.

## THE CONCEPT OF ISLAMIC CROWD MANAGEMENT:

The concept of Islamic crowd management has yet to exist indeed. However, the base to develop such a concept has been there for about 1,437 years, since the outset of the emergence of Islam itself. The base here refers to the Islamic epistemological and philosophical underpinnings, the Islamic *tasawur* (worldview). Islamic epistemology is both the physical and metaphysical knowledge that relates to the existence of Allah SWT and the universe (Osman Bakar, 1991). The sources of the knowledge come from Divine revelation (al-Qur'an), sayings of Prophet Muhammad SAW Hadith), *ijmak* (consensus of the Islamic scholars), and *qiyas* (deductive analogy). The Islamic epistemology therefore is not confined to the use of the mind *per se*, but also being shaped by Divine revelation (Ibrahim Ragab, 1980; Muhammad Al-Buraey, 1992; Muhammad Syukri Salleh, 1990, 2002, and 2003; Osman Bakar, 1991; Ataul Huq Pramanik, 2002; Masudul Alam Choudhury, 2007; Muhammad Abdullah and Muhammad Junaid Nadvi, 2011).

<sup>1</sup> Sports, entertainment, politics, and even religion usually attracted a huge crowd (Chalengger, Clegg and Robinson, 2009). The examples of the events, in specific, are like Olympics Sports, World Youth Day, World Football Cup, and Pilgrimage – all of which have proven to have attracted huge crowds (Fruin, 1993; Al-Tawfiq and Memish, 2012; and Memish et. al., 2012).

The Islamic *tasawur* - or *pandangan sarwar Islam*, *pandangan dunia Islam*, *pandangan alam Islam*, or *pandangan hidup Islam* in Malay (Panel Akademi Pengurusan YaPEIM, 2005), or Islamic worldview in English (M. Umer Chapra, 1992, Mohd. Kamal Hassan, 1993; and Syed Muhammad Naquib Al-Attas, 1995), or Islamic *weltanschauung* or *weltansicht* in German (Abdul Kabir Hussain Soliku, 2009, and Abdelaziz Berghout, 2009a) - reflects the procedures of life based on *Tauhid* (Oneness of God) as a central pillar that entails with a positive impact on all management activities operated by human beings, either inside or outside an organization (Al-Mawdudi, 1985). The Islamic *tasawur* is a view about universe that includes both the present world (*duniya*) and the world Hereafter (*akhirah*) (Syed Muhammad Naquib Al-Attas, 2001:1). It portrays and explains a comprehensive, holistic, and real picture of Islam (Haron Din, 1992, Mohd. Kamal Hassan, 1993; and Ramli Awang, 1997). All in all, the Islamic *tasawur* could be summarized as a real picture of Islam that explains holistically the real and comprehensive basic principles of Islam (Wan Norhaniza Wan Hasan (2014:127-128). Like in all other aspects of life of the Muslims, it is these Islamic epistemological and philosophical underpinnings that mold the concept of Islamic crowd management. Thus, it is not only approaches or techniques that matter to be Islamic, the management itself should be Islamic too. An Islamic management is characterized by five criteria (Muhammad Syukri Salleh, 2008, and 2009). Firstly, it realises the functions of human beings as the servants (*'abd*) and vicegerents (*khalifah*) of Allah SWT, the latter of which relates closely with the very function of human beings as representatives of Allah SWT to manage the universe. Secondly, the realization is undertaken through cooperation and consultation (*syura*) based on true Islamic *shari'ah*, sincerity, values and ethics. Thirdly, the references of the Islamic management are al-Qur'an and Hadith, as well as *ijmak* (consensus of the Islamic scholars), and *qiyas* (deductive analogy). Fourthly, the objective of the management activities is to generate a civilization by avoiding any deeds that are contrary to the pleasure of Allah SWT. Fifthly, the ultimate objective of the Islamic management is the pleasure of Allah SWT (*mardhatillah*), which is believed to entail with happiness in this world, as well as happiness in the Hereafter (*al-falah*).

