Pertanika J. Soc. Sci. & Hum. 25 (S): 51 - 64 (2017)

PERTANIKA JOURNALS

SOCIAL SCIENCES & HUMANITIES

Journal homepage: http://www.pertanika.upm.edu.my/

Halal Culinary Tracking Application at Food Souvenirs Center Based on Analytical Hierarchy Process (AHP) Method

Sucipto Sucipto[1,2]*, Mas'ud Effendi[1], Mochamad Ulul Khilmi[1], Muhammad Arif Kamal[1], Aryo Pinandito[3] and Herman Tolle[3]

[1]Department of Agroindustrial Technology, Faculty of Agricultural Technology, University of Brawijaya, Malang, 65145 Jawa Timur, Indonesia
[2]Halal Qualified Industry Development (Hal-Q ID), University of Brawijaya, Malang, 65145 Jawa Timur, Indonesia
[3]Informatics Department, Faculty of Computer Science, University of Brawijaya, Malang, 65145 Jawa Timur, Indonesia

ABSTRACT

The food souvenir industry is important for tourism at Malang City. This city has become a famous tourism destination over the years which is well-known for its snacks and beverages, such as fruit chips, fruit juices and dairy products. However, information on their products for halal status is limited. On the other hand, the number of tourists who care about halal products is increasing. Therefore, this study has developed a halal culinary tracking (HCT) application to facilitate the search for halal certified souvenir products. The priority factor and the best strategy for its application are investigated. An analytical hierarchy process (AHP) was conducted to analyse content, design, organisation, user-friendly and accessibility of the HCT. The results showed that user-friendly attribute has the highest point (0.423). This attribute became priority in the development of HCT application, because with the easiest operation and appropriate information, the application will be more acceptable for users. The alternative strategy having the highest point was easy to access (0.249). Easy accesses to an application will have a positive impact on its usage.

Keywords: **A**nalytical hierarchy process, ease of access, food souvenir, halal culinary tracking, tourism

ARTICLE INFO

Article history:
Received: 1 March 2017
Accepted: 23 November 2017

E-mail addresses:
ciptotip@ub.ac.id (Sucipto Sucipto)
mas.ud@ub.ac.id (Mas'ud Effendi)
mochamadululkhilmi@gmail.com (Mochamad Ulul Khilmi)
muhammadarifkamal@gmail.com (Muhammad Arif Kamal)
aryo@ub.ac.id (Aryo Pinandito)
emang@ub.ac.id (Herman Tolle)
* Corresponding author

INTRODUCTION

In recent years, food souvenirs have become a craze in tourist destinations. Malang is a tourist destination which is famous for its chips. However, many of the food souvenirs sold there do not have halal certifications

ISSN: 0128-7702

whereas most Muslim tourists demand halal products. According to Marzuki, Hall and Ballantine (2012) Muslims must only eat halal food and abstain from prohibited food (haram). Halal food is permissible food that can be consumed with no doubt by Muslims in accordance with Islamic law (Samori, Ishak, & Kassan, 2014). According to Henderson (2016), and Bonne and Verbeke (2008) halal food is food that is permissible and may be obtained by way of purchase using halal earnings. Halal accreditation is considered as the benchmark for food safety, quality assurance and has many benefits both for Muslims and non-Muslim consumers (Baharuddin, Kassim, Nordin, & Buyong, 2015). Food is an important part of tourism industry with more than 25% of total tourism expenditures (Ardabili, Rasouli, Daryani, Molaie, & Sharegi, 2011). Many food souvenirs do not have halal certification, thus, consumers face difficulty in choosing products with halal certification. This is due to lack of awareness among food manufacturers and producers on the importance of halal certification

Recently, the Assessment Institute for Food, Drugs and Cosmetics, the Indonesian Council of Ulama (LPPOM-MUI), proposed an instrument to find halal products by scanning barcodes found in product packaging. Additionally, the development of information communication technology, especially mobile applications, enable customers to the information needed. One of the mobile applications which are often used by users is any application related to information on travel and culinary, and can be downloaded using Play Store, App Store and Windows Phone App. These applications include information on culinary tourism destinations in Indonesia. However, majority of these applications do not display the travel and culinary destinations that have been halal certified, especially for Indonesia. The only halal certification body in Indonesia is LPPOM MUI.

