The development of Mobile Application for Gastronomic Tourism in ASEAN

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Abstract— **The aim of this paper is to illustrate the mobile application for to support gastronomic tourism in ASEAN. This mobile application is designed for the Android platform. The mobile application was develop by using SDLC. The system provides information via a mobile phone about gastronomic tourism one-day routes in 7 countries in ASEAN (Thailand, Lao, Malaysia, Singapore, Myanmar, Vietnam, and Cambodia) tourism attraction information, restaurants, accommodation, and VDO guidelines for tourists.**

Keywords— **Mobile application, gastronomic tourism, ASEAN**

I. INTRODUCTION

In the globalization era people in very part of the world communicate with each other without borders and every time using information technology and communication (ICT). Mobile devices such as smart phones and tablets are growing and included in everyone's life. Mobile devices are used for many functions such as making phone calls, surfing the Internet, checking email, setting up schedules, watching movies, listening to music, taking a photo, chatting, linking to social networking web sites (such as Facebook, YouTube, etc) playing games, GPS functions and using utility applications [1]. The functionality of the mobile device makes the mobile device popular because it can replace laptops due to its functionality and mobility [1][2][3]. The mobile device market has been growing with a very large scale of number of smart phones in the market and it provides users with features that support business and personal needs [1]. The use of mobile devices is becoming popular for travellers, 29% use a mobile device for travel information to search before booking, 18% for travel booking and 39% for checking in or boarding on flights. [4]. It was found that the purpose of travellers using mobile devices was 63% found it easier to find information they were looking for, 35% low communication costs, 24% easier to use, 6% clearer communication and 15% others [4]. In addition, the biggest driver of using a mobile device for the traveller is to provide tailor made content that is useful and informative.

Figure 1 demonstrates the forecast numbers of international tourist in ASEAN in 2015, which will be more than 100 million people. With the increased number of tourist all looking for a more generic type of experience, especially a unique and authentic experience, which involves participation in local culture. This leads to 'gastronomic tourism' that can be linked with cultural tourism [6][7][8].
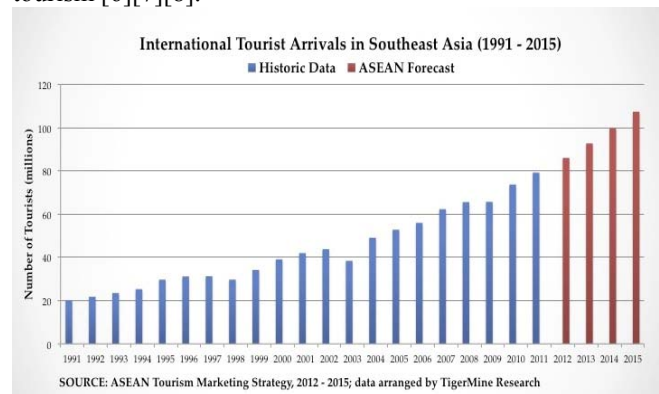

Fig. 1 The international arrival in Southeast Asia (1991-2015) [5]

ASEAN countries have a high potential for gastronomic tourism that involves gastronomy heritage resources based on their amazing tourist destinations, which can be generated from the long history of ASEAN gastronomy heritage resources.

The aim of this paper is to study the development of a mobile application for gastronomic tourism in ASEAN.

II. LITERATURE REVIEW

A. Gastronomic tourism

There are many authors that define the concept of gastronomic tourism. The International Culinary Tourism Association defies gastronomic tourism as the 'the pursuit of unique and memorable eating and drinking experience' [9]. Another definition of gastronomic tourism is, 'there is a need to differentiate between tourist who consume food as part of a travel experience and those tourist whose activities, behaviours and even destination selection are influenced by an interest in food' [10][11][12].

In this study, gastronomic tourism means, the travel experience, the enjoyment of prepared food, beverages, and other related food activities resulting in a great and memorable gastronomic experience including consumption of local food, cuisine, meal system and eating styles together with a tourism experience of learning with gastronomic tourist attractions, culture, life styles, ethos religion and joining a cooking class.

