مَجلةُ أُريد الدَّوليةُ لقياسات المعلومات والاتصال العلمي

العدد 5، المجلد 3، تموز 2022 م

The Role of Smart Device Applications in Enriching the Knowledge Community and Enhancing User Services in The National Archives

Elsayed Elsawy

Assistant Professor-Information Studies Department - Sultan Qaboos University

دور تطبيقات الأجهزة الذكية في إثراء مجتمع المعرفة وتعزيز خدمات المستفيدين في الأرشيفات الوطنية

السيد صلاح الصاوي

أستاذ مساعد ـ قسم دراسات المعلومات ـ جامعة السلطان قابوس

eelsawy400@gmail.com

arid.my/0007-5238

https://doi.org/10.36772/arid.aijisc.2022.355

Abstract:

Based on its role as centers responsible for preserving the official memory of the state and society, the National Archives spare no effort to reach all categories of users (researchers, historians, genealogists, media professionals, and others). To achieve this, they seek to get benefit from technological developments to enhance their role in society, improve their services, and increase access and interaction with the public. This study explores smartphone applications in the National Archives, the reasons of its use, and its importance in enhancing services provided to users. The study also describes and analyzes the characteristics of these applications, and the challenges that the National Archives faced in developing them. It includes smartphone applications in the National Archives of the United Kingdom, the United States, and the United Arab Emirates. The study utilized the descriptive method, and a suggested points' list to analyze the characteristics of these applications. The study has revealed that the National Archives in UK, USA and UAE developed eighteen applications for smartphones and mobile devices. 50% of these applications covered political topics, whereas 16.8% of them covered historical topics, and the remaining 33.2% constituted applications for distinct topics, such as old money, genealogies and web archives for government institutions. The study concludes with suggestions for Arab archives centers that plan to develop successful applications for smartphones and mobile devices.

Keywords:

Smartphone Applications, National Archives, Awareness of Documents, Today's Document

المستخلص

من منطلق كونها مراكز مسؤولة عن حفظ الذاكرة الرسمية للدولة والمجتمع، لا تدخر الأرشيفات الوطنية جهدًا للوصول

إلى جميع فئات المستخدمين (باحثين، مؤرخين، علماء أنساب، إعلاميين، وغيرهم). ولتحقيق ذلك، تسعى الأرشيفات الوطنية

للاستفادة من التطورات التكنولوجية لتعزيز دورها في المجتمع، وتحسين خدماتها، وزيادة الوصول والتفاعل مع الجمهور.

تستكشف هذه الدراسة تطبيقات الهواتف الذكية في الأرشيفات الوطنية، وأسباب استخدامها، وأهميتها في تعزيز الخدمات المقدمة

للمستفيدين. كما تصف الدراسة وتحلل خصائص هذه التطبيقات والتحديات التي واجهتها الأرشيفات الوطنية في تطويرها. وشملت

تطبيقات الهواتف الذكية في هذه الدراسة التطبيقات التي أطلقتها الأرشيفات الوطنية في كل من المملكة المتحدة والولايات المتحدة

والإمارات العربية المتحدة. استخدمت الدراسة المنهج الوصفي وقائمة نقاط مقترحة لتحليل خصائص هذه التطبيقات. وكشفت

الدراسة أن الأرشيفات الوطنية في المملكة المتحدة والولايات المتحدة الأمريكية والإمارات العربية المتحدة طورت ثمانية عشر

تطبيقًا للهواتف الذكية والأجهزة الذكية. 50٪ من هذه التطبيقات غطت موضوعات سياسية، في حين أن 16.8٪ منها غطت

موضوعات تاريخية، والباقي 33.2٪ تعلقت بموضوعات متميزة، مثل النقود القديمة، والأنساب، ومحفوظات الويب للمؤسسات

الحكومية. وختمت الدراسة باقتراحات للأرشيفات العربية التي تخطط لتطوير تطبيقات ناجحة للهواتف والأجهزة الذكية.

