Studying the Use of Smart Phone Applications as a New Tool for Distributing Railways' Services

Noha Abou El Gheit Dawood[1]   **Khaled Soliman Abd El Halem**[1]

[1]Faculty of Tourism and Hotels, Luxor University, Egypt

Abstract

Information and Communication Technology World has now a vital effect on people's life. It has become an important transforming element in every field especially our competitive tourism and hospitality one. Therefore, smart phones are considered as tools for meeting this rapid and global market. They have several capabilities such as fast processors, operating systems (OS), Wi-Fi, GPS and high resolution large screens that represent significant Information and Communication Technology which affect different aspects in our lives. Many travelers nowadays are interested in using smartphones as they can plan, book, and interact through them. This study aims to assess the usefulness and effectiveness of the smart phone applications for distributing railways' services among passengers. It is applied on the Official Egyptian National Railways application (ENR). Questionnaires have been distributed among frequent train travellers through the social media .The results concluded that the application is useful for distributing railways' services. The overall findings of this study also revealed that the main features (ease to use - provide information – design-security-services) influence significantly and positively the word of mouth. Moreover, Egyptian Railway Authority lacks advertising and publicity for this application, thus it is recommended that it has to exert more efforts for promoting it. It is also recommended to provide new additional services to meet the travellers' needs. From these services the presence of an interactive map to determine trains' location, and their speed and also enquiring food and beverage services with its prices on board.

Key Words: Application, Distributing, Passengers, Railways, Smart Phones, Technology.

Introduction

Nowadays, Interconnection has been increased between travellers, trains, and merchandise and this is due to the tremendous development of railways which provide high comfort (Ai et al. 2015). Railway passenger service information system has been developed and constructed through the information technology as to increase competitiveness and improve services' quality that serve passengers and travellers (Zhang, 2012). The expansion of technology is now being used in transportation services' field through smart phones, so it is now easy to determine locations, routes and collect data about transportation services (Shaikh et al. 2014). Applications of smart phones have the ability to assist travelers by all information needed at anytime and anywhere. Passengers' experience has clearly been influenced by the increase in number of users for these applications (Wang et al. 2012).

Thus, they can use these phones to transform their travel experience and facilitate their planning, booking and even payment for trips. Organizations now try to develop smart phones' applications to satisfy their customers' needs and requirements. Moreover, some countries have begun to develop and create new mobile applications for railways to facilitate travelling and transportation (Kasari, 2015). This research aims to study the Official Egyptian Railways application (ENR) "Egypt national railway" as a tool in distributing railways' services. Advantages and disadvantages of this application will be determined from the user's perspective which will help in developing it. Thus, Egyptian Railways Authority can stand on the problems facing this application and can work on solving them, thus creating a better platform for the users to engage with it. This research also tends to study the different examples of applications abroad in order to develop the Egyptian one. The findings of this study will redound to the benefits of the society considering that the development of Egyptian Railways plays an important role in today's rapidly advancing techno world. The greater demand for such mobile technologies justifies the need for more effective mobile applications providing authentic information.

Literature Review

Smart phone technology

From the beginning of the 21st century, there was a booming in mobile phone industry via the huge mobile telecommunication companies such as Nokia, Samsung, Sony, Motorola, ….etc. which offers the current technology of mobile telecommunication (Anuar et al. 2014). Nowadays, mobile phones are vital for all people especially the teenagers. They almost use this device all of the day and always check it every now and then (Persaud and Azhar, 2012). Chen et al. (2017) reported that all people regularly use these phones in every activity in their lives. Regan and Chang (2015) defined smart phones as a pocket mobile phone but with stronger capabilities, with large screen, easily internet access and location based support. They offer a lot of features like browsing, downloading, accessing several applications, GPS, camera, video camera, games, video, and audio play back ,…..etc. IPhone and Blackberry are the most popular brands, while the most widely operation system recorded in the World was the Android. Mang et al. (2016) reported that consumers for mobile phones at developed and high growth emerging economics are increasing and through which, there is a clear rise in the percentage of smartphones' owners.