B. Route and tours recommendations

The functionality that serves mobile users most was navigation tools offering a routing service based on geographic location. Location information is typically extracted from the GPS receiver on a mobile phone and using alternative location tracking techniques [13]. Moreover, the widely use navigator system, route (i.e. point-to-point) recommendation services are integrated in many prototype mobile guide applications to assist users to find their way from their current location to a recommended attraction [13].

III. MOBILE APPLICATION DEVELOPMENT

C. Mobile application design concept

The mobile application was designed to support a smart phone via the Android platform. The mobile application called 'Food ASEAN'. Figure 2 shows the details of 'Developer Economic 2013 Survey: Android Vs iOS'. The survey results found that Android has a clear advantage on development cost (32% Android vs. 14% iOS) and a small lead on the learning curve (26% Android vs. 20% iOS). In fact 24% of developers using Android and iOS indicated that HTML is the best platform in terms of learning curve while 7% indicated that it's Windows Phone [14].
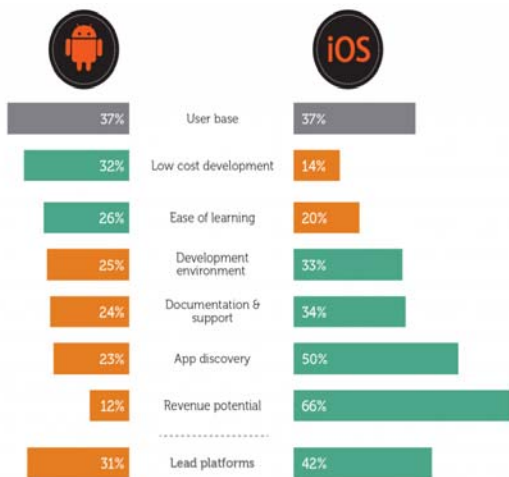

Fig. 2 Survey of Developer Economic 2013 Survey: Android Vs iOS [14]

In this paper, the choice of Android is because of the low cost of development and it's easy to learn the mobile code with the number of user equivalent to iOS.

D. Mobile application prototype

The mobile application was developed by using a prototype concept. Figure 3 shows the steps in mobile prototyping application development.

1) *Requirement:* prototype requirement, identify the capability of the mobile application. It identifies the users requirements by collecting data from interviewing users or travellers that want to use the Food ASEAN mobile application.

2) *Design:* an initial prototype by using tools for rapid mobile application development.

3) *Development:* the mobile application was developed by using JDK (Java Development Kit), Android SDK (Android Software Development Kit), and ADT (Android Development Tool), Android Studio and Genie Motion.

4) *Evaluation:* experts and users evaluated the prototype by referring to feedback assessment and continuous improvement to the prototype.
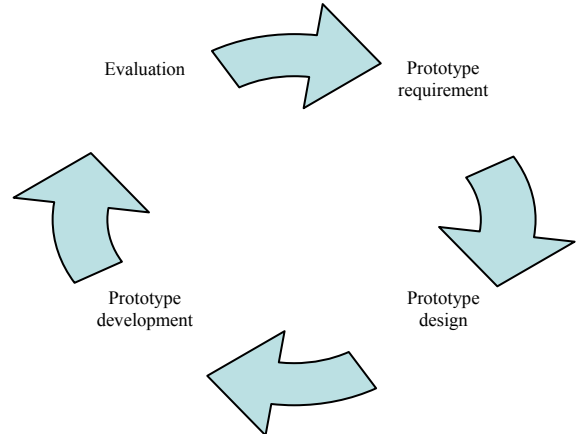