These five criteria should be the fundamental tenets of the Islamic crowd management. These criteria outline the philosophy, method, functions of human being, sources, and the ultimate aim of the Islamic crowd management. The first criterion indicates that the Islamic crowd management is actually a trust and responsibility of the one given the task to manage the crowd. The second criterion indicates that the crowd to be managed is not the crowd that violates Islamic *shari'ah*. The third criterion indicates that the trust and responsibility in managing the crowd enable the managers to perpetuate their status as the slaves (*'abd*) and vicegerent (*khalifah*) of Allah SWT. The fourth criterion indicates that the approach of the Islamic crowd management lies its foundation in the Qur'an and Hadith as well as in *ijmak* (consensus of the Islamic scholars), and *qiyas* (deductive analogy). The fifth criterion indicates that the ultimate objective of the Islamic crowd management is to seek for the pleasure of Allah SWT (*mardhatillah*), and also the happiness in this world, as well as happiness in the Hereafter.

In brief, it could be concluded that the Islamic epistemology, Islamic *tasawur*, and the *mardhatillah* (as the ultimate aim) are the main tenets of the Islamic crowd management. Apart from these, the Islamic crowd management also takes into consideration two important relationships, viz. the relationship between Allah SWT and human beings (*habluminallah*) and the relationship amongst the human beings themselves (*habluminannas*). The former reflects the vertical relationship in which Allah SWT is the God and the human beings are his slaves (*'abd*), while the latter reflects the horizontal relationship in which human beings are the managers of this universe (*khalifah*) as representatives of Allah SWT. Both are necessary in the life of Muslims (Muhammad Syukri Salleh, 2003 & Fadzila Azni Ahmad, 2010). Upholding both relationships indicates the attainment of the very functions of human beings as slaves (*'abd*) and vicegerent (*khalifah*) of Allah SWT (Rasid Muhamad, Mohd Yadman Sarwan & S.Salahudin Suyurno, 2008).

#### CONTEMPORARY HAJJ CROWD MANAGEMENT:

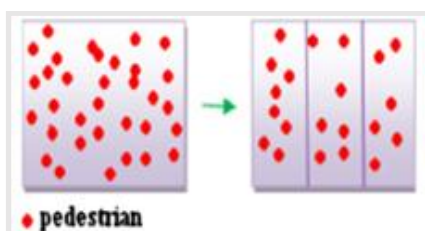
At the moment, there are three approaches in managing the hajj crowd. Firstly, the *Teoriya Resheniya Izobretatelakikh Zadath* (TRIZ Theory); secondly, the *Radio Frequency Identification* (RFID); and thirdly, the Quality Management System (SPK) ISO 9001:2008. Below are brief explanations of each of the approaches.

#### TRIZ Theory:

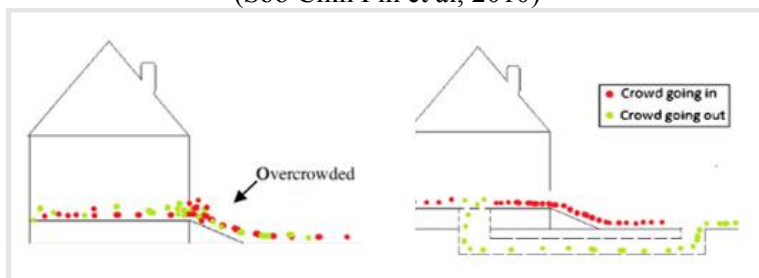
From philosophical viewpoint, TRIZ Theory attempts to provide solutions related to problems based on logical mind, observed facts, and research, but excluding intuition (Ang Mei Choo, Ng Kok Weng & Farah Hanani Megat Ghazali, 2011). It is a systematic method which can generate innovation and solve problems in a more creative way (Altshuller, 2002, 2004 & 2007).

Because of its problem-solving nature, TRIZ Theory is recommended by Soo Chin Pin et al (2010) to be used in hajj crowd management, especially at Jamaraat Bridge, Mekah. According to Soo Chin Pin et al (2010), there are six principles of the TRIZ Theory that are applicable for the hajj crowd management. Firstly, the Segmentation Principle; secondly, the Nested Doll Principle; thirdly, Preliminary Action/Prior Action Principle; fourthly, Another Dimension Principle; fifthly, Feedback Principle; and sixthly, Homogeneity Principle.

