

# THE SIGNIFICANT ROLE OF SMARTPHONES IN IMPROVING CONSUMER'S QUALITY OF LIFE

Saraniya Devendra<sup>1</sup>

<sup>1</sup>Department of Business and Management Studies, Faculty of Communication and Business Studies,  
Trincomalee Campus, Eastern University, Sri Lanka.

## ABSTRACT

*The number of consumers using a smartphone is increasing dramatically in the global scenario, and several M-Commerce applications have been introduced at a global level. Among several M-Commerce applications, location-based service (LBS) and Quick Response (QR) Code System are two new concepts introduced and developed in several countries to increase the quality of life of consumers. This study aimed to identify the role of a smartphone in improving consumers' quality of life in Batticaloa and Colombo districts. A total of 100 consumers in several industries were surveyed regarding smartphone usage in some circumstances and to access location-based service and QR code system. Data collected after the survey were analyzed using excel tools, and then percentage analysis was done to find the role of smartphones on improving quality of life. The results of this study revealed that the role of a smartphone on enhancing the quality of life is at a low level with respect to location-based service and QR code system usage. However, there are some circumstances through which organizations can create awareness on these two M-Commerce tools.*

**Keywords**—Smartphone, Location-Based Service, QR Code System and M-Commerce

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## 1. INTRODUCTION

Smartphones have brought out a massive change in the lives of customers. Consumers enjoy great comfort with the advancement in science and technology. Consumers in the present day find things much easier and perceive things based on technology. According to Sarwar and Soomro [8], Smartphones play a vital role in offering users an excellent platform for communication and access to a wide range of applications. Human beings face formidable challenges to lead a life in this contemporary world. And, technology has become the deciding factor for people's quality of life. Life becomes updated and flexible with facilities to get connected to people and resources at any time. The mode of communication is open through several ways allowing consumers to enjoy and make the best use of advancements. Also, people get better exposure to social life when they use smartphones with many different applications and accessories. Consumers in all industry verticals use smartphones regularly.

## 2. PROBLEM STATEMENT

Among the different usages of smartphones, location-based service and QR code systems are becoming well known as mobile commerce elements globally. Several global organizations have launched their virtual stores with the help of QR code system and have developed mobile apps to work with customers' real-time locations. However, the prevalence of such applications and QR code usages in Sri Lanka is in question. Little consideration has been given to this concept by the researchers in Sri Lanka though it exerts a significant role in developing the quality of life. Thus, there exists a clear empirical gap with respect for the role of Smartphone on improving quality of life. This empirical gap becomes a problem for the Smartphone Industry to know whether their service is successful or not among the customers. Indeed, there is a need to evaluate to what extent the stimuli influenced on society. Therefore, the specific research question of this study is,

**"What is the role of a smartphone on improving quality of life for consumers?"**

## 3. RESEARCH OBJECTIVES

This study's primary objective is to examine the role of Smartphones on improving quality of life in Batticaloa district and Colombo district. Further, this study also aims to achieve the following as secondary objectives.

- Identifying the level of awareness of Location-based service (LBS).
- Identifying the level of awareness on QR code system usage.
- Identifying the level of Usage of Smartphone.

#### 4. LITERATURE REVIEW

##### ○ Smartphones

A smartphone is a mobile phone with an advanced mobile operating system which combines features of a personal computer operating system with other features useful for mobile or handheld use, as in Andrew [2]. Sarwar and Soomro [8] signify how smartphones change social life and culture and the consequences of smartphones in modern society. It shows more than 55% of teens accepted that they are highly addicted to the smartphone and use it for the socializing than adults. It includes the main areas of human life, such as business, education, health, and social life on which smartphone affects. The study shows that it changes an individual's culture and behaviour by its positive and negative impacts. There are several uses that can be derived from a smartphone such as calls, email, calendar, maps, social networking, web browsing, texting, podcasting, recording, camera, news, weather, chatting, playing games, reading books, mobile commerce activities, etc. Under mobile commerce activities, there are several products and services available; Mobile money transfer, Mobile ATM, Mobile ticketing, Mobile vouchers, coupons and loyalty cards, Content purchase and delivery, Location-based services, QR code system applications, Information services, Mobile Banking, Mobile brokerage, Auctions, Mobile browsing, Mobile purchase, In-application mobile phone payments, and Mobile marketing and advertising, as in Tiwari, Buse, and Herstatt [13].