Fig. 3 Food ASEAN mobile application prototypes

E. User Interface

The ASEAN food mobile application user interface was designed using the structure as in Figure 4.
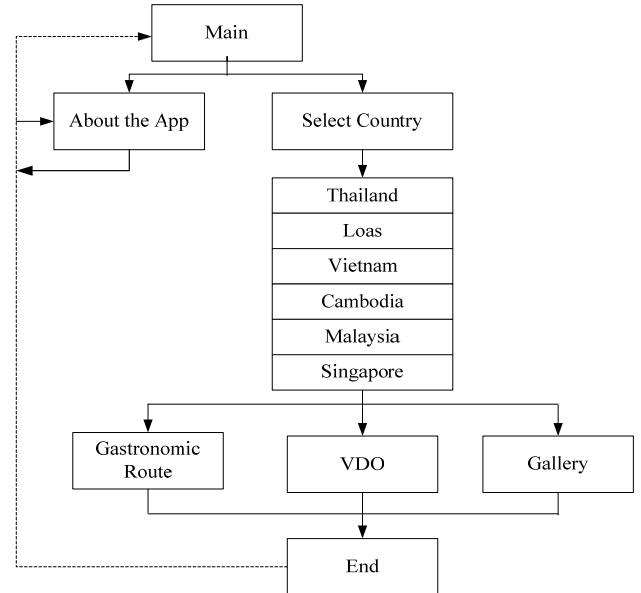

Fig. 4 Food ASEAN mobile application user inference structure

Figure 4 shows the Food ASEAN mobile application user interface structure. The system starts from the Main page, where the user can select About the App or go to Select a Country in ASEAN, browse a Gastronomic Route or watch a VDO about gastronomic tourism routes, or browse pictures in a Gallery and go to the end of program. Figure 5 shows the screen design of the Food ASEAN mobile application.
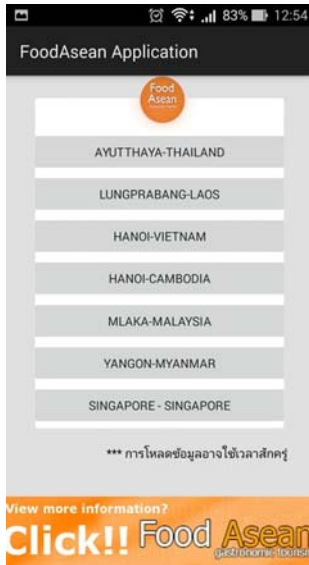
Fig. 5 Screen design of Food ASEAN mobile application

F. Contents

The content used in the Food ASEAN mobile application was created from the research study about 'Gastronomic tourism of ASEAN' [15]. The major content was the 'gastronomic tourism route' that provides a Google Map and GPS points for tourist attractions, local food and restaurants. Figure 6 shows example of a gastronomic tourism route in Singapore.
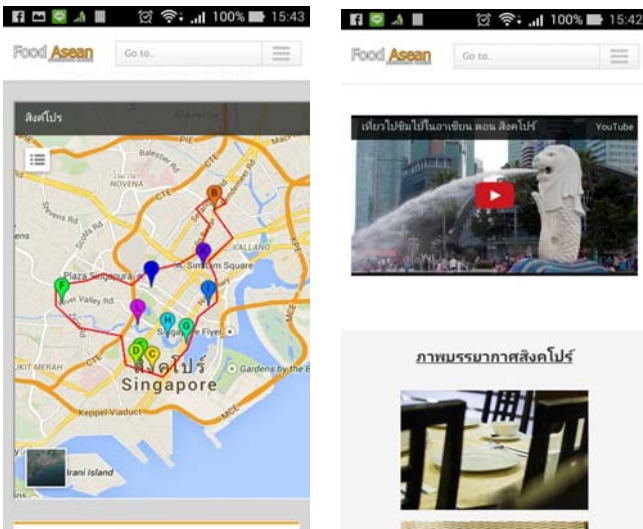

Fig. 6 Example of gastronomic tourism route in Singapore.

The gastronomic tourism routes in the system provide content in text, VDO, picture, animation and GPS Google Map. There were seven one-day routes in the mobile application system as follows: [15].

1) Luang Prabang (Lao) -> Early morning donate food to the monks with sticky rice -> morning market in the city and have breakfast at Phachaniyom coffee -> Luang Prabang Palace -> Wi Chunaarat temple -> Cheng Tong temple -> Lunch (Papaya salad, sticky rice) -> afternoon Prabattai temple -> Poo Sri market -> Poo Sri Mountain ->

evening dinner (Luang Prabang salad, Aolam, Fish Amok) -> night market

2) Hanoi (Vietnam) -> breakfast (Pho, French toast) -> Ho Chi Minh Mausoleum -> One Pagoda -> 36 Roads -> Lunch (Spring rolls, pork grill, Vietnam coffee), Lake of the Returned Sword -> Ngọc Sơn Temple -> Temple of Literature -> water puppet show -> Night -> night market