الكلمات المفتاحية: تطبيقات الهواتف الذكية، الأرشيف الوطني، الوعي بالوثائق، وثيقة اليوم

Introduction:

Smart devices have spread among all categories of society, and its platforms such as iOS and Android helped developers publish applications that make smart devices a formidable force and gateways to the electronic world and services available on information networks. A smartphone is a term given to a category of modern mobile phones that use an advanced operating system (such as iOS, Android), including the iPhone, Android, and BlackBerry devices. Smartphones provide the functionality of portable media players, built-in digital cameras, GPS, internet browsing features, email synchronization and office file opening. Smartphone applications are small programs that aim at promoting the mobile phone; to be more than just a device for sending text messages and calling, and to be used in other aspects. These applications are pre-installed on phones during manufacturing or can be downloaded either for fees or for free by users from software stores or platforms such as the Apple App Store for IOS or Google Play Store for Android.

Guillaume and Menerat (2015) indicate that modern mobile phone applications depend on cloud-based technologies, meaning that data is stored on Internet servers rather than locally on the phone itself. Therefore, applications that use the formula HTML5, for example, which is the current generation of markup language used in preparing web pages, may not require downloading any software (International Bank for Reconstruction, 2012). Smartphone applications may be developed for specific platforms; for example, the "iPhone app" does not work on Android phones and vice versa. Mobile applications are produced by other parties to cover various commercial activities or services, which people can install on their smartphones or mobile devices (Murphy, 2010). One of the advantages of using smart applications is that they are used in the context of e-government, to submit complaints and retrieve local data, plus the ability to download them easily at any time and place and follow-up news via social media, such as Twitter, Facebook, and YouTube.

Statement of the Problem

Smartphone applications are designed for mobile devices such as smartphones and tablets, each of which usually offers specific functions. The use of these applications and smartphones is growing at a steady rate, and there are more than 3.2 billion smartphone users worldwide (Statista, 2020). According to the mobile app usage statistics for 2020, the Apple App Store has 1.96 million

apps available for download. Likewise, there are 2.87 million apps available for download on Google Play Store. In addition, 87% of smartphone users spend their time using apps (BuildFire, 2020)

Like other society institutions, archives centers have developed applications for smartphones to assist them in their archival activities and enhance the services provided to users. This study explores the phenomenon of using smartphone applications in archival work, identifying the reasons for their use, their most important characteristics, and the challenges faced by archives centers that have developed applications for smartphones and mobile devices versus traditional web services.

Importance of the Study

The importance of the study is highlighted in the fact that it deals with a recent topic in the archival literature, by describing and analyzing the phenomenon of using smartphone applications in archival activities and services. The results of the study assist those responsible for document and archives centers in the Arab world in planning and developing smartphone applications that serve Archives' activities and services.

Objectives of the Study

The study aims to explore the reality of the archive's centers using smartphone technology to enhance the Archives' services provided to users, the most prominent of these applications, their objectives, their characteristics, and the most important challenges that the Archives faced during the development of these applications.

Questions of the Study

The study raises the following questions:

- To what extent do archives centers use applications for smart devices to perform their activities and update the services provided to users?
- What are the motives of archives centers for creating smart device applications?
- What are the characteristics of smart device applications used in archives centers (name of the application, its objectives, operating platform, free or paid service, languages in which the application is available, target audience ...)?

- What are the challenges that archives centers faced in creating applications for smart devices?

Delimitations of the Study

- Subject delimitation: The study deals with the use of smart device applications in the National Archives.
- Place delimitation: the study includes the National Archives of the United States, the United Kingdom, and the United Arab Emirates.
- Time delimitation: The study data were collected and updated from February-June 2020

Community of the Study

Using the keywords "National Archives" and "documents", and searching for smartphone applications implemented in the National Archives, three countries are identified to represent the community of this study: the United States, the United Kingdom, and the United Arab Emirates. The smartphone applications in these Archives are characterized by the diversity of their topics, objectives, and target audience.

Methodology and Data Collection Tools

The study used the content analysis method as a suitable method for analyzing the characteristics of smartphone applications in the National Archives; in preparation for extracting indicators that can be later used in developing applications for smartphones in the Arab National Archives. To enumerate the current applications in the National Archives, the researcher used the following tools:

- Direct search on the Google Play Store for Android smartphones (Google Play, 2020), and the Apple Store (2020) which is a digital app distribution platform for iOS developed and maintained by Apple Inc company. Upon installing the application, the store provides information about the application and its basic features.
- Direct search on Federal Government Mobile Apps Directory (2020) of USA to find smartphone applications for Archives.
- The websites of the National Archives, which provide information on the smartphone applications that the Archives created to update its activities and services; For example,

the United States National Archives devoted a page on its website for its mobile applications (US National Archives, 2020).

