

# Digital Preservation of Kampong Bharu

## A Mobile Navigator to Assist Exploration of Kampong Bharu

Muhammad Haikal Mohd Razif

Universiti Kuala Lumpur  
Malaysian Institute of Information Technology (MIIT)  
mhaikal.razif@s.unikl.edu.my

Suhaili Din

Universiti Kuala Lumpur  
Malaysian Institute of Information Technology (MIIT)  
suhaili@unikl.edu.my

**Abstract**— One of the historical places in Kuala Lumpur, Malaysia, is Kampong Bharu. Kampong Bharu is well known for its traditional houses and cuisine. Started as a Malay agricultural reservation now transformed into a township where you can enjoy a day of strolling around wooden stilt homes; coconut and banana trees; against the backdrop of the city's modern skyscrapers. To enjoy the culture and delicacies that cannot be found anywhere else in the district, many tourists, both local and foreign, visit Kampong Bharu. Currently, Kampong Bharu is only known for food but not many knows on the cultural and heritage that it still preserves. The aim of this project is to develop a mobile navigator to aid visitors exploring Kampong Bharu while promoting and preserving information on food, cultural and heritage values of Kampong Bharu digitally. The Mobile Application was developed using Xamarin Forms and the evaluation of its effectiveness was assessed through the results obtained using online questionnaires.

**Keywords**—mobile apps; tourism; geolocation; Kampong Bharu

### I. INTRODUCTION

According to Lizeth [12], millions of mobile apps are now available in different online stores for smartphone users. While mobile development has contributed to improve the overall travel factor, little is known about how it has shaped the on-the-go travel experience. Christian [3] states that this lack of knowledge is important because it deepens awareness about how travel-related apps are used by travelers during their trip, offering useful insights into untapped tourism market opportunities and solving challenges for travelers with insufficient access to technology to enhance their travel experience on the go. In the tourism sector, the smartphone trend is enormous, as research by the full service online travel company Expedia (2014) shows. Christian [3] implies that the online booking agent refers to the vast majority of 76% of travelers saying that today's smartphones play a vital role in our lives, also implying that mobile devices support travelers critically at any point in the travel cycle. , the creation of mobile apps requires continuous changes and modifications to meet changing technological requirements and technologies, presenting major challenges such as: user interfaces generated for different mobile device screen sizes, user experience linked to mobile device capabilities, user interface processes for mobile applications, architectures, among others. One of the causes of the minimal formal and scientific documentation in the development of mobile apps is this need for speed of

adaptability. Lizeth [12] has argued that the scientific literature on engineering processes aimed at mobile applications and their activities is currently lacking. During the past few years, mobile devices have changed dramatically. The majority of mobile devices (Android, iPhone, Samsung) have been developed with features included. A touch screen, sensors (GPS and accelerometer), internet access, and a webcam are such features. Such features meant that for people, literally people on the move, the smartphone was a basic necessity. Mobile devices are a modern way to easily and safely access information and use internet service at any time and location. According to Priandani [16], the challenge is how to submit the correct information at all times and locations to people on the move. Knowledge about geolocation is significant in many research fields as well. Shavitt [17] states that this improves internet mapping and characterization as it links the internet graph to real node locations and facilitates the exploration of previously unknown new aspects of the network, such as the impact of ISP position on its services and the types of relationships with other service providers.

#### A. Problem Statement and Objective

Many digital methods have been developed to ease the lifestyle of everyone in this new age. Somehow, using traditional forms such as brochures, posters, etc., the location of attractions in Kampong Bharu is still advertised and often tourists who came to Malaysia are not aware about it unless the tourist guide shows to them. Currently, Kampong Bharu is only known for food but not many knows on the cultural and heritage that it still preserves. Therefore, the objective of this study is to develop a mobile navigator to aid visitors exploring Kampong Bharu while promoting and preserving information on food, cultural and heritage values of Kampong Bharu digitally.

#### B. Research Question

The research question will focus on how this application will help the visitor in navigating through Kampong Bharu's food, cultural and heritage locations?

### II. LITERATURE REVIEW

The reviews of the literatures are based on journals or articles related to Electronic Preservation, Geolocation and Mobile Device.