##### ○ Location-Based Service (LBS)

Location-based services (LBS) are a general class of computer program-level services that use location data to control features. As such, LBS is an information service and has several uses in social networking today as an entertainment service, which is accessible with mobile devices through the mobile network and uses information on the mobile device's geographical position. This has become more and more important with the expansion of the smartphone and tablet markets as well, as in Shu Wang, Jungwon Min and Byung [10]. LBS includes services to identify a person or object's location, such as discovering the nearest banking cash machine (ATM) or the whereabouts of a friend or employee. LBS include parcel tracking and vehicle tracking services. LBS can include mobile commerce when taking the form of coupons or advertising directed at customers based on their current location. They include personalized weather services and even location-based games.

##### ○ Quick Response (QR) Code System

QR code (abbreviated from Quick Response Code) is a machine-readable optical label that contains information about the item to which it is attached. A QR code uses four standardized encoding modes (numeric, alphanumeric, byte/binary, and kanji) to store data efficiently; extensions may also be used as in QR code [1]. The QR Code system became popular outside the automotive industry due to its fast readability and greater storage capacity compared to standard UPC barcodes as in QR code [1].

There are so many advantages of QR codes. QR codes have become common in consumer advertising. Typically, a smartphone is used as a QR code scanner, displaying the code and converting it to some useful form (such as a standard URL for a website, thereby obviating the need for a user to type it into a web browser). QR code has become a focus of advertising strategy since it provides a way to access a brand's website more quickly than manually entering a URL as in [11]. The use of QR codes for "virtual store" formats started in South Korea as in [12], and Argentina as in [5] but is currently expanding globally as in [4]. Walmart, Procter & Gamble and Woolworths have already adopted the Virtual Store concept as in [14]. During June 2011, according to one study, 14 million mobile users scanned a QR code or a barcode. Some 58% of those users scanned a QR or barcode from their homes, while 39% scanned from retail stores. QR codes can be used to store bank account information or credit card information, or they can be specifically designed to work with particular payment provider applications. There are several trial applications of QR code payments across the world, as in [6], [9].

In November 2012, QR code payments were deployed on a larger scale in the Czech Republic when an open format for payment information exchange - a Short Payment Descriptor - was introduced and endorsed by the Czech Banking Association as the official local solution for QR payments as in [3].

#### 5. METHODOLOGY

The methodology employed in this study involves the primary data collection method. A well-structured and administered questionnaire was prepared and distributed to the consumers in Batticaloa and Colombo districts through social networks

for data collection as a primary source. 100 consumers from all levels have been surveyed for the purpose of data collection. The data was collected based on convenience methodology. The data collected were analyzed through percentages and frequencies in which the data were presented in table formats, pie charts and bar charts which were obtained using Excel. The study was conducted during October 2020 to December 2020.

**6. RESULTS AND DISCUSSION**

The following are the results and findings obtained from primary data which were collected through questionnaires. According to Fig. 1, 86 per cent of consumers own smartphones, while 14 per cent of the consumers do not own a smartphone. Therefore, the improvement of the quality of life of those 14 per cent through smartphones is in question unless they are motivated and encouraged to buy a smartphone.

