The Influence of Artificial Intelligence to Support Halal Tourism Policy in South Korea

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Abstract.
This study focuses on the influence of Artificial Intelligence in the form of application (software) supporting South Korea’s halal tourism policy. Specifically, this study analyses the types of correlations between the software and the implementation of halal tourism policies in South Korea. This illustrates the influence of applications on users as Muslim tourists in South Korea. Thirty applications were randomly selected, and data were collected from Google Play Store devices through Android for the period between 2010-2020. In this study a qualitative approach was applied, and literature study was chosen to examine the data. Indicators available on the Google Play Store was used, complemented by the criteria of halal tourism collected by the authors from various sources. Based on these indicators, the results of the analysis revealed that more than 50 percent of the mentioned applications were helpful for users (Muslim tourists) led to a conclusion that artificial intelligence supports the implementation of halal tourism policies in South Korea.

Keywords: South Korea, Halal Tourism, Policy, Artificial Intelligence, Influence

1. Introduction
Today is a digital era, when technology has penetrated into almost all fields, including halal tourism [1]–[3]. Technology is continually developed and improved, most people including tourists cannot be separated from it. Moreover, it is equipped with smart technology or Artificial Intelligence which proves the sophistication of today's technology in supporting humans’ life. Computers, laptops, mobile phones / gadgets, internet, social media, and various applications are used in people’s activities all over the world with all professions and almost all fields, including tourists and Muslim tourists. In the past when technology was not as sophisticated as it is now, if Muslim people travelled, they were busy carrying maps and guidebooks for halal tourism. But now all these facilities are available in their gadgets. Through gadgets, they can find out any information related to their tourist destinations through the internet or the downloaded applications either through the App Store for iPhone or Android using the Google Play Store. Muslim tourists will be able to access and find out which destinations have complete access and facilities for Muslim tourists who are traveling by carrying out their beliefs according to Islamic law [4]. The times when travel agents choose the tourist route at the office seems an old way now.

Following the development of existing technology, South Korea also uses artificial intelligence in implementing this halal tourism policy. One of them is creating applications related to halal tourism, providing virtual reality, and inventing robots that can move and talk to tourists who come to South Korea.
According to this phenomenon, the authors are interested to further analyse the relationship between artificial intelligence, especially related to applications with halal tourism in South Korea. Whether the relationship creates positive or even a negative effect. For this reason, a problem statement raises, “Does Artificial Intelligence (AI) in the form of an application (software) supporting halal tourism policy help its users, especially Muslim tourists who come to South Korea?”

2. Methods

In this research, the authors collected data at the Universitas Muhammadiyah Yogyakarta and South Korea. The focus of this research is on the influence of artificial intelligence in supporting South Korea’s halal tourism policy. South Korea was chosen based on several reasons. Besides being a country with a minor Muslim population, this country was chosen because of the consideration that it continually introduces halal tourism, which is not only limited to state policies, but also promotion. This paper is descriptive qualitative by collecting 30 random samples of applications (software) which met the criteria to support halal tourism policy in South Korea according researcher from Google Play Store via Android. Sources of data used in the analysis come from secondary data, including literature studies, research, articles, journals, e-books, books, reports, magazines, notes, newspapers and agendas.

3. Basic Theory

3.1. Artificial Intelligence Application in Halal Tourism Sector

The tourism industry has undergone a transformation in response to social, political, and economic changes such as increasing pressure on pension systems in developed countries, negative population growth in developed countries, the increasingly role of robots and artificial intelligence in the critical service and resource industries [5]. Artificial intelligence systems, especially those powered by machine technology, can achieve significant results by rapidly eliminating large data sets, to determine structural changes in both consumer behaviour models and marketing strategies [6]. In the new digital era, AI works together with human feelings and intelligence, offering customers comfortable interactions both online and offline, to increase efficiency, productivity, and better understanding of services [7].

Artificial intelligence (AI) changes the rules of the game in many industries. The combination of opened innovation and artificial intelligence generates new opportunities in the tourism sector through searching tools, social platforms and cognitive interfaces to make smart decisions [8]. Many companies from the travel, tourism and hospitality industries start to adopt Robots, Artificial Intelligence and Service Automation Technologies (RAISA) in their operations like self-check-in counters, robotic pool cleaners, delivery robots, concierges robots, chatbots, etc. which changes the way they create and deliver services [9]. Behavioural dynamic client segmentation, supported by artificial intelligence and machine learning, provides a better understanding of client needs that helps develop new segments with innovative solutions [10]. The tourism industry influenced by AI such as various smart systems and chatbots are used in travel agencies and air transport companies increases efficiency in every industrial sector [11]. Technology-empowered tourism experiences increasingly support tourists to co-create value at all stages of the journey [12].