Smart phone applications

You can download and install several applications only on smart phones, they are also known as apps (Dickinson et al. 2014). Karthick and Velmurugan (2012) stated that these apps can be downloaded through their online stores for example the apple store and android market run by Google.

According to Dickinson et al. (2014), this word refers to the software of these mobiles that improve services' mobile delivery. Since people and organizations become able to develop applications, this has provided a progressive chance to exploit the mobile computing capabilities and resulted in the rapid development of commercial and non- commercial applications for several purposes. Chen et al. (2016) reported that apps have been diffused and developed because of the popularity of tablets and smart phones, thus apps' market is now considered one of the fastest growing consumer technology. In addition, consumers nowadays prefer to access mobile applications more than mobile websites. Gupta et al. (2018) clarified that travellers consolidate their travel experience by using smart technology as there are diverse applications of smart phones which provide several travel services from which travel planning (Tripadvisor and TripIT), tour guide (NY Travel guides and DETOUR), accommodation planning (Expedia and Booking.com), transport planning (Skyscanner and Uber) and directional services by Google maps.

Smart phone usage in travel

Smart phones have intervened in every detail in our lives including travel. Several and recent researches have concluded the great effect and changes happened as a result of using mobile devices, from which the study of the effect of smart phones in traveller's behavior and the travel experience as a whole (Wang and Fesenmaier, 2014). Chang and Shen (2018) have stated that travel plans can now be adjusted using smart phones in addition to several functions offered for people to be used during travelling. There is a variety of applications present in smartphones nowadays that fulfills travellers' desire and requirements. They can offer immediate support such as providing attractions and maintaining relationships between family and friends (Tan and Lu, 2019).

According to Alghizzawi et al. (2018) users of smart phones especially tourists can do several transactions using these phones such as selecting destinations, accessing information, buying products and requesting travel services…etc. Tan and Lu (2019) added that they can be used by travellers at the destination for example to direct them and let them discover new experiential opportunities. No and Kim (2013) mentioned that they can also book and issue tickets by using these phones. Moreover, they can use tour guide apps for navigation, itinerary management, map services, entertainment apps to pass the time, facilities of travel like currency converter, weather reporting and translation apps in addition to sharing and posting photos and stories (Tussyadiah, 2015). Traveller advisor in these smart phones can advise with the attractive places, suitable transportation, accommodation, activities and events (Chang and Shen, 2018). Wang and Fesenmaier (2011) added that apps which recognize travellers' location can also provide them with various suggestions about their inquiries such as bazars, restaurants, restrooms and even gas stations.

Smart phone as a distribution tool

Khan and Hossain (2018) have reported that accessibility and interactive nature of the internet technologies have changed the attitudes and behavior of the consumers, especially the travellers, and this is as a result of changing the way of distributing travel and tourism products. Law et al. (2015) added that over the past few decades, the applications of the internet are the obvious reason of the great change in the distribution of services and products to consumers. Tourism and hospitality field also has been affected greatly by this especially that it is one of the most important industries. Benitez et al. (2016) clarified that these applications that are designed for smart phones are considered as a marketing tool, so they are transformed to be channels, and consumers can enter these channels to obtain the products and services needed. Thus, apps' aim is to obtain a great media coverage and get an interactive process of promotion through using advertisements, discounts, offers and prizes…..etc.