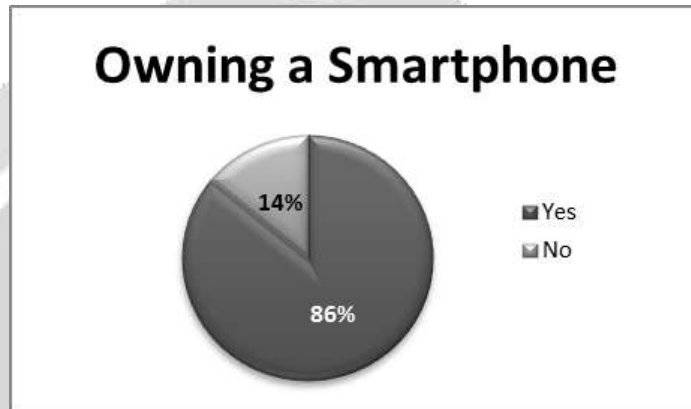


Fig. 1. Possession of Smartphone

According to Fig.2, among the 86 consumers who own smartphones, most of the consumers (53 consumers) do not access location-based service (LBS) through their smartphones. Only 33 consumers access this service. And among the 33 consumers who access LBS, the majority (24 consumers) is from Colombo district. Further, among the 53 consumers who do not access LBS, the majority (41 consumers) is from Batticaloa district.

According to Fig.3, the main reason for not accessing LBS is that the consumers are not interested in accessing, as 51% of the consumers who do not access LBS have said this statement. 36% of the consumers who do not access LBS are unaware of LBS while 4 consumers have mentioned that there are few LBSs in Sri Lanka and 3 consumers have mentioned that these LBSs are not user friendly.

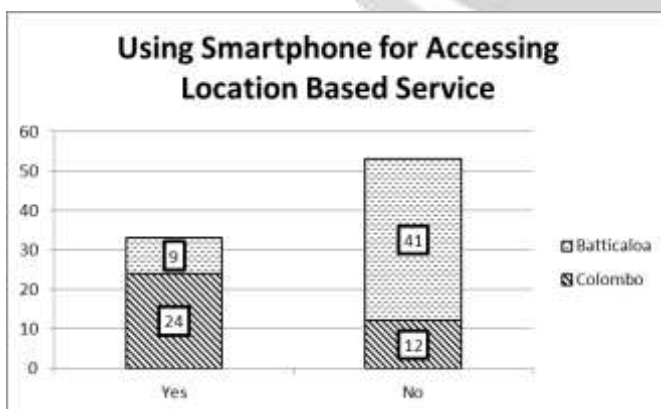


Fig. 2. Usage Level of Location-Based Service

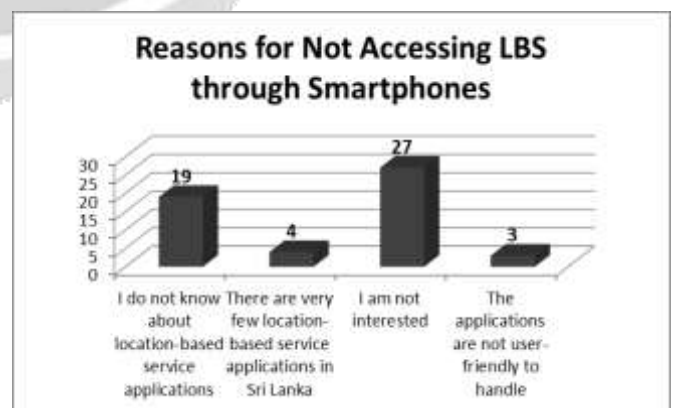


Fig. 3. Reason for Not Accessing LBS Based Service

The following table (Table I) shows how consumers in Colombo and Batticaloa districts are using Location-based Services.

TABLE I: POSSIBLE USES OF LBSS IN SRI LANKA

Mobile Application	Uses
Google Map	To get the directions
Not mentioned	To find nearby shopping centers
Foursquare	To find out users' feedback about a place
Pickme.lk Dialog DApp	Cab service to travel To get information about offers and discounts
Viber	To post locations
Banjo	Discover social media posts posted near to my place. Use it to find nearest Twitter / Instagram users to send direct sales offers.
ToucHotel	Searching hotels/restaurant p&s.
Aroundme	To find out city special places and restaurants
Not mentioned	Pointing dress points.
Yamu	Location service for hotels and restaurants
Zomato	Location service for hotels and restaurants

Even though some consumers use smartphones to access location-based service, the frequency of use was analyzed to check whether they use the service frequently or not. According to Fig. 4, 40% of the consumers access LBS rarely, while 33% of the consumers access a few times a week. Frequent usage of LBS is tackled by only the balance of 27% of the consumers.