This research developed an android based mobile application which does not only provide information on tourist destinations and culinary, but also information about halal food. This application is called Halal culinary tracking (HCT) and evaluated using Analytical Hierarchy Proses (AHP) based on the Technology Acceptance Model (TAM). TAM method can explain the major factors that influence the individuals to accept a technology (Serenko & Bontis, 2004). This technology acceptance is determined by an individual's behaviour against use of technology (Kulviwat, Bruner II, Kumar, Nasco, & Clark, 2007). Perceived motivation by users to try the new technology can be explained by two variables, namely ease of use and usefulness (Davis, 1989). On the other hand, the AHP method was used to improve business performance (Cheng, Li, & Ho, 2002), evaluation of CMMS software (Braglia, Carmignani, Frosolini, & Grassi, 2006), and digital library with ease of use; good interface was the critical point for improvement of this software (Lai, Chiu, Huang, Chen, & Huang, 2014).

The HCT application was developed to find halal certified products as an alternative to barcode scanning and SMS notifications.

Tracking refers to the ability for tracking food and food ingredients throughout production chain. Tracking can be used to find and recall products that might present a serious risk to consumer health (Zailani, Arrifin, Wahid, Othman, & Fernando, 2010). Sucipto et al. (2017) evaluated acceptance of HCT application among sharia hotels and halal restaurants.

In the present study, the AHP method based on expert judgment on HCT application was adopted. Expert judgment is required to provide an assessment of several key factors and alternative development strategies to subscribe to mobile applications. The AHP method was selected due to its ability to break down a complex problem become easier to understand (Sipahi & Timor, 2010). A uniform test was applied where weights of each level are calculated against the total goal, and decisions are made based on calculation of results through a combination of different evaluation models (Saaty, 2008). According to Gass and Rapcsák (2004), AHP was used to solve complex problem that can be decomposed in a hierarchical structure, where each of the levels is divided into specific elements. The main objective has been given top priority; the criteria, attributes, sub-attributes and the decision alternative are listed in descending order of the hierarchy. Based on the AHP method, the present study is aimed at obtaining the priority factors and the best alternative to develop HCT application through experts' judgment.

METHODS

Time and Place of Research

This research adopted a survey method and interviews were conducted among tourism officials, cooperatives and small and medium enterprises (SMEs), public health officials in Malang, East Java, Indonesia on September 2015 to January 2016. Data was processed at Laboratory of Computational and Systems Analysis, Department of Agro-industrial Technology, Faculty of Agricultural Technology, Brawijaya University.

Scope of Problem

This research focused on SMEs who promote food souvenirs in Malang and developed HCT to improve tracking of halal food souvenirs SMEs there.

Identification of Factors and Alternative Strategies

Identification of factors are important to determine the effect of alternative strategies. Structural diagram mapping was used to outline the factors and to explain the AHP linkage between factors and alternative strategies. The factors and alternative strategies were developed based on the various problem that occurred in the development of HCT application in food sector SMEs based on TAM method (see Table 1).

Determining Respondents

Respondents of this study were selected using invitation judgment sampling, a technique

Table 1
Factors and alternative strategies

Factors	Alternative Strategies
Content	• Displaying products price
Design	• Displaying product images
Organisation	• Provide a column of expired products
User-friendly	• Navigation of the site
Accessibility	• Add two features language • Ease of access • Add field ratings and use reviews

based on the criteria of researchers. The five respondents of this research were experts from Tourism Officials, Cooperatives and SME Official, Public Health Official in Malang, East Java, Indonesia and the chairman of group SMEs of Malang.

Designing Questionnaire

The questionnaire was designed to assess weight of criteria that influence the development and then analysed using AHP. Each criterion was weighted using pair wise comparison scale as in Table 2.

Analytical Hierarchy Process (AHP) Method

This section looks at the priority level of alternatives of HCT application based on AHP method using Criteria Decision Plus software. Random index value varies in accordance with the matrix order as shown in Table 3.