- A list of points suggested by the researcher to analyze the characteristics of smartphone applications used in the Archives, including: the name of the application, its objectives, operating platform, paid or free service, languages in which the application is available, application's launch date and its category (political, educational, Archives' services, historical documents, leaders / presidents). The researcher communicated via e-mail with the officials in the National Archives to learn about the most important challenges they encountered in planning, designing and implementing these applications.

Previous Studies

By searching online or in bibliographic databases for studies dealing with description and analysis of the characteristics of smartphone applications in information institutions, or their role in increasing awareness of the role of the National Archives and the importance of archival documents, the researcher has found a number of studies that dealt with the topic of smartphone applications and their effects on users. One of these studies was about the reality of using mobile phone technology in providing information services in Saudi university libraries (Al-Qarni, 2014). It revealed that 70.8% of Saudi university libraries do not use mobile phones to provide information services, and that this is due to the lack of training and awareness of the importance of technology and how to deal with it. Moreover, a study about Moving towards mobile phones in the library (Nowlan, 2013) indicates that students in the University of Regina (Canada) would like to interact with the library on their mobile devices, and that the library index is the most popular resource. Furthermore, considering the rapid evolution in the use of smartphones, it is important to analyze the characteristics of interactive applications, including high-definition audio, video, and high-quality multimedia, dynamic web content, user interfaces and responsiveness, and graphics (Gutierrez et al., 2011).

However, smartphones have negative effects on students' behavior, and that parents should observe their children, and not allow them to use smartphones excessively and for long periods (Al-Jamal, 2015). A study aimed to know how the Saudi university youth specialized in communication and media use smartphones. It found that 98% of these young people use smartphones, and that 48.4% of them have two smartphones. As for their motives of using phones,

they mentioned useful motives, meaning that smartphones enable them to browse the Internet; so, it gives them the ability to make phone calls, then ritual motives, the most important of which is that they use them to access social media, then to take photos and record videos. As for the satisfactions achieved, they included obtaining information quickly, saving time and effort, and developing culture and knowledge (Al-Otaibi, 2014).

In light of previous studies, it is obvious that some of them focused on studying the impact of smart phone applications on users and that some information institutions do not use mobile phones to provide information services, and that students want to interact with the library on their mobile devices. Although smartphones have negative effects on students' behavior, they also have many benefits including quick access to information and saving time and effort. This study differs from the previous studies in that it focuses on analyzing the experience of using National Archives for smart applications to get benefit from them in enhancing services provided to users.

1. The National Archives' Interest in Creating Smartphone Applications: A Brief History

In the last two decades, the foreign and Arab National Archives have adopted strategies for digitizing documents and archiving them electronically in organizations, using Web 2.0 applications, publishing documents, and making samples of them available on the archives' website and its social platforms. Laptops, tablets, and smartphones have also grown in popularity. In the context of its insistent endeavor to update the services provided to users, the Archives sought to make their services more compatible with mobile devices, bearing in mind that many users on the internet do not visit the National Archives in person, or do so rarely. Therefore, the National Archives have created applications for smartphones to help them modernizing and developing its activities and improving the services provided to users.

According to Theimer (2014), Archives realized the capabilities of these applications as a fruitful way for public participation shortly after their availability to the public with the opening of the Apple App Store in 2008. The commonness of laptops, tablets, and smartphones increased, and they were used by the Archives' users by bringing them during their visits to the Archives, as they used to print several pages from the Archives' website and tag these pages on their devices as bookmark pages. That is why the National Archives of Australia (2013) acknowledges the increasing use of mobile technology; more than 50% of Australian adults use smartphones to access the Internet, and they expect government to provide services on these devices, increase

accessibility and operational efficiency. This increasing use is prompting the National Archives of Australia to reconsider its delivery methods for their products and services (National Archives of Australia, 2013). Through smartphone applications, images of documents and archival materials can be shared with a smartphone or a tablet. The abilities of these applications increase when they are combined with digitized content, as they contribute in increasing awareness of the richness and vitality of Archives' resources (Theimer, 2014).