### A. Global Impact Towards Mobile Application

In the new era of the information and communication system, people are used to the application of technology and computers. But the use and production of mobile apps is a new and increasingly growing field. The Mobile App is having an international positive effect. According to Islam [10], it is getting easier to use developed worlds for mobile devices and people are upgrading themselves and developing a new form of IT infrastructure. The user is provided with different features through the use of mobile apps that will allow him to satisfy all his needs and much more. Bakhta [2] states that the apps should be user-interactive. Most technology is based on the Internet and offers great features. And then there is a dramatic increase in the use of mobile phones over the Internet. Islam [10] has argued that these mobile apps are designed to support us in our daily lives and allow us to connect to the internet, communicate with the world, obtain remote information, use Facebook or Twitter for social networking, recognize current locations, etc.

According to Estes [8], geolocation is a technology that defines or explains the actual physical position of a user by using data obtained from a person's computer or mobile device. In two types of data, active user / device-based information and passive server-based lookup/data correlation can be gathered, then cross-referenced to generate the most precise result. [2] also implies that the proliferation of Global Positioning Systems (GPS), Wi-Fi, mobile cellular networks and IP location recognition techniques provides consumers at various locations with a wider range of derivative technology applications to customize products and services, conduct mobile financial transactions with greater digital security assurance, and exploit the ability to use cloud services. In order to cope with the large amount of content on the internet, search engines use sophisticated algorithms to personalize search results for individual users. Kliman-Silver [11] states that custom search results are useful in some instances. For example, see [11] if two people search for "coffee shop" on the opposite ends of the US, search results for nearby cafés will probably be displayed. In the "always connected" world, mobile geo-location services are popular. They developed software and services that were innovative, effective, and realistic. With location technology that appeals to advertisers, merchants, government agencies, law enforcement, attorneys and, sadly, criminals, user experience can be customized. These services pose a risk to consumers, [2] has argued that service providers and others who, given their many advantages, use the data obtained by the service providers.

### B. Digital Cultural Heritage

Most contemporary thinkers agree that we are going through a time of historical transformation, building a new structure and paradigm for social interrelationships. According to Portalés [15], our lives and careers, as well as the ways we communicate and interact with each other, have changed. Wang [18] also states that it is therefore a major concern of UNESCO to recognize and maintain its outstanding universal value (OUV) and to highlight the changing role of digital heritage that UNESCO identifies as the use of digital media to preserve, protect, study and present those heritages. In a way, this new phenomenon means that the cultural policies of the exhibition

and museum space break with previous negative patterns. Emblematic museums appeared in the 1980s, and were seen more as a spectacle than a place to conserve cultural properties. [15] has argued that the architectural object indicated in them more than the desire of the public to enter. An integral part of the Digital Earth program is "digital heritage," a concept that separates itself from its physical equivalent. [18] implies that digitalizing heritage allows the permanent value of tangible heritage to be preserved in the long term, readily visible, widely shared and disseminated to the public. Cultural relations, based on a genuine meaning, are thus no longer created. At the same time, today, as ever, the development and conceptual needs of the personality remain the same as the position of the real sphere of human life (education and education). According to Nikonova [13], the sense of community and heritage in these fields of human life means a lot. The definition of heritage slowly incorporates a wide range of material artefacts, natural phenomena, as well as non-material forms of culture, reflecting different aspects of the relationship between man and nature, global and regional development trends, etc. Yet the very sense of heritage changes. In conclusion, Kampong Bharu as it well known for its traditional houses and cuisine, it also applies to their culture and the lifestyle in Kampong Bharu must be preserved so in the future, the heritage of Kampong Bharu will never be forgotten and can be implies to the other historical places such as Malacca.

### C. Case Study

Two applications that have similar functions have been studied in order to collect the beneficial information on the features provided by the applications as the base of the development of the project.

#### 1) Next Exit History



Fig. 1. Next Exit History

A personal user tour guide (FREE) designed for adventurers. Explore tens of thousands of historic sites around the world via our GPS-enabled, easy-to-use mobile app. Next Exit History goes wherever it is no longer needed by hundreds of local heritage travel apps.