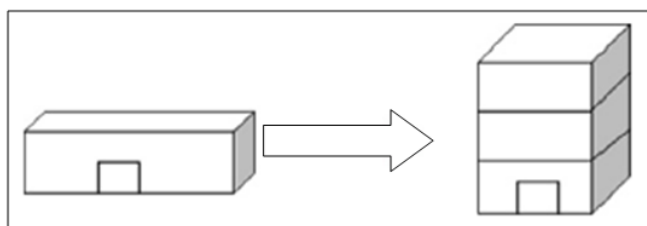
Segmentation Principle is a principle that advocates barricades or divisions along the routes of the hajj pilgrims so as their movements are eased (see Figure 1). Nested Doll Principle on the other hand, recommends a construction of building within a building to ease the trip in and out (Figure 2), while Preliminary Action/Prior Action Principle suggests an exposure, education and knowledge on precautionary and cautious steps. Another Dimension Principle necessitates a change in the dimension of a building to avoid human compact and crowding (Figure 3). Feedback Principle is a principle that proposes provision of feedback to all parties involved in management of hajj pilgrims. With the feedback, controlling and monitoring of the situation of the crowd become more systematic. Lastly, Homogeneity Principle relates to the segmentation principle based on similar age and sex, with the aim to ease and smoothen the routes of the pilgrims (Figure 4).



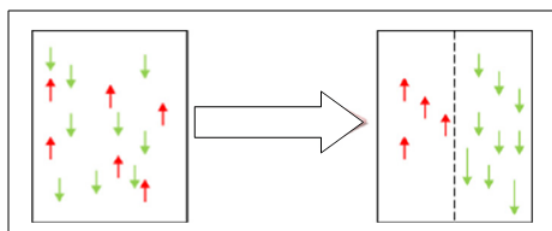
**Figure 1: Segmentation Principle**  
(Soo Chin Pin et al, 2010)



**Figure 2: Nested Doll Principle**



**Figure 3: Another Dimension Principle**



**Figure 4: Homogeneity Principle**

**RFID Technology:**

As mentioned earlier, RFID Technology is a form of technology that automatically identifies and detects something, including human beings, objects, business transaction, and an incident, using radio frequency (Finkenzeller, 2003; Hodges & McFarlane, 2005:2; Landt, 2005 & Muhammad Muazzem Hossain & Prybutok, 2008). The RFID Technology contains two elements, that is firstly, the RFID tag, and secondly, the RFID reader (Hodges &

McFarlane, 2005:1; Mohammed Mohandes, 2010 & Al-Hashedi et al., 2013). The RFID tag is an instrument that consists of antenna and chips which can keep information about an object. The RFID reader is an instrument adopted to read the data from the RFID tag (Muhammad Ilyas Prakananda, 2012 & Al-Hashedi et al., 2013).

In general, the RFID Technology has been applied in some sectors such as business, medical services, and transportation (Finkenzeller, 2003). Now the RFID Technology is also suggested to be used in the hajj crowd management by various authors such as Mohammad Yamin et al (2008), Mohammad Yamin (2009), Mohammed Mohandes (2010), Imran Khan (2009), Alnizari (2011), Al-Hashedi et al (2013), Nabeel Koshak dan Akram Nour (2013). According to these scholars, RFID Technology is potentially applicable for the management of the hajj pilgrims. For instance, RFID Technology is said to be able to keep the personal record of the pilgrims (Mohammed Mohandes, 2010 & Al-Hashedi et al., 2013); to control and detect the position of the hajj pilgrims and help to manage their medical services (Mohammad Yamin, 2009 & Al-Hashedi et al. 2013); to smoothen transport system during the hajj season (Al-Hashedi et al., 2013; Nabeel Koshak & Akram Nour, 2013); to ease the pilgrims' passport and visa inspection system, their baggage tags, and to help the pilgrims' supervision and security (Al-Hashedi et al., 2013).

**Standard SPK ISO 9001:2008:**

Standard SPK ISO 9001:2008 – which has been used by Lembaga Tabung Haji to manage the crowd of the hajj pilgrims in Mekah (Lembaga Tabung Haji, 2013:135 & Lembaga Tabung Haji, 2015:118) - is a standard that accentuates well-planned work and fulfillment of international standard (Tricker, 2008 & Debby Willar, 2012). It consists of identified, documented, implemented, and controlled processes, to produce products and services with consistent quality, and provide satisfaction to all customers (Lam, Low & Teng, 1994; Thorpe & Sumner, 2004). Standard SPK ISO 9001:2008 also gives a significant emphasis on preventive actions, as opposed to solving problems only when they happen (Thorpe dan Sumner, 2004). In fact, the Standard emphasizes on continuous reviewing of critical processes, apart from regularly taking corrective actions and creating consistent way of working. It also insists on the principle of first-time and always correct, and continually recording works that have been done to prove the action that has been taken (Ahmed et. al., 2005; Cachadinha, 2009; Farooqui and Ahmed, 2009; and Shibani, Soetanto and Ganjian, 2010).