Value of consistency ratio (CR) which is smaller than or equal to 0.1 has a good level of consistency and accountability (Saaty, 1983). The CR value is a measurement of

Table 2
Pair wise comparison scale

Score	Information
1	Alternative A as important as Alternative B
3	A is a little more important than B
5	A is clearly more important than B
7	A is very obviously more important than B
9	A is absolutely more important than B
2,4,6,8	When hesitating between two adjacent values

Source: Bayazit (2006)

Table 3
Random Index (RI) Matrix

Matrix order	1	2	3	4	5	6	7	8	9	10
Random index	0	0	0.58	0.90	1.12	1.24	1.32	1.41	1.45	1.49

Source: Saaty (1983)

consistency of pair wise comparison matrix based on opinions.

RESULTS AND DISCUSSION

Overview HCT Application

The HCT application is designed to allow Muslims to access halal food, particularly in tourism destinations. The application is based on tracking or showing the location of tourism destinations. The information provided is related to food souvenirs, restaurants, caterings, hotels, mosques, and tourism attractions that educate society. It contains brief information and review of the product, store opening time, address, phone number, price, image, location, and number of halal product certification.

Figure 1 and Figure 2 show samples of city, object selection, tracking from user location to object in maps display.

The HCT application has Google map services that is directly connected to the application when the user selects the object destination. Google map helps users to find

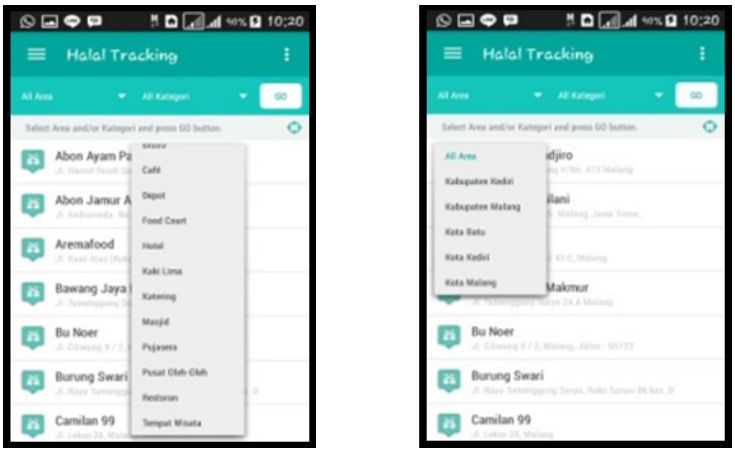

Figure 1. City selection and destination category

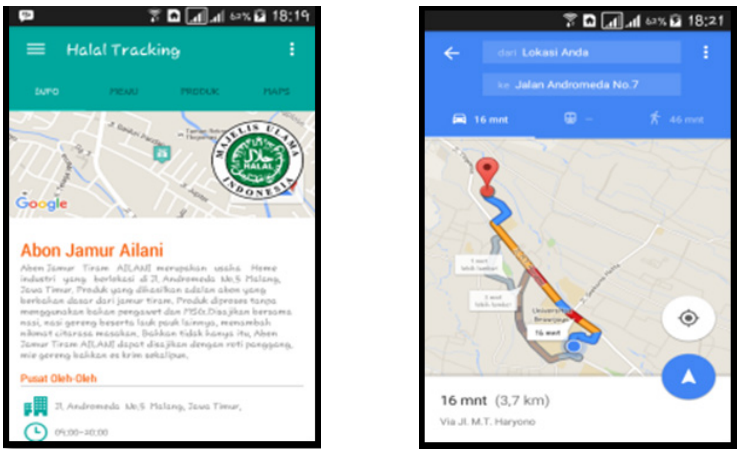

Figure 2. Destination information and map display in HCT application

the object destination while travelling to tourist destinations. The map icons help users to find their desired locations.

Malang City Profile

Malang is the second largest city in East Java, after Surabaya. It is located about 83 km from Surabaya with a height of 440-667 meters above sea surface. Malang was known as the Paris of Java during Dutch colonial era. It has a tropical climate, and there are 2 seasons - with an average temperature of 22.7-25.1^{o}C and a maximum temperature of 32.7^{o}C. The weather is generally cooler compared with other metropolis, and the people are hospitable (Anonymous, 2016).

Malang offers nature and shopping tours, handicraft, cultural, culinary and food souvenirs. Food souvenirs in Malang are strong attraction and there is a famous centre for food souvenirs. Travellers can choose from a variety of food souvenirs, especially *tempe* chips and fruit chips (Anonymous, 2016).