Direct selling to consumers has been widely spread as a result of this transformation in the distribution channels to provide products and services that meet the changing in requirements of these consumers (Khan and Hossain, 2018). Thus, Yu (2013) concluded that the increase in smart phone users is the reason behind why companies are now using apps as one of their distribution tool to deliver their products and services to consumers.
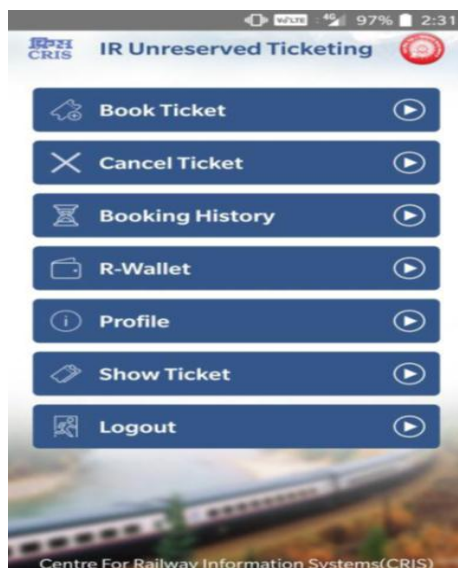
Smart phone technology in rail transport

Railways are considered one of the important and vital transportation infrastructures at any country that contributes in its economic activities and helps people in their daily lives. Urban areas - in particular – depend on trains which are the best way in travelling to transport people from one destination to another as other means of land transportation like cars, buses and taxis are usually affected by traffic jams and crowd (Higuchi et al. 2015). Chatterjee and Nath (2014) stated that railway services are preferred by the majority of people who demand speedy, reliable and friendly passengers' services. They added that the increase in demand now in railways requires more efficient mechanisms to afford the increase in the number of passengers and goods. This will not only be handled by man power but also by smarter technologies that will lead to produce a smarter railway system.

Examples of using smart phone applications in railway

UTS Mobile App:

The UTS (Unreserved Ticketing System) is an application for mobile ticketing of the Indian Railways. It is one of the most popular applications used by frequent railway passengers to reserve and get tickets. It is available for both Android and Windows mobile operating systems. User has to register first with a username and his mobile number, then determine the city, train type, the class

service and most common five routes from his location to the destination. This application is easy to be accessed as it consists of menu to facilitate booking the ticket, cancelling it, history of booking, R-wallet, profile, show the ticket and finally logging out (Iyer et al. 2018).

Source: (Iyer et al. 2018).

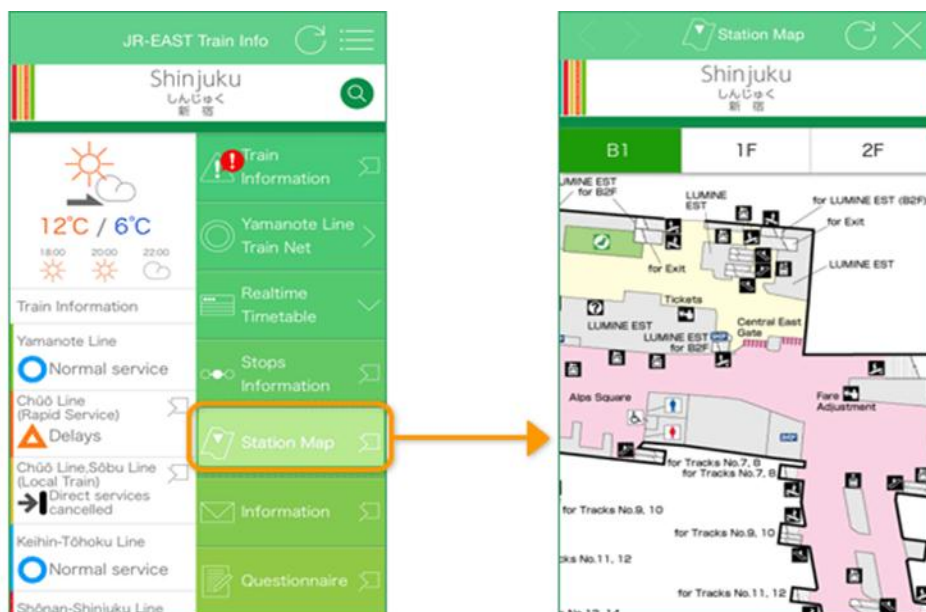**Figure 1: UTS (Unreserved Ticketing System) App operations**