## 2) TripAdvisor

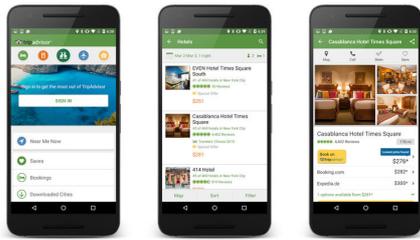


Fig. 2. TripAdvisor

TripAdvisor, Inc. is an online travel company that operates a global network of online transportation, hotel, travel and restaurant reservations, price comparison tools and user-generated content. Its flagship company, Tripadvisor.com, exceeded 600 million unique visitors per month on average in 2018.

In conclusion, both of the mobile applications above giving a different purpose of usage in their apps. Next Exit History app implies the GPS in their app for the purpose of guiding the user to visit certain places accurately from their location. While TripAdvisor app is designed to display information about the certain places for user.

### III. METHODOLOGY

The waterfall model, according to Eric Conrad [4], is a linear model of application development that uses stable phases; the next phase begins when one process ends as shown in the Figure 3. For example, once the requirement phase is done, the next phase will begin which is analysis phase. This implies to all phase. The paradigm of the waterfall predates the design of software and was initially used in production. It was first used to describe a software development process in 1969, when large software projects had become too hard to design using informal methods. [4] also states that steps happen sequentially, and it is not possible for developers to return to earlier phases with the unmodified waterfall model. It is known as the waterfall because it simulates falling water so that it does not go up.

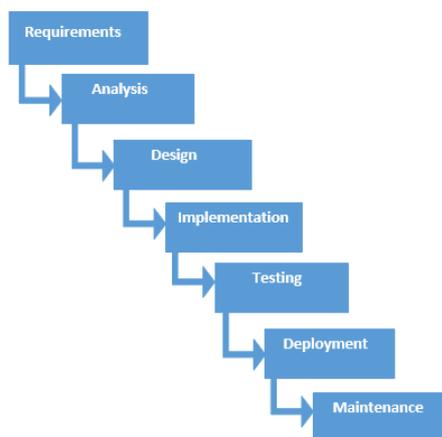


Fig. 3. Waterfall Model

#### 1) Requirement Phase

This stage includes all the schedule of activities to keep on track of the process, such as doing a feasibility analysis at the previous related stage, defining the problem involved in the project and collecting the requirement for hardware and software. This stage is very critical for the collection of project information. In this point, a process of observation will be carried out to obtain information about the places of attraction available at Kampong Bharu and to get some idea of the current Kampong Bharu environment as well.

#### 2) Analysis Phase

The program that needs to be used will be evaluated in this process. There are many applications that can be used for the development of the Android smartphone application, which are Xamarin forms, Microsoft Visual Studio, Google Cloud, etc. Xamarin Forms from Microsoft Visual Studio is the program that was chosen for this project to build a framework to develop an Android application.

#### 3) Design Phase

Hardware design and software design are involved in this process. The hardware design focuses mostly on the design of the interface, which is the delivery of the hardware involved in this project. For example, the location, link and smartphones that are allowed. The design focuses on designing an Android mobile application interface for software design with the use of Xamarin Forms and Visual Studio information design.

#### 4) Implementation Phase

The task involved in this implementation process is for Android smartphone users to create a prototype framework using the Visual Studio platform. The required hardware and software are all installed.

#### 5) Testing Phase

The testing stage is an important stage in testing the project to assess whether or not the project is successfully meeting the requirement and goal. The testing aspect involved in this process is to test the prototype system based on the android platform, test the relation between the system and ensure that the position is currently formed by the exact location of the user that needs internet connection and smartphone configuration location.

#### 6) Deployment Phase

After the prototype has been validated and mounted on the customer's Android smartphone, this phase will be introduced. It will also require planning the android device product for the client android smartphone to be installed and used. Delivery may take place via the internet or physical media, and to encourage changes at a later date, a formal revision number is usually tagged.

7) Maintenance Phase

After the deployment process, this stage takes place and involves modifying the Kampong Bharu android mobile application or an individual component to change the attributes or improve the mobile application 's performance.

IV. PROTOTYPE DEVELOPMENT

Adobe XD was used to prototyping the application’s User Interface (UI). Once the design was decided and finalized, the final product was developed using Microsoft Visual Studio for Android smartphone users.

A. Hardware Requirement

The following table shows the hardware requirements for the application development.

TABLE I. HARDWARE REQUIREMENT

Hardware	Functions
Personal Computer	For an implementation phase this computer will use for develop an android application and act as an android simulator
Huawei Nova 3i Smartphone	The function of this smartphone is to act as a client for testing purposes.