Halal Food Souvenir Industries in Malang

Malang has natural resources to support the agroindustry. The famous ones include *tempe* and *tempe* chips, processed mushrooms, processed fruits and processed milk. Halal certified food souvenir in Malang is still limited. This could be due to the lack of awareness among business managers and producers on halal certification. Today, halal food is very important because majority (80%) of Indonesians are Muslims.

Halal food refers to Islamic methods of sourcing and preparing food of animal origins. Therefore, halal material certification and production are important for Muslims. Due to globalisation, processed foods are imported from abroad and thus, halal certification of various materials and processed products is managed by LPPOM-MUI, established 23 years ago. Regional MUI of Malang provides *halal promise certificate* based on producer commitment to produce halal product through a restricted assessment. Table 4 and Table 5 show samples of halal food souvenirs certificate from LPPOM MUI and halal food souvenirs promise certificate from Regional MUI of Malang.

It is evident from the information above halal certification is still limited. On the other hand**,** there are numerous products that have acquired *halal promise certificate*, but which are sufficient to guarantee their halal status. LPPOM MUI halal certification conducts detail audit using Halal Assurance System (HAS) series. Products are also tested in the laboratory if required. On the other hand, the *halal promise certificate* was based on the recognition of producers without detailed audit. Thus, *halal promise certificate* is cheaper than halal certificates from LPPOM MUI.

Strategies Priority Identification of HCT Application Development with AHP Method

The strategic priority determination of HCT application development in Malang was conducted using AHP. The results are based

on questionnaire, and Criterion Decision Plus Software obtained consistency ratio (CR) and the weight of each factor and alternative strategy. Respondents rated consistently if the CR is smaller than or close to 0.10. If the CR is of more than 0.10, then the respondents with less consistency should be 'repaired'. According to Saaty (2008), logical consistency in AHP is a rational principle which means that the thought or similar objects are grouped in accordance with their homogeneity and relevance as well as the relationships between objects based on specific criteria justifying each other logically. The CR values of respondents are shown in Table 6.

Consistency ratio value of each level is less than 0.1, so each level is consistent and should not be replaced.

Table 4
Samples of food souvenirs that acquired halal certificate from LPPOM MUI in Malang

No.	Name	Address	Product
1	Ailani Shredded Mushroom	Andromeda Street No. 5 Malang	Shredded Mushroom
2	Arema food	Kawi Atas Street 43 C Malang	Various Chips
3	Camilan 99	Lekso Street 20, Malang	Various Chips
4	"Sahabat" Processed Catfish	Klayatan Street Gang 2 No. 18 Malang	Processed Catfish
5	Pao Telo	Terusan Borobudur Street 80	Pao Telo
6	Star Candy Lollipop	Bandulan Street Gang 4 Malang	Lollipop Candy

Table 5
Samples of food souvenirs that acquired "halal promise certificate" from LPPOM MUI in Malang

No.	Name	Address	Product
1	Bawang Jaya Makmur	Tumenggung Suryo Street 24 A Malang	Various Chips
2	Bu Noer	Ciliwung Street 2 Malang	Various Chips
3	Burung Swari	Tumenggung Suryo Street, Sanan Shop 86	Various Chips
4	Caprina	Tlogomas Street No. 45	Various Chips
5	Cak To Meatball Chips	Bogor Street No. 1 Malang	Meatball Chips
6	Padjiro Chicken Shredded	Hamid Rusdi Street Gang V No. 413 Malang	Chicken Shredded
7	Kotak Ketjil	Bendungan Jati Luhur Street 38 Malang	Fresh Snack
8	Kentang Chips	Raya Bukit Berbungan Street 55	Special Snack
9	Kue Gaya Baru	Soekarno Hatta Street D-508 Kav 2	Bread and Cake
10	Ledre Pisang Bangka	Bangka Street 35 Malang	Banana Ledre
11	Murni Sari	Soekarno Hatta Street Malang (in front of the fuel station)	Special Snack
12	Pie Apel Malang	Tumenggung Suryo Street No. 908 Malang	Apple Pie
13	Pia Mangkok	Soekarno Hatta Street PTP II No. 1	Bakpia
14	Pie Apel	R. Tumenggung Suryo Street No. 90 B	Apple Pie
15	Rahayu	R. Tumenggung Suryo Street No. 31	Various Chips
16	Sanan Intan Jaya	Tumenggung Suryo Street 81 A Malang	Various Snack