**CONTEMPORARY HAJJ CROWD MANAGEMENT VERSUS THE ISLAMIC HAJJ CROWD MANAGEMENT:**

As mentioned earlier, an Islamic crowd management consists of five elements, that is the Islamic epistemology, the Islamic *tasawur*, the ultimate aim (*mardhatillah*), the vertical relationship (*hablumminallah*) and the horizontal relationship (*hablumminannas*). Looking from these five elements, as shown in Table 1, the contemporary hajj crowd management possesses only one element, that is the horizontal relationship (the crowd to be managed is not the crowd that violates Islamic *shari'ah*). The other four elements do not exist at all in the mind of the advocates of the contemporary hajj crowd management. In all the three approaches (TRIZ Theory, RFID Technology, and Standard SPK ISO 9001:2008), the Islamic epistemology, the Islamic *tasawur*, the Islamic ultimate aim, and the relationship between Allah SWT and the human beings are not taken into consideration.

**Table 1: Islamic Hajj Crowd Management Versus Contemporary Hajj Crowd Management**

Elements of Islamic Crowd Management	TRIZ Theory	RFID Technology	Standard SPK ISO 9001:2008
Islamic Epistemology	x	x	x
Islamic Tasawur	x	x	x
Ultimate Aim (Mardhatillah)	x	x	x
Vertical Relationship ( <i>Hablumminallah</i> )	x	x	x
Horizontal Relationship ( <i>Hablumminannas</i> )	/	/	/

In consequence, although at operational level, the three approaches of the contemporary hajj crowd management may seem to be not in contrary to Islamic *shari'ah*, but when Islamic philosophical underpinnings are taken into account, the three approaches suffer from an inadequacy of the Islamic elements. The epistemology of the contemporary hajj crowd management is merely based on observation, experience, and perception of mind rather than on Divine revelations (al-Qur'an and Hadith), *ijmak* dan *qiyas*. The *tasawur* and ultimate aim are based merely on technological worldview and quality management service respectively, while the Allah-human beings relationship is ignored.

As such, an inclusion of the five elements of the Islamic hajj crowd management into the three approaches of the contemporary hajj crowd management is necessary to position the contemporary hajj crowd management

into an Islamic framework. As stated earlier, hajj pilgrimage is an Islamic ritual. All aspects related to it, in this case the hajj crowd management, need to be Islamic.

### CONCLUSION:

This paper has shown that there are five main elements in an Islamic hajj crowd management. They are the Islamic epistemology, the Islamic *tasawur*, the ultimate aim (*mardhatillah*), the vertical relationship (*hablumminallah*) and the horizontal relationship (*hablumminannas*). In contemporary hajj crowd management, there are three approaches recommended and adopted, that is the TRIZ Theory, RFID Technology, and Standard SPK ISO 9001:2008. However, these three approaches are found not to be compatible with the five elements of the Islamic hajj crowd management, with the exception of the only one element, the *hablumminannas*. As at operational level these three approaches seems to be useful to be adopted in the hajj crowd management, the five elements of the Islamic hajj crowd management need to be included at the approaches' philosophical level, so that these approaches become Islamic approaches.

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### REFERENCES:

- [1] Abdelaziz Berghout (2009a). *The Islamic worldview: Glimpses on studies and definitions*, dlm. Abdelaziz Berghout (Peny.). *Introduction to the Islamic worldview study of selected essentials*. Kuala Lumpur: Universiti Islam Antarabangsa Malaysia.
- [2] Abdul Kabir Hussain Solihu. (2009). Semantics of the Qur'anic weltanschauung: A critical analysis of toshihiko izutsu's works. *American Journal of Islamic Social Sciences*, 26 (4), 1-23.
- [3] Ahmed Q.A., Memish Z.A., Steffen, R., & Stephens G.M. (2012). Emergence of medicine for mass gatherings: Lessons from the hajj. *The Lancet Infect Disease* 12 (1), 56-65.
- [4] Ahmed, S. M., R. T. Aoieong, S. L. Tang and D. X. M. Zheng. (2005). A comparison of quality management systems in the construction industries of Hong Kong and the USA. *International Journal of Quality & Reliability Management* 22 (2):149-161.
- [5] Al-Hashedi A. H., Muhammad Rafie Mohd Arshad, Hasimah Mohamed & Ahmad Suhaimi Baharudin. (2013). RFID applications in hajj management system. *Proceeding of the 2013 IEEE International Conference on RFID Technologies and Applications*, doi: 10.1109/RFID-TA.2013.6694546.
- [6] Al-Hashedi, Abdullah S. Hussein. (2001). *Hajj (pilgrimage) in Islam. A review*. Retrieved on 17/12/2013 from <http://search.proquest.com/docview/203030818?accountid=14645>.
- [7] Al-Mawdudi, Abu al-A'la. (1985). *Cara hidup Islam*. Terjemahan Wan Salim Muhammad Nur. Shah Alam, Selangor: Dewan Pustaka Fajar Sdn Bhd.
- [8] AlNizari, Nezar Amer. (2011). *A real-time tracking system using RFID in Mecca*. Thesis submitted in partial fulfilment of the requirements for the degree of Master of Engineering in Electronics and Computer System Engineering. Massey University, Turitea Campus, Palmerston North.
- [9] Al-Tawfiq, J. A. & Memish, Z. A. (2012). *The hajj: updated health hazards and current recommendations for 2012*. *Euro Surveill.* 2012; 17(41): pii=20295. Available online. <http://www.eurosurveillance.org/ViewArticle.aspx?ArticleId=20295>.
- [10] Altshuller, G. (2002). *40 principles: TRIZ Keys to technical innovation*. Worcester: Technical Innovation Center, Inc.
- [11] Altshuller, G. (2004). *And suddenly the inventor appeared: TRIZ, the theory of inventive problem solving*. Worcester: Technical Innovation Center, Inc.
- [12] Altshuller, G. (2007). *The innovation algorithm: TRIZ, systematic innovation and technical creativity*. Worcester: Technical Innovation Center, Inc.
- [13] Ang Mei Choo, Ng Kok Weng & Farah Hanani Megat Ghazali. (2011). Pencetusan Idea Reka Bentuk Produk Menggunakan TRIZ. *Journal of Information Technology and Multimedia*, 11: 1-9.
- [14] Ataul Huq Pramanik. (2002). Islam and development revisited with evidence from Malaysia. *Islamic Economic Studies*, 10 (1), 39-74.
- [15] Brown, C. & Lewis, E.L. (1998). Protesting the invasion of Cambodia: A case study of crowd behaviour and demonstration leadership. *Polity*, 30 (4), 1998, 645-665.