In the United States, given the importance of useful applications for smartphones that can be used by the public for free at almost any time and place, the previous President of US Barack Obama (2009-2017) ordered all federal agencies to create at least two applications for mobile devices as a part of the digital government plan, in which the president called for the "21st century platform" to better serve the American people (Breeden, 2012). One of the agencies that has begun launching mobile apps is the National Archives and Records Administration (NARA). The US National Archives believes that it is the honest guard of the documents of the American nation and believes that all Americans will understand the vital role that documents play in a democratic state. Part of that vision includes making sure that every American has access to documents.
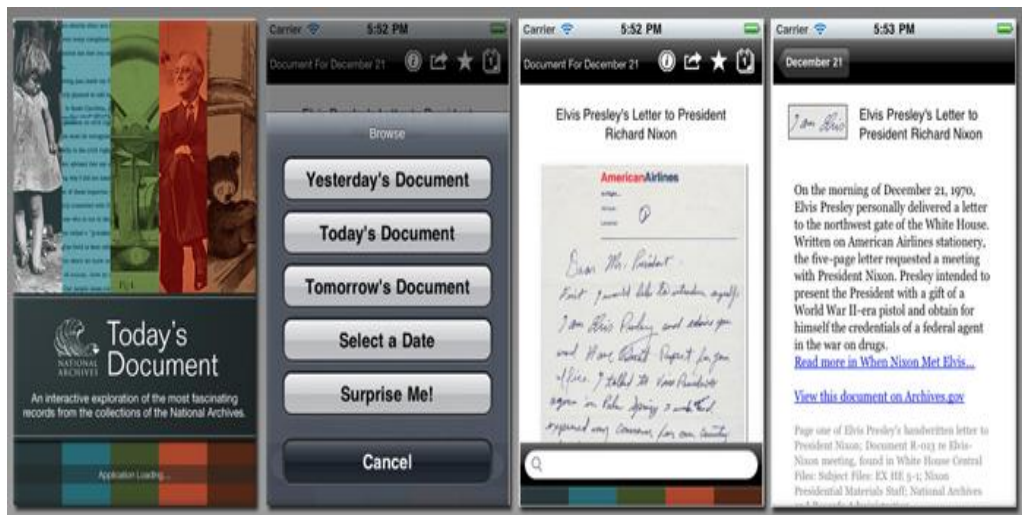

Figure (1): "Today's Document" application in NARA

Based on this vision, NARA created (7) applications for mobile devices: Congress Creates the Bill of Rights, DocsTeach, JFK and the Cuban Missile Crisis, Today's Doc, World War I, Presidential Docs Mobile Site, and National Archives. The objectives of these applications vary;

Today's Doc application, which was released in January 2017 via iTunes and the Android Market as a free application, provides a history record displaying a historical document from the National Archives' properties for each day of the year. This makes it a valuable resource for teachers, historians and the general public. Therefore, the application was well received by the public. In its latest application World War I, the National Archives of the United States invites the public to participate, collaborate, and interact with the Archives' vast collection of moving and still images of World War I, representing America's most important cultural heritage.