Table 5 *(continue)*

No.	Name	Address	Product
17	Sananta	Tumenggung Suryo 112 Malang	Various Snacks
18	So Kressh	Polowijen Street Gang 2 No. 359 Malang	Various Chips
19	Toko Mayla Jaya	Sanan Street No. 25 Malang	Tempe Chips
20	Wicaksono	Candi Agung Street II/1	Various Chips

Table 6
Consistency Ratio (CR) expert respondents

Objectives, Factors, and Alternatives	Consistency Ratio (CR)
Development Strategies	0.009
Content	0.010
Design	0.016
Organisation	0.006
User-friendly	0.028
Accessibility	0.018

Priority Development of Halal Culinary Tracking Application

Based on the assessment obtained at criteria level 1 (factor), the development of HCT application is shown in Table 7. The priority factors of HCT application are user-friendly (0.423), accessibility (0.156), content and organisation (0.142), and design (0.135). User-friendly is the first priority in strategic development of HCT application. Applications which are easy to operate and give clear and relevant information are preferred by users.

The main issue in developing an interactive mobile application is its usability. The principles of usability are measured in three common attributes; effectiveness, efficiency and satisfaction. Other attributes, such as cognitive load, tend to be overlooked in the usability models that are most prominent despite their likely impact on the success or failure of an application (Harrison, Flood, & Duce, 2013). People at the centre of mobile application development (PACMAD) identify three factors which can affect the overall usability of a mobile application: User, Task and Context of use.

Mobile application based on user interface (UI) should consider the content design and organisation in order to support the usability of the application. The overall design of mobile application will affect how the user will interact with the technology (Harrison et al., 2013). Thus, mobile user interface should consider the application content such as effectiveness of user functions, consistency related to user interface and interaction method, information related to clear and concise understanding and efficiency that allow users to perform quick function. The organisation attribute should consider directness related to user feeling to direct manipulation,

simplicity that allows user to intuitively understand and recognise the functional task and learnability related to easy applicability. The last, feature design, should consider familiarity of product display and minimise user effort in executing tasks (Park, Han, Kang, Park, & Chun, 2011).

Table 7
Priority factor of HCT application development

No.	Criteria Level 1	Priority Vector	Priority
1	User-friendly	0.423	1*
2	Accessibility	0.156	2
3	Content	0.142	3
4	Organisation	0.142	4
5	Design	0.135	5

User-friendly is related to ease of use of application. Users that find it easy to use and operate application would use this program as reference to buy food souvenirs in tourism destinations. An interactive application can allow for easy reference and operation (Kwon, Bae, & Blum, 2013; Park et al., 2011). Another definition describes ease of use as the degree that people believe using a new technology will reduce their efforts (Davis, 1989). According to Venkatesh and Bala (2008), the six determinants of ease of use were: new technology self-efficacy, external control, objective usability, computer playfulness, perceived enjoyment, and computer anxiety. Self-efficacy relates to personal beliefs and whether a person has the ability to use a new system. Perceived enjoyment explains that the activity of a new technology is perceived to be enjoyable. Computer anxiety describes the fear people experience.

Mobile internet technology increasingly facilitates access and flexible. For example, technology users easily perform financial transactions, ordering goods and services on time, as well as other activities (Wang & Wang, 2010). Technology users also could encourage the development of mobile technology for non-profit organisations, or to build profit-oriented applications to reach potential consumers (Kwon et al., 2013).

Priority Alternative Strategies of HCT Application Development

Seven alternative strategies development of HCT application are shown in Table 8. Expert respondents (0.249) suggest ease to access of mobile application, namely user flexibility to get information from anywhere and any place or devices (Wang & Wang, 2010) as the main advantage. The next strategic priority is site navigation (0.188). Site navigation allows users to easily move from one attribute to the another within an application (Zhao & Dholakia, 2009). The third priority related to strategic alternative is ratings columns and user reviews (0.122). This alternative strategy allows users to recognise and memorise then enhance the information on halal culinary destination (Park et al., 2011). The fourth strategic alternative shows image product attribute (0.114). This allows user to get more detailed information on product attribute. This attribute also allows the other stakeholder (SMEs') to promote their products and services. The last two attributes, language feature and displays product prices (0.110), and expiration (0.107) are considered as

additional information. Figure 3 shows strategy development hierarchy of HCT Application.