3) Siem Reap (Cambodia) -> breakfast (Rice Congee, French toast) -> Angkor Wat -> Prasat Bayon -> lunch (Amok, pickled fish, Curry) -> Prasat Bantaisri -> Prasat Tarprom -> Sunset At Phnom bakeng -> dinner and watch Ausara show

4) Melaka (Malaysia) -> breakfast (Nasi Lemak, Bak kut the) -> Melaka walking street -> Cheng Hoon Teng temple -> lunch (chicken rice) -> Dutch Square   -> Ruins of St. Paul's -> A' Famosa -> dinner Roti Mataba

5) Rangoon (Myanmar) -> breakfast at Scott Market -> Kyak Htat Gyi -> Botataung -> Bo bo Gyi -> Buddha tooth relic temple -> lunch (shrimp, soybean fired) -> Yele Praya -> dinner and Kalaweak show -> Shwedagon Pagoda

6) Singapore -> breakfast (Hók-gîan noodle) -> Guan Yin temple -> Thian Hock Keng temple -> Tooth relic Buddha temple -> lunch (Singapore Chicken rice) Merlion -> Sir Thomas Stamford Bingley Raffles -> Sun Tech city -> Orchard road -> dinner at Clarke Quay

7) Phra Nakhon Si Ayutthaya (Thailand) -> breakfast Hua Rao market -> Wat Chai Watthanaram -> Wat Phananchoeng -> old floating market Tha Nok Roung temple -> Lunch (noodle) -> Wat Yai Chaimongkol -> Wat Mahatha -> Wat Mongkol Bophit -> Dinner (Tomyum shrimp, river shrimp roast)

G. Food ASEAN in Android Application store

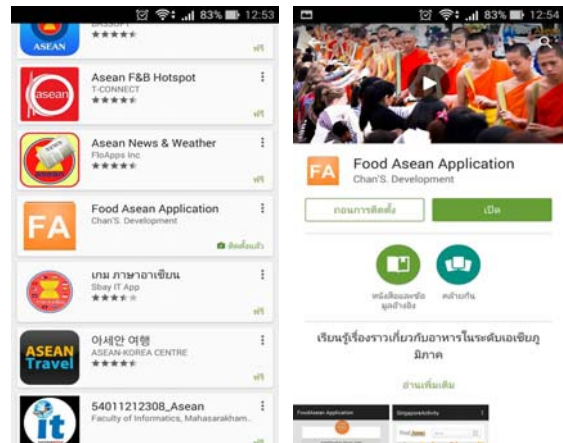Fig. 7 Food ASEAN on Android application store

Figure 7 shows that a user can go to the Android application store and download the 'Food ASEAN' application and install it on a smart phone.

H. User evaluation Food ASEAN mobile application

The Food ASEAN mobile application was trailed with 380 users in Bangkok, Thailand. The users evaluated the Food ASEAN mobile application by using a questionnaire

and interview. There were three part of the survey as follows:

-Part I Demographic (6 question, check-list)

-Part II Food ASEAN mobile application evaluation (12 questions, 5 point Likert scale)

-Part III Suggestions and recommendations (open ended questions)

The surveys ran the Cronbach Alpha value of 380 that, is greater than 0.926, meaning that the reliability level is excellent. The mean level of 4.21-5.00 means strongly agree, 3.41-4.20 means agree, 2.61-3.40 means moderate, 1-81-2.60 means disagree and 1.00-1.80 means strongly disagree.

IV. RESULTS

The results of the user evaluation of the mobile application are as follows:

A. Demography

The demography of the sampled users is shown in table 1-8. Table 1 demonstrates the gender; most of the mobile application users were female (87.90%)

TABLE I
GENDER

Gender	Frequency	Percent
Male	46	12.10
Female	334	87.90
Total	**380**	**100.00**

Table 2 demonstrates the age, most of the mobile application users were aged 20-29 (44.21%), 30-39 (23.16) and less than 20 (17.89) respectively.