B. Software Requirement

Table 2 shows the software requirements needed in developing the mobile application.

TABLE II. SOFTWARE REQUIREMENT

Software	Functions
Adobe XD	Adobe XD, developed and released by Adobe Inc, is a vector-based user interface design platform for web apps and mobile apps. It is available for macOS and Windows, while iOS and Android versions are available to help preview the results of work on mobile devices directly.
Visual Studio 2019	Microsoft Visual Studio is a Microsoft integrated environment for development. As well as blogs , web browsers, web services and smartphone apps, it is used to create computer program.
Android Device Manager	Android Device Manager is a software to launch Android Smartphones as simulator.

C. Prototype Design

In figure 4, these are all the pages in Kampong Bharu Ventures mobile application. The theme colours are turquoise,

grey and white representing the minimalist design for users’ eyes comfortability.

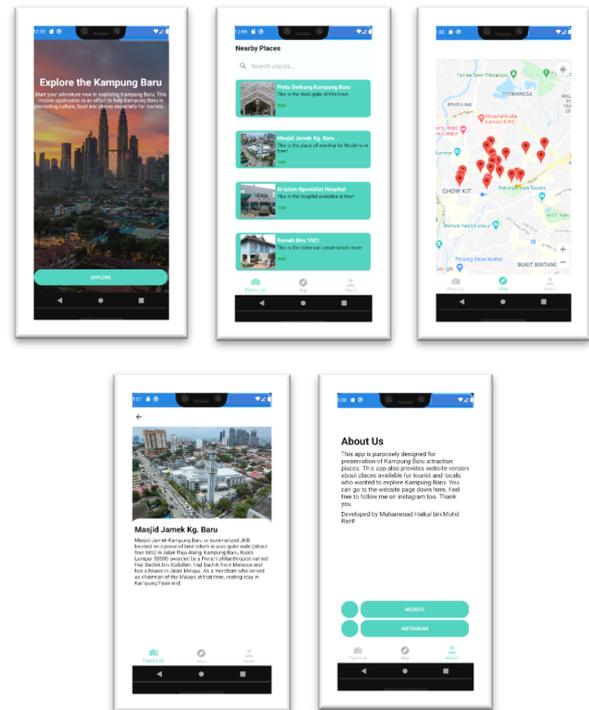


Fig. 4. Pages of Kampong Bharu Ventures Application

From top left figure, this page shows a splash page. In the top middle, this page shows list of places available in Kampong Bharu. User can also use the search bar above to find the exact places easily. In top right, this page shows Google Maps and all the attraction places in Kampong Bharu. This map page is interactive where user can click on the red pin inside the map to know what places available there. In bottom left, this page shows the details about the places after they interact with the place list page. This page will show information and images of the places to user. In the bottom right, this page shows the about page. This page providing information on the developer. There are also buttons where user can redirect to Kampong Bharu Instagram and website, which created as part of this project, to know more information about the places available in Kampong Bharu.

D. Prototype Features

As overall review, the mobile navigator has the following features that might help visitors in exploring Kampong Bharu:

1. Provides information on food, cultural and heritage locations.
2. Provides search option to find specific place.
3. Provides map to go to the location and shows your journey within Kampong Bharu.
4. Minimalist UI/UX designs that comfortable to the user’s eyes.

## V. TESTING AND RESULT

There are several kinds of methods that can be used to evaluate a specific application of a product. Upon completion of the entire design and development process, the developer evaluated the application by using questionnaires and the users were also given the opportunity to use the mobile application before answering the questionnaires.

### A. Survey Result

The survey was carried out among UniKL students and tourists via online. The findings help to support the future development and improvement of the mobile application. The questionnaire has 3 sections; application functionality, design interface and the application's effectiveness in preserving the heritage and cultural value of Kampong Bharu. The following graphs and pie charts provide the results of the collected data.