- [16] Cachadinha, N. M. (2009). Implementing quality management systems in small and medium construction companies: A contribution to a road map for success. *Leadership and Management in Engineering* 9 (1):32-39.
- [17] Challenger, R., Clegg, C.W., & Robinson M.A. (2009). *Understanding crowd behaviours: guidance and lessons identified*. This report has been commissioned by and prepared for the Cabinet Office. It forms part of the 'Understanding Crowd Behaviour' research report series. ([www.cabinetoffice.gov.uk/ukresilience](http://www.cabinetoffice.gov.uk/ukresilience))
- [18] Fadzila Azni Ahmad (2010). *Kaedah pengurusan institusi-institusi pembangunan berteraskan Islam di Malaysia*. Shah Alam: Pusat Penerbitan Universiti (UPENA).Universiti Teknologi Mara (UiTM).
- [19] Farooqui, R. U. and S. M. Ahmed. (2009). *ISO 9000: A stepping stone to total quality management for construction companies*. In Seventh LACCEI Latin American and Caribbean Conference for Engineering and Technology (LACCEI 2009). San Cristobal, Venezuela: LACCEI.
- [20] Finkenzeller, K. (2003). *RFID handbook: Fundamentals and applications in contactless smart cards and identification*, (2nd ed).  
Retrieved on 27/10/2014 from <http://onlinelibrary.wiley.com/book/10.1002/0470868023>.
- [21] Fruin, J. (1993, March). The causes and prevention of crowd disasters. Originally presented at the *first International Conference on Engineering for Crowd Safety*, London, England.
- [22] Haron Din (1992). *Tasawwur Islam*. Shah Alam, Selangor: Pustaka Hizbi.
- [23] Hodges, S. & McFarlane, D. (2005). *Radio Frequency Identification: Technology, Applications and Impact. White Paper Series / Edition 1*.
- [24] Ibrahim Ragab (1980). Islam and development. *Journal World Development*, Vol. 8, pp. 513-521. [PDF] from [um.ac.ir](http://um.ac.ir).
- [25] Imran Khan (2013). *Hajj crowd management: Discovering superior performance with agent-based modeling and queueing theory*. Unpublished doctoral thesis, University of Manitoba.
- [26] Lam, S.W; Low, C.M & Teng, W.A. (1994). *ISO 9000 in construction*. McGraw-Hill.
- [27] Landt, J. (2005). The history of RFID. *IEEE Potentials* (Volume:24 , Issue: 4 ). <http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=1549751>.
- [28] Lembaga Tabung Haji (2013). Laporan tahunan TH 2013. <https://cms-th.s3.amazonaws.com/Lembaga+Tabung+Haji+Annual+Report+2013.pdf>
- [29] Lembaga Tabung Haji (2015). *Jurnal Pelayaran Dhuyufurrahman Musim Haji 1435H/2014M*. Kuala Lumpur: Jabatan Haji, Lembaga Tabung Haji.
- [30] Lofland, J. (1985). *Protest: Studies of collective behavior and social movements*. New Brunswick, NJ: Transaction Books.
- [31] M. Umer Chapra (1992). *Islam and the economic challenge*. Leicester, UK: The Islamic Foundation.
- [32] Masudul Alam Choudhury (2007). *The universal paradigm and the Islamic world-system: Economy, society, ethics and science*. New Jersey: World Scientific.
- [33] Mohamed Mohandes (2010). Mohammed Mohandes. (2010). A case study of an RFID-based system for pilgrims identification and tracking, in Turcu, C. (ed.) *Sustainable Radio Frequency Identification Solutions* (pp.356), ISBN 978-953-7619-74-9. INTECH, Croatia.
- [34] Mohammad Rahami Roslan, Noor Asmawati Samsuri, Mohd Kamal A Rahim, Mohd Afiq Abdul Majid & Mohd Hazmi Mokhtar (2013, Ogos). RFID Based System for Malaysian Pilgrims Identification and Monitoring Through GSM, kertas kerja yang dibentangkan di *5th National Seminar on Hajj Best Practices on Crowd & Health Issues* pada 27 & 28 Ogos 2013 di Hotel Equatorial, Pulau Pinang.
- [35] Mohammad Yamin (2009). Crowd management with RFID & wireless technologies. *Proceedings of the 2009 First International Conference on Networks & Communications*, (pp.439-442). ISBN:978-0-7695-3924-9. doi:10.1109/NetCoM.2009.14.
- [36] Mohammad Yamin, M. Mohammadian, X. Huang, & Sharma, D. (2008, December). *RFID technology and crowded event management*. Paper presented in *International Conference on Computational Intelligence for Modelling, Control and Automation*, Vienna, Austria.
- [37] Mohd. Kamal Hassan. (1993, Ogos). The Islamic world-view. Kertas kerja yang dibentangkan di *Seminar on Islam and Its World-View: An American Perception*, anjuran Institut Kefahaman Islam Malaysia dan The Malaysian-American Commission on Education Exchange, di Hotel Pan Pasific, Kuala Lumpur.
- [38] Muhammad Abdullah & Muhammad Junaid Nadvi. (2011). Understanding the principle of Islamic world-view. *The Dialogue*, 4(3), 268-289.