IRCTC E Catering – Food on Track (Indian Railway catering and Tourism Corporation Limited)

IRCTC is an application which can be downloaded on IOS and Android phones. It gives the passenger the ability to book preferred meals through. Any passenger who has valid reservation ticket can use this app and book a meal. Passenger can choose a restaurant from a list of several ones gets its menu then place the order. Finally, he can get the requested meal on his seat at train (Indian Railway Catering and Tourism Cooperation, 2019)

JR (Japan Railway) East App:

The aim of JR East Application is to provide passengers with information needed through their smart phones. According to Matsomoto (2016) it includes:

1- Information on 150 JR East stations.
2- Information on services which can be provided on train.
3- Yamanote Line train which is a train that stops at major stations such as: Tokyo, Shibuya, Shinguku, and Akihabra. You can view its position and its accurate time at stations.
4- Stops Information: departing routes are displayed on the top of the app and every stop along the route.
5- Maps of the stations are also displayed on the top of the page.

Source: (East Japan Railway Company, 2019).

Figure 2: The application of East Japan Railway

Methodology

The statistical tool exploited in the present research is the quantitative method to be appropriate to numerical analysis through SPSS program. Questionnaire are administered using a Likert scale (1 strongly disagree to 5 strongly agree). A questionnaire form is designed and is based on the related literature review (Regan and Chang, 2015; Chang and Shen, 2018; Gupta, et al. 2018; Mang, et al. 2016; Benítez, et al. 2016). The questionnaire is divided into five main parts. Part one is about personal data. The second part was dedicated to identify the users and non-users of the official application of the Egyptian Railways authority and the reasons of this. The third section is about the features of ENR application, it consists of six elements (ease of use, information provided, form and design, safety and privacy, services and facilities, payment policies). The fourth part is about the word of mouth and it consists of 2 statements .The fifth part is about other services that hopefully to be existed in the application and it consists of 4 statements.

Sampling

The aim of this study is to assess the usefulness and effectiveness of smart phone applications for distributing railways' services among passengers. The population of this study includes frequent railway passengers to explore their views about features of ENR application (Egyptian National Railways) and to identify their satisfaction about this application and their suggestions to develop it. Questionnaires were designed and uploaded on Google drive. They have been distributed through social media. The link was copied and uploaded on Facebook groups that have frequent train travellers. Moreover, sharing this link and sending it through emails and Whatsapp to friends and relatives who frequently use trains in their transportations. There were (374) responses.

Data Analysis

Data analysis was conducted by using the Statistical Package for Social Sciences (SPSS) version 25. Appropriate statistical analyses such as means, standard deviations are calculated for all variables, Cronbach's alpha to coefficient is used to determine the reliability of study tool. Regression test indicates the effect of the features of application on the word of mouth. Questionnaire forms responses contain a five point Likert scale and respondents were asked to indicate their level of agreement or disagreement for each variable.

Reliability

Cronbach's alpha is used to assess the reliability for all scales, reliability coefficient of 0.70 or higher is considered "acceptable" in most social science situations.

Table 1: Reliability Statistics

Cronbach's alpha	Number of Items
0.894	26

In this study, the Cronbach's alpha in table (1) is used to assess the reliability of the data. This is due to the fact that Cronbach's alpha is a meaningful measure of internal consistency of a survey. The results showed that the alpha coefficient was above 0.80 which indicated that the instrument was reliable for being used.

Findings and Discussion

Profile of the research sample
This section shows the main characteristics of the research sample, including: gender, age, education.

Table 2: Characteristics of the research sample

Gender	Frequency	Percent %
Male	220	58.8
Female	154	41.2
Total	374	100
Age		
20 : 40 years	299	79.9
41 : 60 years	69	18.4
More than 60 years	6	1.7
Total	374	100
Education		
High school	12	3.20
Bachelor's degree	192	51.3
Post graduate	170	45.4
Total	374	100

The tabulated data in table (2) clarifies that 58.8 % of the sample were males and 41.2% of the sample were females. The results shows that the majority of the respondents (79.9%) were between 20 to 40 years old, followed by a category ranging from 41 to 60 years (18.4%) and finally 1.7 % of the sample are more than 60 years. The table shows also that the majority (51.3%) of respondents have Bachelor's degree, 45.4 % of respondents have post graduate degree, and only 3.20 % graduated from high school.