Based on Table 8, the highest priority of alternative strategy was easy of access, which is very important as a goal to make the application user friendly. This application is designed in a certain way so that all users have equal access to information and functions (Manasra, Zaid, & Taher Qutaishat, 2013).

Table 8
Priority strategic alternatives of HCT application development

No.	Criteria Level 1	Priority Vector	Priority
1	Easy to Access	0.249	1*
2	Site Navigation	0.188	2
3	Ratings Columns and User Reviews	0.122	3
4	Show Images Product (Product Image Layout)	0.114	4
5	Two Language Features	0.110	5
6	Product Prices	0.110	5
7	Expiration	0.107	6

Acceptance and Improvement of HCT Application

The aims of HCT application are to provide halal information, market place promotion of SMEs and to ensure it is more convenient and practical for people to get halal products. The most expected outcome of the application is its user acceptance. Based on the five factors analysed, these expert respondents chose the ease of access as the most important factor. Application must be easy to access and easy to use. Perceived ease of use positively affects the perception of the usefulness of an application (Kwon et al., 2013). Display features of HCT application need to be repaired to give the user's convenience. Information updates are needed periodically in order to provide accurate information. In addition to ease of access, expert respondents also highlighted accessibility, for example Play Store as distribution channel.

Expert respondents expect this application to become the people's choice so that domestic and foreign tourists can obtain information on halal products. It has implications for businesses to deliver information on their products to the general public. This application is expected to be introduced and launched as soon as possible, so it provides information to the public and provides benefits for business owners.

There are expert respondents who provided feedback on enhancing the HCT application. The public health officials advise sorting out LPPOM MUI halal certificate and *halal promise certificate* to ensure clarity. Tourist officials suggested changing appearance of the application to become more attractive and interesting for user to use it. Cooperatives and SMEs Official advised to display price of products so that consumers can choose their purchase based on their affordability. Chairman of