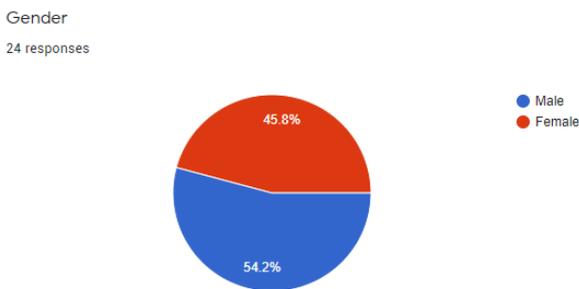


Fig. 5. Gender

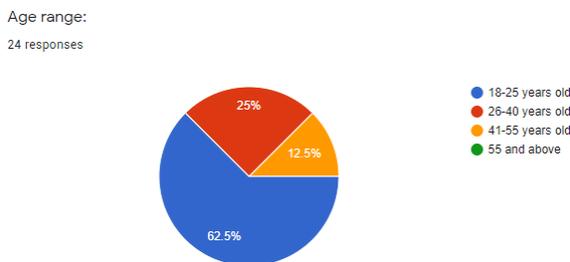


Fig. 6. Age

Based on Figure 5 and 6, it shows that the questionnaires were answered by most male and visitors age range from 18 to 25.

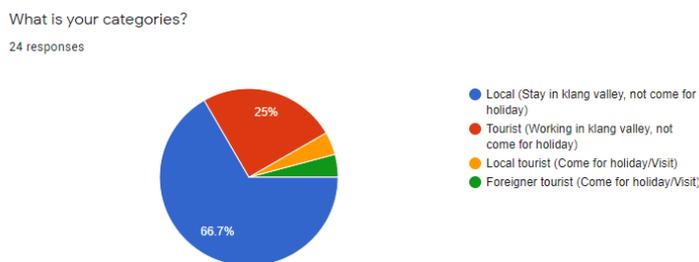


Fig. 7. Categories

In Figure 7, it shows that 66.7% visitors who have answered the questionnaires were locals and this may conclude that they are may be from Klang Valley area.

Digital preservation is a new way of method to conserve the value of culture and heritage of the historical places such as mobile application and website. While analog preservation is an old way of method in such as using booklet, pamphlet and so on. Which medium do you prefer to use?

24 responses

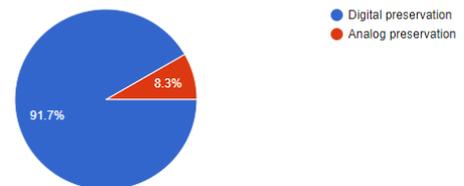


Fig. 8. Digital Preservation Method

91.7% users chose to use digital preservation as a method to conserve the value of culture and heritage of Kampong Bharu as shown in Figure 8.

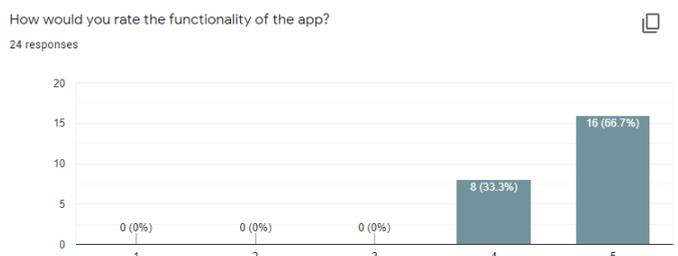


Fig. 9. Functionality

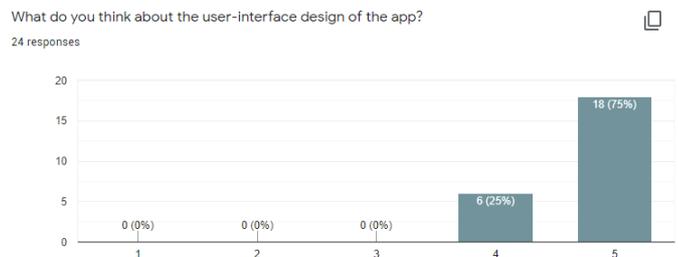


Fig. 10. User-Interface

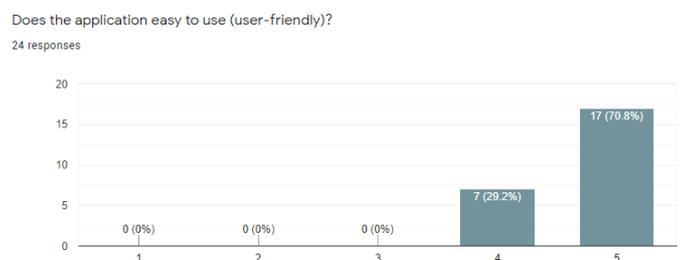


Fig. 11. User-Friendly

Most of the users found that this application's functionality is very good as shown in Figure 9. Besides that, they also agree to say that the application's user-interface is very promising, clear and understandable as shown in Figure 10. Lastly, most users also agreed to say this application is user-friendly as shown in Figure 11.