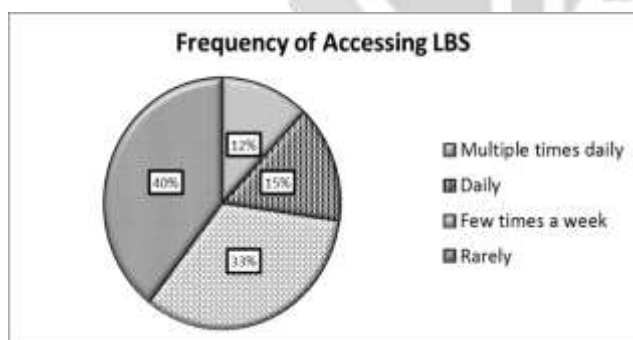


Fig. 4. Frequency of Accessing LBS Based Service

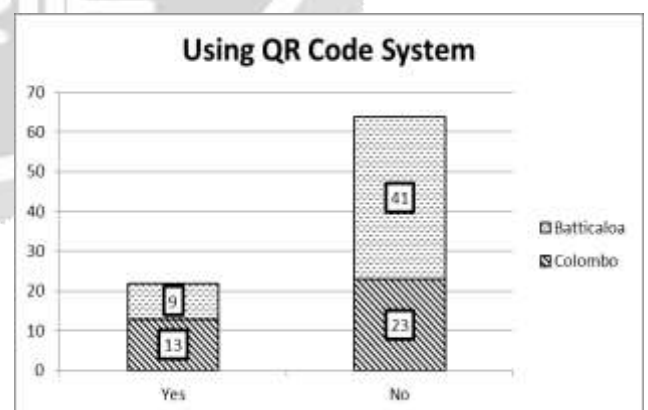


Fig. 5. Using QR Code System

The next important emphasis after location-based service is given on the usage level of the QR code system. Fig. 5 depicts the usage level of the QR code system. According to Fig. 5, among the 86 consumers who own smartphones, most consumers (64 consumers) do not use the QR Code system through their smartphones. Only 22 consumers use this system. There is no much difference in the use of the QR Code system between the Colombo district and Batticaloa District consumers. However, there is a huge difference shown in not using the QR Code system between the two mentioned districts. Among the 64 consumers who do not use the QR Code system, most (41 consumers) are from Batticaloa district.

The reason for not using the QR code system was analyzed, and it is depicted in Fig. 6. 12 consumers did not answer why they are not using the QR code system. According to figure 6, the main reason for not using QR Code System is that the consumers are not aware of it, as 46% of the consumers who do not use QR Code System have said this statement. 31% of the consumers who do not use QR Code System are not interested in using it while 9 consumers have mentioned that they did not face such situations to use QR Code System.