In the world of digital marketing, it is important to obtain information to meet customer needs for example information from users who have posted on different websites like Google Play Store where they express their opinions about the application [13]. Google Play Store users frequently refer to other people’s opinions before downloading an application. The reputation of an application can depend entirely on this rating thus users review is very attractive to be analysed by application owners to make decisions in the future [14].

In the literature study above, it shows that there have been many previous references that discuss artificial intelligence in the tourism industry. Most of them discussed the benefits and purposes of using an artificial intelligence, especially for players in the tourism industry. However, only a small amount of literature about artificial intelligence in the halal tourism sector. Although some discussion about Google Play Store is already exist, but the scope of discussion is different from the author’s perspective.
Most discussion about Google Play Store relates to sentiment analysis. It is rare to find a study about Google Play Store whether it affects a policy or no. Especially, its use to support halal tourism policy in South Korea, whether it helps the users or no.

4. Findings and Discussion

Muslim tourists who will travel to South Korea and use gadgets to help them, are automatically considered interact with AI whether they realize it or not. Various applications are made related to halal tourism in South Korea usually will be connected to maps to find out the fastest route. It is possible because of AI technology in the machine. AI can also collect data from everyone’s online habits and determine what is suitable for that person. For example, a halal tourism application can provide recommendations for prayer rooms or halal restaurants as what Muslim tourists look for. Furthermore, the results of the analysis are used as a benchmark to find similar places which are then presented in the form of a list of recommendations for the places they should visit.

AI can also be applied to simplify the experience of shopping for halal foods, for instance Halal Scan. If we find foods but also doubtful about the halal status because the ingredients are written in Korean or Chinese language, we only need to take a picture of the item and upload it to the Halal Scan application. The AI will process the image and explain whether the food is halal or not. In that way, we save time from typing the name of the item and looking for it one by one from the searching results that appear.

Halal travel applications use technology and learning machine to offer recommendations based on consumer reactions, interests, preferences, and behaviour to enhance the customer experience in the travel industry that can satisfy customers. The application also significantly increases customers’ engagement through learning machine and Artificial Intelligence to recommend places to go, helping customers find new ways and make unforgettable journeys while keeping the Islamic law easy. AI takes all the customer’s past behaviour, web searches, interactions, and everything the customer did while the customer was in the application, then adapts the experience which Muslim customers look for. The only goal of AI here is to make the app so appealing and addicting, that customers will feel satisfied and come back to use the app when they travel.