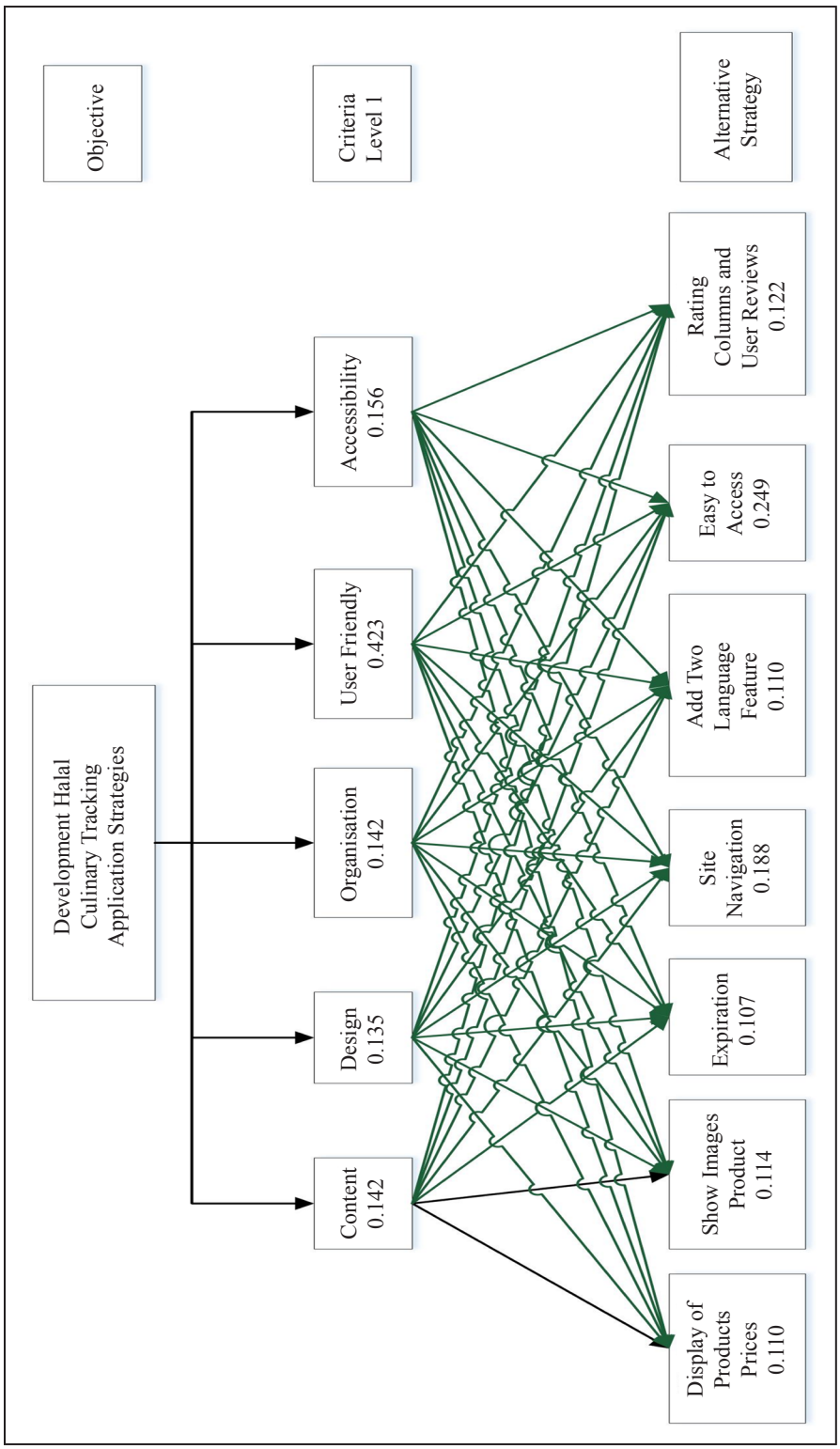

Figure 3. Strategy development hierarchy of HCT application

Malang SMEs community suggested that the image display products that are more interesting. Each dominant food souvenirs centre was expected to become an icon in HCT application which can increase the demand of these products. This feedback is very important to develop HCT application.

CONCLUSION

The development of HCT application in Malang was undertaken using AHP method. Factor and alternative strategies development score of HCT application are as follows: The first priority factor to develop HCT application is user-friendly with a weight of 0.423. The highest priority of alternative strategy to develop HCT application is ease of access with a weight of 0.249. These results support those of Wang and Wang (2010), and Lai et al. (2014).

Some suggestions for HCT application developments are:

(1) Improve application because it has less functional searching feature, so that it would be better and easier to use in public.

(2) Display features innovation, such as icon of SMEs product, as icon in HCT application and change icon image to a more attractive one, so the application is able to compete with similar applications.

(3) Further research is expected can improve the initial appearance of the application and make it easier to use for greater efficiently.

REFERENCES

Anonymous. (2016). *Geografis of Malang city*. Retrieved from http://malangkota.go.id/sekilas-malang/geografis/

Ardabili, F. S., Rasouli, E.-h., Daryani, S. M., Molaie, M., & Sharegi, B. (2011). The role of food and culinary condition in tourism industry. *Middle-East Journal of Scientific Research, 9*(6), 826-833.

Baharuddin, K., Kassim, N. A., Nordin, S. K., & Buyong, S. Z. (2015). Understanding the halal concept and the importance of information on halal food business needed by potential Malaysian entrepreneurs. *International Journal of Academic Research in Business and Social Sciences, 5*(2), 170-180.

Bayazit, O. (2006). Use of analytic network process in vendor selection decisions. *Benchmarking: An International Journal, 13*(5), 566-579.

Bonne, K., & Verbeke, W. (2008). Religious values informing halal meat production and the control and delivery of halal credence quality. *Agriculture and Human Values, 25*(1), 35-47. doi:10.1007/s10460-007-9076-y

Braglia, M., Carmignani, G., Frosolini, M., & Grassi, A. (2006). AHP-based evaluation of CMMS software. *Journal of manufacturing technology management, 17*(5), 585-602.

Cheng, E. W., Li, H., & Ho, D. C. (2002). Analytic hierarchy process (AHP) A defective tool when used improperly. *Measuring Business Excellence, 6*(4), 33-37.