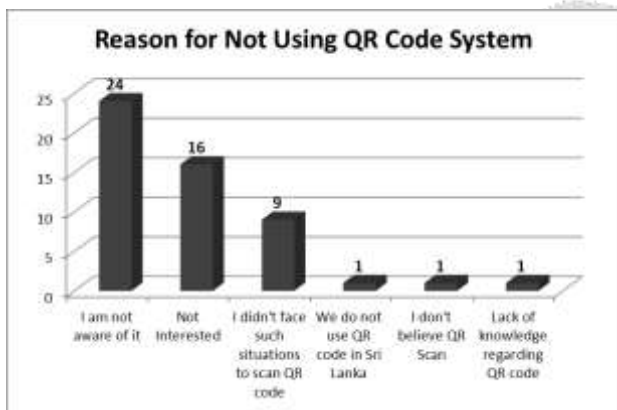


Fig. 6. Reason for Not Using QR Code SystemBased Service

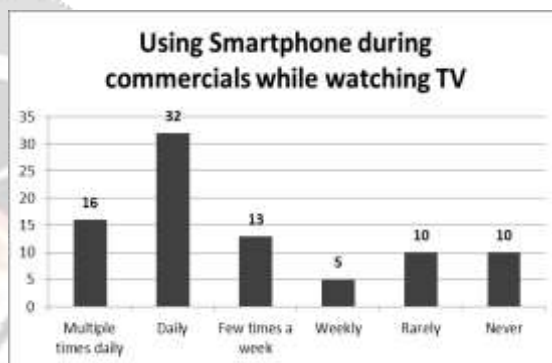


Fig. 7. Using Smartphone during commercials while watching TV

22 consumers stated that they are using the QR code system, and thus, the purpose of using the QR code system was questioned, and the responses are as follows:

- For sharing information in Superbeam
- To add friends in Viber
- Add people to WeChat App
- For reading visiting cards of VIPs
- To get the mobile website from PC
- To add Contact Cards
- To approve Identity and Login
- To get product information through online

In addition to the above analyses, the usage level of smartphones in some circumstances was analyzed to see whether there are any implications from those usage levels. According to Fig. 7, from 86 respondents 19% of users use smartphone multiple times daily, 37% of users use a smartphone daily, 15% of users use smartphone few times a week, 6% of users use smartphone weekly, 12% of users use smartphone rarely, and 12% of users never use a smartphone during commercials while watching TV. Within these, the majority of consumers use a smartphone daily during commercials while watching TV.

According to Fig. 8, from 86 respondents 48% of users use smartphone multiple times daily, 26% of users use a smartphone daily, 8% of users use smartphone few

times a week, 12% of users use smartphone rarely, and 7% of users never use a smartphone during idle time at work. Within these, the majority of consumers use smartphone multiple times daily during idle time at work.

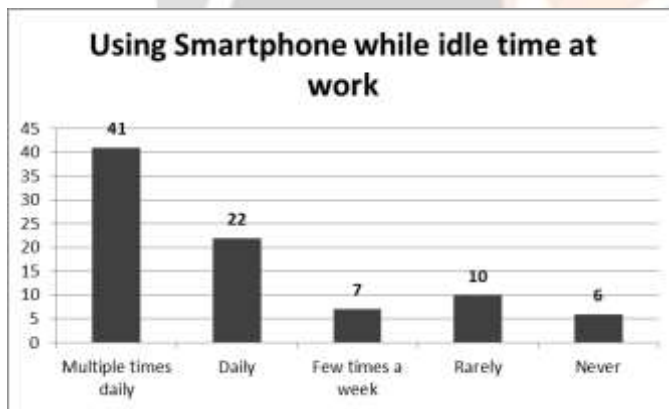


Fig. 8. Using a Smartphone while idle time at work

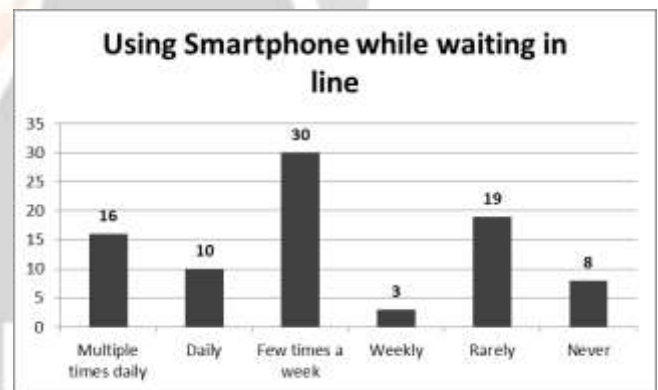


Fig. 9. Using a Smartphone while waiting in line

According to Fig. 9, from 86 respondents 19% of users use smartphone multiple times daily, 12% of users use a smartphone daily, 35% of users use smartphone few times a week, 3% of users use smartphone weekly, 22% of users use smartphone rarely, and 9% of users never use a smartphone while waiting in line. Within these, the majority of consumers use a smartphone a few times a week while waiting in line.