### Table 1. The Applications related South Korea’s Halal Tourism.

| No | Name/Offered by | Rating | Review | Download Size | Users | Feature |
|----|----------------|--------|--------|---------------|-------|---------|
| 1  | Halal Korea/ Federasi Konsumen Korea Halal | - | - | 12.05MB | 1000+ | Travel, Food Scanner (food barcode), Community, Business, Qibla, Prayer, Nearby, Restaurant, K-Wave, Brand |
| 2  | i Tour Seoul/ Seoul Metropolitan Government | 4.1 | 1.093 (dominant positive) | 79.33MB | 500,000+ | Top 10 Tourist Attraction, Recommended Travel Tours, Show Ticket & Hotel Reservations, Transportation Information, Nearest Restaurant/bus station, Seoul Drama Location Tours, Fidow in Hallyu Star Footsteps, Maps, Guidebook |
| 3  | Visit Korea: Official Guide/ KTO | 3.5 | 1.663 (dominant positive) | 36.76MB | 100,000+ | Hotel, Restaurant, Supermarket, Course Institute, Smart Navigation, Spot Near Me, Themed Travel, Happy Wi-fi |
| 4  | Mufko-Muslim Friendly Korea / Travel information/ ANDA | 4.8 | 34 (dominant positive) | 10.57MB | 100+ | Halal Restaurant, Prayer Spot, Qibla, Prayer Time |
| 5  | Crave Halal | 4.4 | 162 (dominant positive) | 19.65MB | 10,000+ | Halal Restaurant (Halal Information, Working Hours, Location, Picture & Restaurant Reviews) |
| 6  | Have Halal Will Travel (HHWT) | - | - | 9.38MB | 1,000+ | Restaurant, Hotel, Mosque |
| No. | Application Name                                           | Rating | Size (MB) | Total Downloads | Description                                                                 |
|-----|------------------------------------------------------------|--------|-----------|----------------|-----------------------------------------------------------------------------|
| 7   | Irhal Halal Travel City Guide                             | 4.1    | 45.72MB   | 10,000+        | Restaurant, Hotel, Mosque, Prayer Time                                     |
| 8   | 1330 Korea Travel Hotline/ KTO                            | 4.6    | 5.43MB    | 5,000+         | Travelling recommendation, translation service, tourists centre            |
| 9   | Ozar/KTO                                                   | 3.8    | 10.02MB   | 100,000+       | Audio Guide, Photos, Script, Map, Sharing, Widget                        |
| 10  | Korea Travel SMART TOUR KOREA                             | 4.8    | 47.47MB   | 10,000+        | Cultural Attractions, Nearby Information, Translator, GPS, Local Weather Information, Currency Converter, Accommodation, Restaurants, Events & Performances |
| 11  | Korea Travel Guide/ Travel to Apps                        | 4.3    | 1.87MB    | 10,000+        | Information on Attractions, Hotels, Restaurants, Nightlife, Travel Tips, Security, Vaccines, Embassies, Telephone Numbers, Visa Requirements |
| 12  | Tour Korea: Quick Guide/Official KTO                      | 5.0    | 3.86MB    | 1,000+         | Tour Information                                                          |
| 13  | Halal Trip Korea: Food, Resto/ Monster Labs               | 2.9    | 16.21MB   | 5,000+         | Halal Restaurants, Mosques, Prayer Times                                  |
| 14  | Visit Jeju/Tour Jeju Tourism Organization                 | 4.5    | 2.16MB    | 100,000+       | Informasi Wisata, Komentar, Berita, Restoran                             |
| 15  | Whatzdn/ANDA                                              |        | 52.46MB   | 50+            | Scan, Check, Eat                                                          |
| 16  | Jadwal Sholat Korea Selatan/ Mazen Dev                    | 4.8    | 11.18MB   | 10,000+        | Adzan, Prayer Times, Qur'an, Qibla, muslim prayers                       |
| 17  | Baewon Mart/ Umeed Pro                                    | 3.8    | 19.98MB   | 100+           | Promotions, Coupons, Need Something that we do not Have, Payment, Push Notifications |
| 18  | Halal Korea Consumers Union                               | 3.6    | 41.33MB   | 10,000+        | Protection of Muslim Consumer Rights, Halal Product Monitoring, Korean Halal Culture Promotion |
| 19  | Discover Seoul Pass/Seoul Metropolitan Government          | 3.1    | 66        | -              | Attractions, Tourism Information                                           |
| 20  | Visit Busan/Busan Metropolitan City, Korea                |        | 2.74MB    | 100+           | Attraction, Festival, Travel, Restaurant                                   |
| 21  | K-Visa                                                     | 3.6    | 63.45MB   | 1,000+         | Visa Information                                                          |
| 22  | Story Trip-Seoul/ Real Korea                              | 4.9    | 14.92MB   | 1,000+         | Digital Tour Guide, Human Tour Guide, Restaurants & Attractions            |
| 23  | Halal Local: Halal Food Worldwide Qibla Salat Trip/Astrajingga Inovasi Digital | 4.3    | 32.37MB   | 5,000+         | Halal Restaurants & Market, Mosques & Prayer Spaces, Salat/Prayer Timetable, Qibla Direction, Halal Traveling Tips |
| 24  | KMI Korsel/ Ideas Research                                | 4.9    | 7.32MB    | 500+           | Mosques, Halal Product, Halal Restaurant, Muslim association news and talk |
| 25  | Korea Tour – Offline Maps/ Nusa Inc.                      | 4.1    | 36.55MB   | 100,000+       | Offline Maps, Offline Metro Map, Korea Travel Guide, Support Multi-Language |
| 26  | Whatshalal – Halal Food Discovery/ Nur Industries          | 3.0    | 32.82MB   | 10,000+        | Halal Restaurant Directory, Order from you App, Ethical Halal Agriculture, Scan for Halal Data, Snap & Contribute |
| 27  | Welcome to Korea (Tour Guide)/ Skyapps                    | 3.7    | 5.32MB    | 1,000+         | Tourist Information, Evente/Festivals, Accommodation, Attractions, Tourism Dictionary, Search, Schedule & Notes, Favourites, Travel Materials, Seoul Subway Map, Korea Time |
| 28  | Seoul Offline Map & Travel Guide/ Offline Travel Maps & Routes | 4.6    | 120MB     | 500+           | Seoul Offline Map with Travel Guide, Attractions, Address Search, Search by Category, Favorite Locations, GPS |
| 29  | Map of South Korea Offline/ Map Apps                      | 4.4    | 101MB     | 10,000+        | Map of South Korea Online                                                 |
| 30  | Seoul Metro Subway Map & Route Planner/ Mapway            | 4.0    | 17.35MB   | 100,000+       | Seoul Metro                                                                |

The Total Number of Useful Applications: 17/30, 12/30, 21/30, 24/30, 11/30
4.1. Supporting Application Indicators

4.1.1. Ratings

Google Play Store provides application users with the possibility to rate each application with score 1-5 plus optional comments. Ratings appear to distinguish among different app categories. Education applications appear in the highest rank with an average rating above 3.8 while the News category average score is less than 3.2 [15]. If a higher rank correlates with more sales, it is also in the market's interest to raise the rating. App ratings are listed along with review comments. This value provides an average value (on a scale of 1-5) [16].