Descriptive Statistics

Table 3: The number of users and non-users of the application

Question	Yes		No	
	Frequency	Percentage	Frequency	Percentage
Did you use ENR electronic application of the Egyptian Railways Authority?	103	28 %	271	72%

Table (3) clarifies that 72% of the sample have not used the electronic application of the Egyptian Railways Authority (ENR) while 28% of the sample have used it.

Table 4: The reasons for not using the application

Statements	Frequency	Percentage
1- I didn't hear about this application	208	76.7%
2- I don't have smart phone	2	0.7%
3- I am not good in using smart phones	3	1.1%
4- I don't trust using smart phones' applications	29	10.7%
5- Others (Please mention)………………	29	10.7%
Total	271	100

From Table (4), it is clear that the first reason for not using the application is "I didn't hear about this application "by 76.7%" .

Table 5: Means of knowing the application

Items	Frequency	Percentage
Friends	60	58%
Announcements of the Railways Authority in different stations	8	7.77
Railway authority website	8	7.77
Social media	24	23.30%
Others (Please mention)………	3	2.9%
Total	103	100

Table (5) clarifies that 60% of the sample knew about the application through friends, followed by social media (23.30%), Announcements of the Railways Authority in different stations and Railway Authority website occupied the third rank (7.77%).

Table 6: The features of the application

Statements		Mean	SD
Ease of use	1- Application is accessible and easy in browsing its contents	3.90	0.79
	2-Users can understand displayed options easily	3.93	0.69
	3- Application provides speed in completing tasks	3.72	0.88
Information Provided	1- Application provides full data about provided services	3.59	0.81
	2- Application provides correct and accurate information about provided services	3.67	0.77
	3- Application displays recent information	3.60	0.86
Design	1- Application has attractive design	2.93	0.98
	2- Attractive and interrelated colors are used in the application	2.93	0.91
	3- Application's logo is creative and attractive	2.95	0.89
Security and privacy	User trusts this application	3.66	0.92
Services and facilities	1- User can enquire about available seats easily	3.80	0.84
	2- Application facilitate reservation process	3.79	1.01
	3- Application facilitate enquiring trains' schedules	3.65	0.98
	4- Application offers cancelling reservation process easily	3.19	0.98
	5- Customers' complaints are handled quickly and seriously	2.46	0.99
	6- Application offers the enquiring of trains' route during the trip	2.35	0.99
	7- Application offers reservation for all kinds of trains (air conditioned, Special, Renovated and Sleeping trains)	2.74	1.03
	8- Application offers selection for the seats required	2.57	1.10
	9- Application offers reservation for all routes	3.18	1.05
Payment policies	10- Payment policy is satisfactory	3.55	0.87

The aim of this question was to find out the features of the application. As shown in table (6) the first rank has been given to statement which indicates that users can understand displayed options easily, with a mean of (3.93) and standard deviation 0.69, followed by application is accessible and easy in browsing its contents, with a mean 3.90 and standard deviation 0.79. The statement which indicates that the user can enquire about available seats easily has been ranked as the third with a mean 3.80 and standard deviation 0.84, the statement application facilitate reservation process, has been ranked as the fourth one with a mean of 3.79 and standard deviation 1.01. The last rank was for statement which indicates that application offers the enquiring of trains' route during the trip, with a mean of 2.35 and standard deviation 0.99.

Table 7: Publicity through word of mouth

Statements	Mean	SD
I will tell the others about the services offered through this application.	3.76	0.85
I will encourage my family and friends to use this application.	3.88	0.91

The results in table (7) indicates that there is publicity through the word of mouth, this appears through the statement: I will encourage my family and friends for using this application with a mean of 3.88 and standard deviation 0.91, followed by I will tell others about the services offered through this application with a mean of 3.76 and standard deviation 0.85.