According to Fig. 10, From 86 respondents 10% of users use smartphone multiple times daily, 44% of users use a smartphone daily, 8% of users use smartphone few times a week, 2% of users use smartphone weekly, 17% of users use smartphone rarely, and 17% of users never use a smartphone while walking. Within these, the majority of consumers use a smartphone daily while walking.

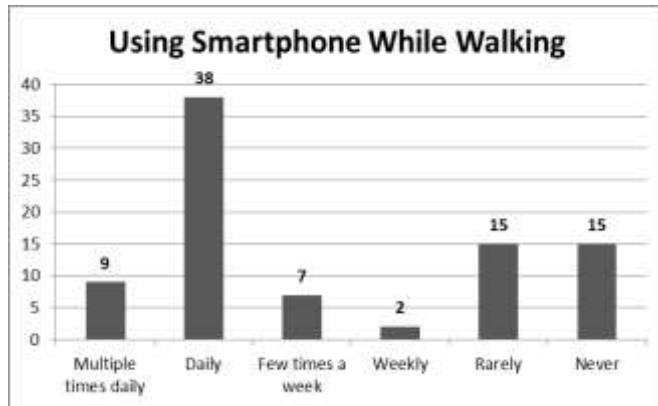


Fig. 10. Using a Smartphone while walking

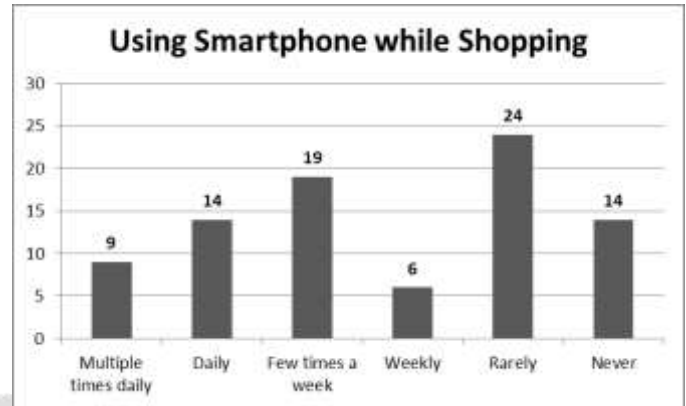


Fig. 11. Using a Smartphone while shopping

According to Fig. 11, From 86 respondents 10% of users use smartphone multiple times daily, 16% of users use a smartphone daily, 22% of users use smartphone few times a week, 7% of users use smartphone weekly, 28% of users use smartphone rarely, and 16% of users never use a smartphone while shopping. Within these, the majority of consumers use smartphone rarely while shopping.

### 7. CONCLUSIONS AND RECOMMENDATIONS

According to the discussion above, it is now easy to conclude the smartphone's role in improving the Batticaloa and Colombo District's quality of life. This study's primary objective is to determine the smartphone's role in enhancing the quality of life. As per the literature survey initially, there are several uses that can be gained from a smartphone. Among those uses, mobile commerce is one that has gained more attention nowadays. There were several mobile commerce activities noted in the literature review. Among them, this study focused mainly on how the smartphones are used to access location-based services and QR code systems to improve quality of life. First of all, it was implied that 86% of the workforce own smartphones while the other 14% of the workforce do not own a smartphone. Therefore, smartphone producers should encourage the non-users of smartphones to buy a smartphone to improve their quality of life. If they remain as a non-user, there will be an unbalanced improvement of quality of life.