Ratings and reviews measure app quality. Users expect these ratings and reviews to be authentic and relevant [17]. Just like reviews, the more ratings you have, the better it is. However, ratings take less time and effort to fill out, so they don't always reflect people's engagement as your app runs. Sometimes people who judge also write reviews. Therefore, it is advisable to check reviews after ratings [18]. From the existing experience, a high rating from 4.0 and above means that the application is favoured by users based on their experience when using it [19]–[21].

4.1.2. Reviews

Customers who take time to write a review of an app, no matter how long or short, indicate their engagement with the app. Record the number of reviews an app receives and what users say. Usually these reviews contain praise (positive) or criticism (negative). Both complaints and positive criticism are keys to know how to improve or fix the app. This will help an application developer know what user needs [18]. The more people give positive reviews, and the less negative reviews, the better the application, and vice versa [22].

4.1.3. Download Size

Fast loading speed is one of the keys to attract users' attention. Some people uninstall apps not because they do not get the features they need, but because they find them unusable due to long process. One of the examples is the low loading speed. Sometimes the reason is because the size of the application's download capacity is too large [18]. The smaller the size of the capacity to be downloaded, the better the application will be, and vice versa. If a download capacity is more than 40 MB then the application is not good, conversely if it is less than 40 MB then the application is good [23]. Smaller apps can be downloaded faster and have a higher installation success rate, so it is important to monitor and optimize app size for best results, because many users could potentially uninstall the app due to the lack of available storage space on the device [24].

4.1.4. Users

This indicator shows how many people downloaded an application [25], so the time of using the application will definitely vary. The number of downloads is not shown exactly in the Google Play Store (or on the web or in apps). However, unlike Apple's App Store, anyone can view a rough estimation of the number of downloads and even see a trend chart. The number of app downloads will be presented as a range, such as 1,000+, 5,000+ or 10,000+, etc. These rough statistics provide an overview to customers about the popularity of this application [16]. The more people who download the application, the better the application, and vice versa. If the number of users who download is at least 1,000, the application is good, but if less than that the application is still not helpful [26].

4.1.5. Features

In an application, of course, it is equipped with various features. The more complete the features in the application, the better the application, and vice versa. According to Jia and Chaozhi (2020), Muslim tourists need at least six aspects, food, hotels, transportation, entertainment and shopping, toilets, and personal service. For religious-related needs, they only demand halal food, water-friendly toilets, and prayer facilities [27]. This can also be a feature criterion for halal tourism application to support halal tourism policies. If an application has at

| The Total Number of Useless Applications | 13/30 | 18/30 | 9/30 | 6/30 | 14/30 |
|----------------------------------------|------|------|-----|-----|------|

Processed by researchers from various sources in 2020
least six essential features for the growth and success of a travel application then the application is success, but if it is less than that the application is not success [28].

4.2. Halal Tourism Applications

The applications taken as part of the study were selected randomly through the Google Play Store which can be downloaded via Android. Thirty applications were selected, consist of the Korean Halal application, Korea Travel, Halal Restaurant, Travel Hotline, Travel Guide, Halal Trip, Prayer Times, Mart, Halal Consumer, Visa, Halal Food, Maps, and Metro Subway. Then the five indicators are divided into Rating, Review, Download Size, Downloader, and Feature. (Table 1. The Applications related South Korea’s Halal Tourism (see attachment)).

Based on evaluation from the table above, each thirty applications that support halal tourism has different rating. It is considered that if the rating shows a number of 1.0-3.4 then the application is not good, while a good application is indicated by a rating of 3.5-5.0. So from the table above it can be seen that there are 23 good applications out of 30. The more people who give positive reviews, the better the application will be, and vice versa. Based on the table above, there are applications that have a lot of positive comments, there are also applications that have more negative comments, and there are also applications that do not have comments. If an application that does not have comments is a less good application, then based on reviews, the number of good applications is 12 out of 30 applications. If it is considered that an application with a download size of at least 50 MB is a bad application, then the table above shows that 24 from 30 applications are good. If it is considered that an application with minimum 10,000 of downloaders are good applications, according to the table above, the number of good applications is 14 out of 30 applications. A good application has at least four features in it. Based on the table above, a good application that has a minimum of four features is a total of 16 applications out of a total of 30 applications.

5. Conclusion

This study discusses the influence of artificial intelligence in the form of applications to support halal tourism policy in South Korea. There were thirty applications selected randomly and five supporting application indicators used. The findings show that between the five indicators, three indicators have good applications number more than less applications. So it can be said that more than 50 % of the application or artificial intelligence are helpful for the users (Muslim tourists) to support the implementation of halal tourism policies in South Korea.

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