TABLE III
AGE

Age	Frequency	Percent
< 20	68	17.89
20-29	168	44.21
30-39	88	23.16
40-49	31	8.16
50-59	25	6.58
Total	**380**	**100.00**

Table 3 demonstrates the education level of the users; most of mobile application users graduated with a bachelor's degree (60.00%), a master's degree (21.84%) and under graduate (14.21%) respectively.

TABLE IIIII
EDUCATION

Education	Frequency	Percent
Under graduate	54	14.21
Bachelor degree	228	60.00
Master degree	83	21.84
Ph.D.	15	3.95
Total	**380**	**100.00**

Table 4 demonstrates the occupation of the users, most of the mobile application users were studying (39.21%),

government officers (33.16%) and the business sector (16.32%) respectively.

TABLE IVV
OCCUPATION

Occupation	Frequency	Percent
Study	149	39.21
Business sector	62	16.32
Employee	20	5.26
Government officer	126	33.16
Business owner	23	6.05
Total	**380**	**100.00**

Table 5 demonstrates the type of mobile use; most of the mobile application users used an iPhone (43.42%), Samsung (25.79%) and I-mobile (18.42%) respectively.

TABLE V
TYPE OF MOBILE PHONE USE

Mobile phone	Frequency	Percent
Samsung	98	25.79
iPhone	165	43.42
I-mobile	70	18.42
Other such as Huawei, Acer	47	12.37
Total	**380**	**100.00**

Table 6 demonstrates the use of the mobile phone per day; most of the mobile application users used a mobile phone 4-5 hours/day (33.95%), more than 8 hours (31.58%) and 1-3 hours/day (16.84%) respectively.

TABLE VI
USING MOBILE PHONE USING PER DAY

Mobile use/ day	Frequency	Percent
>1 hours	18	4.74
1-3 hours	64	16.84
4-5 hours	129	33.95
6-7 hours	49	12.89
< 8 hours	120	31.58
Total	**380**	**100.00**

Table 7 demonstrates the payment system of the mobile phone, most of the users used post-paid (73.68%)

TABLE VII
PAYMENT SYSTEM OF MOBILE PHONE

Payment	Frequency	Percent
Pre-paid	100	26.32
Post-paid	280	73.68
Total	**380**	**100.00**

Table 8 demonstrates the mobile phone package; most of users used Call+SMS+Internet (97.63%) and call only (2.37%) respectively.

TABLE VIII
MOBILE PHONE PACKAGE

Package	Frequency	Percent
Call only	9	2.37
Call + SMS	0	0.00
Call+SMS+Internet	371	97.63
Total	**380**	**100.00**

B. Food ASEAN mobile application evaluation

Table 9 demonstrates the results of the evaluation of the Food ASEAN mobile application. Overall they were high on satisfaction (mean = 4.11, SD = 0.69). The highest satisfaction, was that the system was easy to use (mean =4.29, SD =0.62), the system supported effective Internet use (mean = 4.29, SD =0.67) and the system can share information for tourists (mean = 4.26, SD = 0.7)

TABLE IX
FOOD ASEAN MOBILE APPLICATION EVALUATION

	Mean	SD.
1. Easy to access the system	4.23	0.55
2. The system is easy to use	4.29	0.62
3. The system is interesting	4.19	0.67
4. The system provide useful functions	3.97	0.51
5. The system support effective Internet use	4.29	0.67
6. The system can provide information effectively	4.15	0.60
7. The design of the system is attractive	3.79	0.79
8. The content is useful for preparing the trip in ASEAN	4.11	0.73
9. The content on the system is interesting	3.92	0.77
10. VDO is useful and guide line place to travel and place to eat in ASEAN	4.14	0.83
11. The system can support self planning in tourism	3.98	0.80
12. The system can share information for the tourist	4.26	0.71
Overall satisfaction	**4.11**	**0.69**

Table 5 demonstrates the t-test analysis of gender and the use of the mobile application. The result found that, there was a significant difference of the gender for using the mobile application (t =-2.808).

TABLE X
T-TEST ANALYSIS

Gender	n	$\overline{\text{X}}$	SD	t	p
Male	46	3.91	0.48	-2.808*	0.005
Female	334	4.14	0.51		

* significant <0.05

Table 6 demonstrates the One Way ANOVA analysis of age and the use of the mobile application. The results found that there was a significant difference (p =.000).