The first sub-objective is identifying the level of awareness on Location-based service (LBS). Among the consumers who own a smartphone, only 38% of the consumers are using their phones to access location-based service (LBS). 62% of the consumers do not use this location-based service which is widely used in foreign countries for several reasons such as recommending social events in a city, requesting the nearest business or service, such as an ATM, restaurant or a retail store, turn by turn navigation to any address, assistive Healthcare Systems, locating people on a map displayed on the mobile phone, receiving alerts, such as notification of a sale on gas or warning of a traffic jam, location-based mobile advertising, games where your location is part of the game play, for example, your movements during your day make your avatar move in the game, or your position unlocks content, and real-time Q&A revolving around restaurants, services, and other venues. Further, it was revealed that most of the non-users of LBS are from Batticaloa district. While inquiring the reason for not using such service, it was found out that almost half of the respondents were not interested in using the service and around 36% of the consumers are unaware of LBS.

While looking at LBS (38% of the consumers), it was noted that, in Sri Lanka, there are some mobile applications available for accessing LBSs and are used for some reasons as indicated in Table I. However, while concentrating on the frequency of the usage of such LBSs, 40% of the workforce use it rarely, and 33% of the workforce use it only a few times a week. Only 27% of the workforce use LBSs daily.

The second sub-objective is identifying the level of awareness on Quick Response (QR) code system usage. It was revealed that the usage of QR code system is also a problem in selected districts. 74% of the consumers do not use QR code system, and the reasons they pose for not using the system are unawareness, having no interest and no situations to use such a system. 46% of the consumers are unaware of the system, and 31% of the consumers are not interested, and even 17% of the consumers do not find any situations to use such systems.

Hence, the organizations in Sri Lanka have to initiate two activities regarding location-based services in order to increase the quality of life of consumers; first, they have to make the non-users of LBS aware of LBSs and its benefits as well as they have to make accessing the LBSs interesting to users. Second, they have to increase the current users' frequency of usage of LBSs by making the applications easy to handle and attractive and increasing applications' benefits.

As far as QR code system usage is concerned, in global scenario it is being introduced in several countries for mobile advertising, for visiting websites, use in virtual stores, for making payments, etc. But in Sri Lanka, especially in Colombo and Batticaloa district, such systems have to be introduced to make the life easy and quality, and make the people aware of such system and its benefits.

Stimulating awareness and usage of LBSs and QR code system usage are not challenging to implement as there are already opportunities for organizations to utilize. It can be concluded from the discussion of the third objective that more than half of the consumers use smartphones daily during commercials while watching television and while walking. Around 50% of the consumers use smartphone multiple times a day during idle time at work. 30% of the consumers use smartphones daily while waiting in line, and another 35% use it few times a week. These are the perfect opportunities for companies to promote LBSs and QR code system, which will give profits for the companies and at the same time, it increases the quality of life. Another significant opportunity for the developments as mentioned above is shopping. 27% of the consumers use smartphones daily while shopping and 22% of the consumers use it few times a week while shopping. It is easy for companies to promote their products and services through LBSs and QR code system while the customers do shopping.

This survey results revealed that compared to Colombo district, there are more non-users of LBS and QR code system in Batticaloa district. Therefore, more prominence should be given for developing districts such as Batticaloa regarding making awareness on LBS and QR code system usage.

#### 8. IMPLICATIONS FOR FUTURE RESEARCH

This study only focuses on the usage of Location-based services and the QR Code system to explain these services' awareness. However, it is explicit that other mobile commerce activities may be considered to explain the variation of awareness. Future studies can be devised to identify those additional mobile commerce activities for explaining the consumer's awareness, Positive and Negative Impact of Smartphones on Society, Impact of Smartphones on Academic Performance of Students and current smartphones' security issues, and Its Impact on Society. Further, we would like to suggest that future research should include some other analysis such as Bivariate and Multivariate analyses as only the frequency analysis was carried out to find the results of this study, and hence it cannot be able to generalize the results to the whole working population in Sri Lanka. It is also advisable to extend this study by considering other districts in Sri Lanka and even other nations to further understand the target customer's decision-making behavior and improve the quality of life to aid national development.

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