- [39] Muhammad Al-Buraey. (1992). *Pembangunan pentadbiran menurut perspektif Islam*. (Terj. Abdullah Md. Noor, Norlida Abdul Halim & Norlela Hassan. (*Administrative development: An Islamic perspective*)). Kuala Lumpur: Dewan Bahasa & Pustaka.
- [40] Muhammad Ilyas Prakananda (2012). Rancangan penerapan teknologi RFID untuk mendukung proses identifikasi dokumen dan kendaraan di Samsat. *Prosiding Seminar Nasional Aplikasi Sains & Teknologi (SNAST) Periode III* Yogyakarta.
- [41] Muhammad Muazzem Hossain & Prybutok, V.R. (2008). Consumer acceptance of RFID technology: An exploratory study. *IEEE Transactions on Engineering Management*, 55(2). Retrieved from <http://ieeexplore.ieee.org/stamp/stamp.jsp?arnumber=4494740>.
- [42] Muhammad Syukri Salleh. (1990). Mukadimah 1: Ke arah pembentukan konsep dan pelaksanaan pembangunan berteraskan Islam, in Muhammad Syukri Salleh (ed), *Konsep dan pelaksanaan pembangunan berteraskan Islam*, Pulau Pinang: Penerbit Universiti Sains Malaysia.
- [43] Muhammad Syukri Salleh. (2002). *Pembangunan berteraskan Islam*. Kuala Lumpur: Utusan Publications And Distributors Sdn. Bhd.
- [44] Muhammad Syukri Salleh. (2003). *7 prinsip pembangunan berteraskan Islam*. Kuala Lumpur: Zebra Editors Sdn Bhd dan Pulau Pinang: Projek Pengurusan Pembangunan Islam, Pusat Pengajian Sains Kemasyarakatan, Universiti Sains Malaysia.
- [45] Muhammad Syukri Salleh. (2009). Ke arah pengurusan pembangunan Islam, in Muhammad Syukri Salleh & Fadzila Azni Ahmad, (eds.) *Pengurusan pembangunan Islam: Prosiding seminar*. Pulau Pinang: Universiti Sains Malaysia Pulau Pinang.
- [46] Musse, S.R. & Thalman, D. (1997). A model of human crowd behaviour: Group inter-relationship and collision detection analysis. *Proceeding of Workshop Eurographics Computer Animation and Simulation 1997*.
- [47] Nabeel Koshak & Akram Nour (2013, July). Integrating RFID and GIS to support urban transportation management and planning of hajj. Paper presented in *The 13th International Conference on Computers in Urban Planning and Urban Management*, Utrecht, The Netherlands.
- [48] Osman Bakar (1991). *Tawhid and science: Essay on the history and philosophy of Islamic science*. Pulau Pinang: Secretariat for Islamic Philosophy and Science.
- [49] Panel Akademi Pengurusan YPEIM (2005). *Pengurusan dalam Islam menghayati prinsip dan nilai qurani*, Kuala Lumpur: Akademi Pengurusan YPEIM.
- [50] Ramli Awang (1997). *Tasawwur Rabbani menurut al-Qur'an dan al-Sunnah*. Kuala Lumpur: Al-Hidayah Publication.
- [51] Rasid Muhamad, Mohd Yadman Sarwan dan S.Salahudin Suyurno (2008). *Pengurusan Islam: Teori dan praktis*. Pusat Penerbitan Universiti (UPENA), UiTM.
- [52] Sharma, A. (2000). Crowd-behavior prediction using subjective factor based multi-agent system. *Proceedings of the 2000 IEEE International Conference on Systems, Man and Cybernetics*.
- [53] Shibani, A., Soetanto, R., and Ganjian, E. (2010). Identification of CSFs of TQM in the Libyan construction industry. *Proceedings of the Building a Better World CIB World Congress*, 'Building a Better World. CIB World Congress'. Held 10-13 May 2010 in Salford, UK. 281
- [54] Soo Cin Pin, Fazilah Haron, Siamak Sarmady, Abdullah Zawawi Talib & Ahamad Tajudin Khader. (2011). Applying TRIZ principles in crowd management. Retrieved on 20/4/2014 from *Journal Homepage:www.elsevier.com/locate/ssci*.
- [55] Syed Muhammad Naquib Al-Attas (1995). *Prolegomena to the metaphysics of Islam: An exposition of the fundamental elements of the worldview of Islam*. Kuala Lumpur: International Institute of Islamic Thought and Civilization (ISTAC).
- [56] Syed Muhammad Naquib Al-Attas (2001). *Risalah untuk kaum Muslimin*. International Institute of Islamic Thought and Civilization (ISTAC). <http://www.iium.edu.my/istac/pub.php>
- [57] Thorpe, B. & Sumner, P. (2004). *Quality management in construction*. Gower Publishing, Ltd.
- [58] Tricker, R. (2008). *ISO 9001:2000 for small business*. (3rd ed). Oxford: Butterworth-Heinemann.
- [59] Wan Norhaniza Wan Hasan. (2014). *Indeks pembangunan berteraskan Islam: Satu analisis konseptual*. Tesis Doktor Falsafah. Universiti Sains Malaysia. Tidak Diterbitkan.
- [60] Willar, D. (2012). *Improving quality management system implementation in Indonesian construction companies*. Unpublished doctoral thesis, Queensland University of Technology.
- [61] Yusuf al-Qaradawi. (1996). *Memahami keutamaan berasaskan al-Qur'an dan al-Sunnah*. Petaling Jaya: Angkatan Belia Islam Malaysia (ABIM).

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