Table 8: Facilities and services required (Other Services)

Statements	Mean	SD
Enquiring food and Beverage services and its prices on board	4.29	0.86
Enquiring about train stations' facilities such as : (Stairs and elevators – Reservation office – Cafes – Toilets – ATMs)	4.06	0.98
Presence of interactive map to determine trains' location and their speed	4.69	0.71
Presence of enquiring portage service	4.23	0.90

The detailed examination of the results presented in table (8) reveals the respondents' responses pertaining the facilities and services required (Other Services), the first rank has been given to the statements: Presence of interactive map to determine trains' location and their speed with a mean of 4.6990, followed by enquiring food and beverage services and its prices on board with a mean 4.29. The statement which indicates presence of enquiring portage service is with a mean of 4.23. Finally, enquiring about train stations' facilities such as: (Stairs and elevators – Reservation office – Cafes – Toilets – ATMs) with a mean of 4.06.

Table 9: Effect of the features of the application on the word of mouth

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Adjusted R Square
		B	Std. Error	Beta			0.300
1	(Constant)	2.550	0.774		3.292	.001	
	Ease to use	0.441	0.066	0.554	6.689	.000	
a. Dependent Variable: word of mouth							
							0.353
1	(Constant)	2.720	0.668		4.070	.000	
	Provided information	0.453	0.060	0.599	7.521	.000	
a. Dependent Variable: word of mouth							
							0.154
1	(Constant)	5.307	0.549		9.660	.000	
	Design	0.266	0.060	0.403	4.431	.000	
a. Dependent Variable: word of mouth							
							0.347
1	(Constant)	3.794	0.535		7.094	.000	
	Security and privacy	1.053	0.142	0.595	7.433	.000	
a. Dependent Variable: word of mouth							
							0.152
1	(Constant)	3.703	.910		4.068	.000	
	Services and facilities	0.142	.032	0.401	4.396	.000	
a. Dependent Variable: word of mouth							
							0.318
	Payment policies	3.846	.562		6.845	.000	
		1.071	0.154	0.570	6.968	.000	
a. Dependent Variable: word of mouth							

As illustrated in table (9), all the features of the application affects directly, significantly and positively the word of mouth by the different values. The ease to use of the application affects by ($\beta = 0.554$, p>.05), with R value 30%. Provided information affects it with ($\beta = 0.599$, p>.05) with R value 35.3%. Moreover, the design of the application affects by ($\beta =.812$, p>.05), with R value 15.4%. Furthermore, security and privacy affects it by ($\beta = 0.595$, p>.05) with its R value 34.7%. For services and facilities it is ($\beta = 0.401$, p>.05), with R value 15.2%. Finally, the payment policies has ($\beta = 0.570$, p>.05) value, with R value 31.8%.

Conclusion

The study aims to assess the usefulness and effectiveness of the smart phone applications for distributing railways' services among passengers. The results highlighted that (72%) of passengers haven't used this electronic application of the Egyptian Railways Authority (ENR). The most important and clear reason is that they didn't hear about this application. This indicates a lack of marketing and advertising for this application among travellers. It was clear that only (28%) of the passengers have used this application and most of them knew about it through their friends. This definitely explains the importance of the word of mouth as a tool of publicity. The advantages of this application are: facilitating reservation process, enquiring trains' schedules, cancelling reservation easily, accessibility and ease to use. These findings are consistent with the studies of Regan (2015) and Benítez (2016).

The disadvantages of ENR application from passengers' point of view are: application is poorly designed and also the logo is neither creative nor attractive. Customers' complaints are not handled quickly and seriously .Moreover, application doesn't offer the service of enquiring the route of the trains during the trip which is important for them to determine their location. Application also doesn't offer reservation for sleeping trains, only sitting ones. It doesn't offer the option of selecting the seats required which is important to most of passengers to have the ability to choose their seat in advance.