TABLE XI
ONE WAY ANOVA ANALYSIS OF AGE OF THE MOBILE APPLICATION USER

	SS	df	MS	F	p
between group	10.580	4	2.645	11.040	.000*
within group	89.846	375	.240		
Total	100.426	379			

* significant <0.05

Table 7 shows the Least Significant Difference (LSD) analysis of age. The results found that when the users age is less than 20 (<20) there was a significant difference in every age group. Age 20-29 there was no significant difference with age 30-39 (p=.064) and age 50-59 (p=.333) was significant with age 40-49 (p=.000). The age 30-39

were significantly different with age 40-49 (p=.000) and 50-59 (p=.047). Finally, age 40-49 were not significantly different with age 50-59 (p=.052).

TABLE XII
LEAST SIGNIFICANT DIFFERENT (LSD) ANALYSIS OF AGE OF THE MOBILE APPLICATION USER

The use of the mobile application	<20	20-29	30-39	40-49	50-59
<20	-	.000*	.029*	.000*	.001*
20-29		-	.064	.000*	.333
30-39			-	.000*	.047*
40-49				-	.052
50-59					-

* significant <0.05

Table 8 demonstrates the One Way Anova analysis of the educational level of the mobile application users. The results found that, there was a significant difference (p=.000)

TABLE XIII
ONE WAY ANOVA ANALYSIS OF EDUCATION LEVEL OF THE MOBILE APPLICATION USER

	SS	df	MS	F	p
between group	13.065	3	4.355	18.744	.000*
within group	87.361	376	.232		
Total	100.426	379			

* significant <0.05

Table 8 demonstrates the LSD analysis of education level of the mobile application users. The results found that, there was a significant difference of undergraduate and bachelor's degree (p=.000) and master's degree (.000); and no significant difference with Ph.D. (p=.178).' There was a significant difference between a bachelor's degree and a master's degree (p=.046) and Ph.D. (p=.034). Finally, there was a significant difference between a master's degree and a Ph.D. (p=.003).

TABLE IX
LEAST SIGNIFICANT DIFFERENT (LSD) ANALYSIS OF EDUCATION LEVEL OF THE MOBILE APPLICATION USER

The use of mobile application	Under graduate	Bachelor degree	Master degree	Ph.D.
Undergraduate	-	.000*	.000*	.178
Bachelor degree		-	.046*	.034*
Master degree			-	.003*
Ph.D.				-

* significant <0.05

There were some comments from the mobile application users that were relevant to the quantitative results:

"I think this mobile app is cool because I can use it for planning to travel in ASEAN. I know where to eat, where to visit, what kind of local food that I should try. This information is useful for me."

"I like the VDO that bring us to the travel, we can package and walk following the routes in the system."

"In the future, should allow the tourist or user can give a comment about local food, restaurant, accommodation and

tourist attraction will be very good because most of the tourist like to read the comment or review".

"We can use the content from mobile app very easy, we can see the place to travel in world heritage in ASEAN with recommendation local food".

"Overall all I like this Food ASEAN mobile app because it can link to the Google Map, I can see the travel route easily."

V. CONCLUSIONS

The Food ASEAN mobile application has been developed on an Android platform. The contents of the mobile application were synthesized from the research of gastronomic tourism of ASEAN. The mobile application was available at the Android App store. The functionality of the mobile application provided information about 'gastronomic tourism' which included gastronomic routes, VDO, pictures, information of tourist attractions, local restaurants and spas and souvenir shops. However, this mobile application was evaluated by 380 users, the results found that overall users have a high satisfaction of the system (mean = 4.11, SD =0.69). The highest satisfaction was that the system was easy to use (mean =4.29, SD =0.62), the system supported effective Internet use (mean = 4.29, SD =0.67) and the system can share information for tourists (mean = 4.26, SD = 0.7). In the future, this mobile application should be developed on the IOS platform because many of the mobile users were using iPhone and it should also be translated to several languages such as English, Chinese, Japanese and Korean etc.

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