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly, 13*(3), 319-340. doi:10.2307/249008

Gass, S. I., & Rapcsák, T. (2004). Singular value decomposition in AHP. *European Journal*

of Operational Research, 154(3), 573-584. doi:http://dx.doi.org/10.1016/S0377-2217(02)00755-5

Harrison, R., Flood, D., & Duce, D. (2013). Usability of mobile applications: literature review and rationale for a new usability model. *Journal of Interaction Science, 1*(1), 1-16. doi:10.1186/2194-0827-1-1

Henderson, J. C. (2016). Halal food, certification and halal tourism: Insights from Malaysia and Singapore. *Tourism Management Perspectives, 19*, 160-164. doi:http://dx.doi.org/10.1016/j.tmp.2015.12.006

Kulviwat, S., Bruner II, G. C., Kumar, A., Nasco, S. A., & Clark, T. (2007). Toward a unified theory of consumer acceptance technology. *Psychology and Marketing, 24*(12), 1059-1084.

Kwon, J. M., Bae, J. I., & Blum, S. C. (2013). Mobile applications in the hospitality industry. *Journal of Hospitality and Tourism Technology, 4*(1), 81-92.

Lai, C.-F., Chiu, P.-S., Huang, Y.-M., Chen, T.-S., & Huang, T.-C. (2014). An evaluation model for digital libraries' user interfaces using fuzzy AHP. *The Electronic Library, 32*(1), 83-95.

Manasra, E. A., Zaid, M. K. S. A., & Taher Qutaishat, F. (2013). Investigating the impact of website quality on consumers' satisfaction in Jordanian telecommunication sector. *Arab Economic and Business Journal, 8*(1), 31-37. doi: http://dx.doi.org/10.1016/j.aebj.2013.11.004

Marzuki, S. Z. S., Hall, C. M., & Ballantine, P. W. (2012). Restaurant managers' perspectives on halal certification. *Journal of Islamic Marketing, 3*(1), 47-58.

Park, W., Han, S. H., Kang, S., Park, Y. S., & Chun, J. (2011). A factor combination approach to developing style guides for mobile phone user interface. *International Journal of Industrial Ergonomics, 41*(5), 536-545. doi: http://dx.doi.org/10.1016/j.ergon.2011.04.002

Saaty, T. L. (1983). Priority setting in complex problems. *IEEE Transactions on Engineering Management, EM-30*(3), 140-155. doi:10.1109/TEM.1983.6448606

Saaty, T. L. (2008). The analytic hierarchy and analytic network measurement processes: Applications to decisions under risk. *European Journal of Pure and Applied Mathematics, 1*(1), 122-196.

Samori, Z., Ishak, A. H., & Kassan, N. H. (2014). Understanding the development of halal standard: Suggestion for future research. *International Journal of Social Science and Humanity, 4*(6), 482-486.

Serenko, A., & Bontis, N. (2004). A model of user adoption of mobile portals. *Quarterly Journal of Electronic Commerce, 4*, 69-98.

Sipahi, S., & Timor, M. (2010). The analytic hierarchy process and analytic network process: An overview of applications. *Management Decision, 48*(5), 775-808.

Sucipto, S., Subhekti, A., Effendi, U., Kamal, M. A., Pinandito, A., & Tolle, H. (2017). *Development strategy of halal culinary tracking application on halal restaurant and sharia hotel in Great Malang, East Java, Indonesia.* 1st International Halal Tourism Congress. Alanya, Turkey.

Venkatesh, V., & Bala, H. (2008). Technology acceptance model 3 and a research agenda on interventions. *Decision Sciences, 39*(2), 273-315. doi:10.1111/j.1540-5915.2008.00192.x

Wang, H.-Y., & Wang, S.-H. (2010). Predicting mobile hotel reservation adoption: Insight from a perceived value standpoint. *International Journal of Hospitality Management, 29*(4), 598-608. doi: http://dx.doi.org/10.1016/j.ijhm.2009.11.001

Zailani, S., Arrifin, Z., Wahid, N. A., Othman, R., & Fernando, Y. (2010). Halal traceability and halal tracking systems in strengthening halal food supply chain for food industry in Malaysia (A Review). *Journal of Food Technology, 8*(3), 74-81.

Zhao, M., & Dholakia, R. R. (2009). A multi-attribute model of web site interactivity and customer satisfaction: An application of the Kano model. *Managing Service Quality: An International Journal, 19*(3), 286-307.