The overall findings of this research also revealed that there is a significant, direct and positive effect of the following features on the word of mouth: using the application easily, information provided by the application, design, security and privacy, services and facilities and finally the payment policies.

Recommendations

The Egyptian National Railways Authority has to increase marketing and promotion for its official ENR application through different channels and mass media such as social media, web site, televisions,…etc. It should take into consideration the enquiries of trains' route and their speed during the trip which will be useful for passengers. It is also recommended to improve the design of the application to be more attractive. Moreover, it is worth to let the passenger reserve all kinds of trains through it. Egyptian National Railway Authority has to think about assigning different prices for foreigners and subsequently inserting more than one language in this application. This will spread using it among tourists and facilitate reserving train tickets by their own. Additional services are recommended to be added for travellers in this application which will give them luxury and joy in their trips amongst them is:
- The service of enquiring food and beverage with its prices on board.
- Enquiring about train stations' facilities such as: (stairs and elevators – reservation office – cafes – toilets – ATMs).
- Presence of an interactive map to determine trains' location and their speed.
- Presence of enquiring portage services at stations.

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دراسة إستخدام تطبيقات الهواتف الذكية كأداة جديدة لتوزيع الخدمات بالسكك الحديدية

نهى أبوالغيط داوود¹   **خالد سليمان عبدالحليم**¹

¹ كلية السياحة والفنادق، جامعة الأقصر

الملخص العربى

إن التقدم في تكنولوجيا المعلومات والاتصالات له تأثير عميق على أسلوب حياة الإنسان في جميع أنحاء العالم. لقد أصبح عنصرًا هاما في سوق السياحة التنافسى السريع والعالمي. على وجه الخصوص، أصبحت الهواتف الذكية المزودة بأنظمة تشغيل متقدمة ومعالجات سريعة ونظام تحديد المواقع و الواى فاى تمثل تكنولوجيا المعلومات التى تؤثر على كل شىء فى جميع جوانب الحياة. يهتم العديد من المسافرين فى الوقت الحاضر بإستخدام الهواتف الذكية التى تمكنهم من التخطيط و الحجز و التفاعل من خلالها. تهدف هذه الدراسة إلى تقييم فائدة و فاعلية تطبيقات الهواتف الذكية لتوزيع خدمات السكك الحديدية للمسافرين. وتم تطبيق هذه الدراسة على التطبيق الرسمى للسكك الحديدية المصرية حيث تم توزيع استبيانات على مسافري القطارات عبر وسائل التواصل الاجتماعي. وأظهرت النتائج إلى أن التطبيق مفيد لتوزيع خدمات السكك الحديدية ، لأنه يسهل عملية الحجز، والإستفسار عن جداول القطارات ، .. إلخ . هذا وقد كشفت النتائج الإجمالية لهذه الدراسة أيضًا إلى أن السمات الرئيسية لهذا التطبيق من (سهولة الاستخدام ـ توفير المعلومات ـ التصميم ــ التسهيلات والخدمات ـ خدمات الأمن) تؤثر بشكل كبير وإيجابي على الكلمة المنطوقة. هذا بالإضافة إلى أن هيئة السكك الحديدية المصرية تفتقر إلى الدعاية والإعلان لهذا التطبيق. توصى الدراسة إلى أنه من الضرورى أن تبذل هيئة السكك الحديدية المصرية المزيد من الجهود للترويج لهذا التطبيق ، وكذلك تنصح بتقديم خدمات إضافية جديدة لتلبية احتياجات المسافرين ومنها: وجود خريطة تفاعلية لتحديد موقع القطار وسرعته ، وكذلك الاستعلام عن خدمات الطعام والشراب بأسعاره على متن القطار.

الكلمات الدالة : التوزيع، التطبيق، الركاب، السكك الحديدية، الهواتف الذكية، تكنولوجيا المعلومات.