## VI. CONCLUSION AND RECOMMENDATION

The development of Kampong Bharu Ventures is intended to develop a mobile navigator to aid visitors exploring Kampong Bharu while promoting and preserving information on food, cultural and heritage values of Kampong Bharu digitally. Furthermore, the mobile application also aims to assist both international and domestic tourists in order to promote tourism activities in Kampong Bharu.

Using mobile apps will assist tourists more on the finding the attraction places in Kampong Bharu that previously hidden and unaware of. Geolocation features provided in the application allow user to search a specific place in Kampong Bharu and able to trace your journey within Kampong Bharu. Therefore, it serves the purpose of promoting Kampong Bharu at the same time preserves information on cultural and heritage values of Kampong Bharu.

As future improvements, gamification value with business approach in increasing the local sales in Kampong Bharu can be added to make it more fun while exploring the places. Augmented Reality (AR) may be added as extra features to give simulation of the past history at the cultural and heritage sites. In conclusion, different enhancements may be made for potential research purposes, such as program reliability and new functionality. This improvement should be implemented in multiple stages of app development.

## REFERENCES

- [1] App Likey Solutions. (2017, December 13). Retrieved from App Likey Solutions Web Site: <https://applikeysolutions.com/blog/how-to-create-a-mobile-app-with-geolocation>
- [2] Baktha, K. (2017). Mobile Application Development: All the Steps and Guidelines for Successful Creation of Mobile App. *International Journal of Computer Science and Mobile Computing*, 15-20.
- [3] Christian, M. (2015). Mobile Application Development in the Tourism Industry. *Impact on On-Site Travel Behavior*, 9.
- [4] Conrad, E. (2012). Waterfall Model. *CISP Study Guide*, 169.
- [5] Culatta, R. (2020). Instructional Design. Retrieved from [InstructionalDesign.org: https://www.instructionaldesign.org/models/addie/](https://www.instructionaldesign.org/models/addie/)
- [6] Culatta, R. (2020). Instructional Design. Retrieved from [InstructionalDesign.org: https://www.instructionaldesign.org/models/addie/](https://www.instructionaldesign.org/models/addie/)
- [7] Duggal, S. (2015, November 13). Quora. Retrieved from [www.quora.com: https://www.quora.com/What-are-the-three-stages-of-video-production](https://www.quora.com/What-are-the-three-stages-of-video-production)
- [8] Estes, B. (2016). Geolocation—The Risk and Benefits of a Trending Technology. *ISACA Journal*, 1.
- [9] Forest, E. (2014). Educational Technology. Retrieved from [The ADDIE Model: Instructional Design: http://educationaltechnology.net/the-addie-model-instructional-design/](http://educationaltechnology.net/the-addie-model-instructional-design/)
- [10] Islam, M. R. (2010). Mobile Application and Its Global Impact. *International Journal of Engineering & Technology*, 104.
- [11] Kliman-Silver, C. (2015). Location, Location, Location: The Impact of Geolocation on Web Search Personalization. 121-127.
- [12] Lizeth. (2015, November 13). Mobile Application Development Process. A Practical Experience, 1. Retrieved from [www.quora.com: https://www.quora.com/What-are-the-three-stages-of-video-production](https://www.quora.com/What-are-the-three-stages-of-video-production)
- [13] Nikonova, A. A. (2017). The Role of Digital Technologies in the Preservation of Cultural Heritage. *Odborné články z praxe*, 170.
- [14] Omar, A. H. (1996). *Language Planning For Unity And Efficiency*. Universiti Malaya.
- [15] Portalés, C. (2018). Digital Cultural Heritage. *Multimodal Technologies and Interact*, 2.
- [16] Priandani, N. D. (2017). Mobile Application Based on Geolocation. *Malang Historical Tourism Guide*, 1.
- [17] Shavitt, Y. (2011). *A Geolocation Databases Study*. 1.
- [18] Wang, X. (2019). *Manual of Digital Earth*. Springer, 566.