The National Archives of the United States is keen to keep its smartphone applications available on more than one operating platform to be compatible with different devices and affirms its legal disclaimer or endorsement of any products or services offered on the Android Marketplace, Apple iTunes Store, or any sites related to it. In the United Kingdom, archivists believe that their documents are not just a first draft of history, and that they can be used in smart ways by developers to create innovative products and services for those who need immediate access to practical historical information. In January 2011, the National Archives, in cooperation with the historian Nick Barratt, began developing their application "Old Money" (RevelMob 2020), which is an application for iPhones and iPads used to convert old money into today's values, that is, it can be used to find out the current value and purchasing power for historical price data from National Archives' documents. The application allows users to understand the historical facts and figures contained in the historical documents so that they have meaning, such as the sale of Buckingham Palace for 21,000 pounds in 1761, or that the annual salary of the English writer William Shakespeare in 1599 was 100 pounds. This means that the application provides a historical background of what life was like at the time, and the living standards of British ancestors.
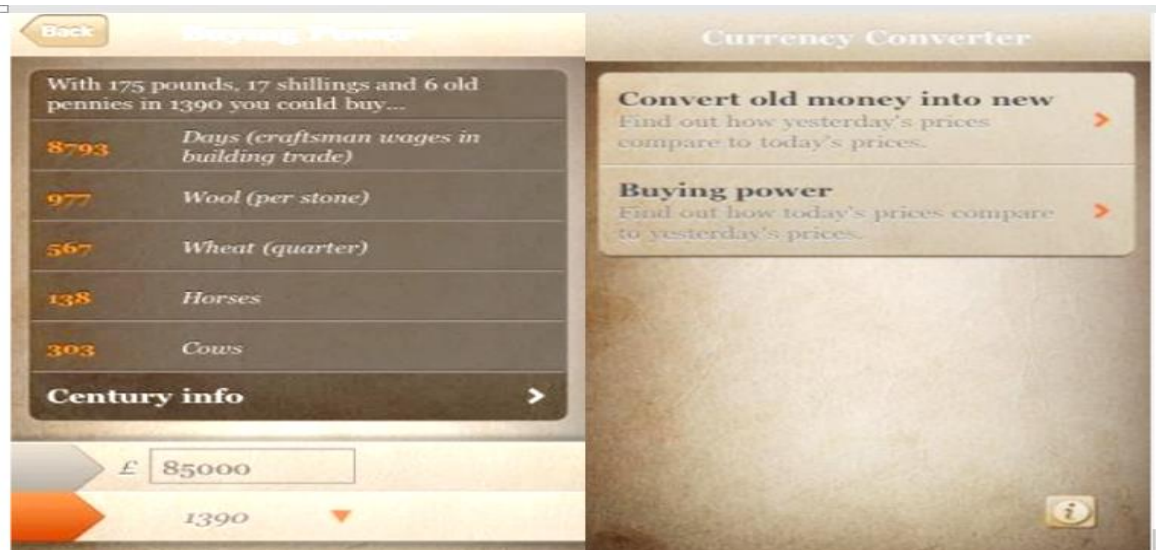
Figure 2: The "Old Money" application in the British National Archives

In the United Arab Emirates, the increasing interest in the history of the state was a motive to provide services for smartphones that are the applications for the Archives and rulers in the country, including: the National Archives' application which contains an integrated system for electronic publishing of Archives' publications in addition to providing information on the services, activities, and news of the National Archives. Another service is the application of the audio library of Sheikh Zayed bin Sultan Al Nahyan, and the applications of diaries of leaders and sheikhs (Khalifa bin Zayed, Mansour bin Zayed Al Nahyan, Mohammed bin Rashid, Hamdan bin Mohammed, Mohammed bin Zayed). The diaries cover various fields (social, economic, media, security, political, and sports).

2- Smartphone applications according to its creators

By searching online and on the free Apple Store on Google Play for Android apps, and Archives' websites, the study has found the following applications:

Table 1: Smart device applications according to the Archives that created it.

No.	Application name	National Archives	Number	%
1.	Congress Creates the Bill of Rights	US (Mobile Apps from the National Archives, 2020)	7	%38.9
2.	DocsTeach			
3.	Today's Doc			
4.	JFK and the Cuban Missile Crisis			
5.	Remembering WWI (2020)			
6.	Presidential Docs Mobile Site			
7.	National Archives			
8.	Old Money	UK	1	5.6
9.	National Archives VR	Arab Emirates	10	55.5
10.	The audio library of Sheikh Zayed bin Sultan Al Nahyan			
11.	Diary of Khalifa bin Zayed			
12.	Diary of Mansour bin Zayed Al Nahyan			
13.	Diary of Mohammed bin Rashid			
14.	Diary of Hamdan bin Mohammed			
15.	Diary of Mohammed bin Zayed			
16.	Diary of Zayed bin Sultan Al Nahyan			
17.	Al Nahyan			
18.	Web Archives			
	Total		18	100%

From the previous table, we deduce the following indicators:

- The National Archives of the United States, the United Kingdom, and the United Arab Emirates created (18) apps for smartphones and mobile devices.
- The National Archives of the United Arab Emirates is the most one that created smartphone applications with a rate of 55.5%, with (10) applications, followed by the US National Archives with 38.9%, with (7) applications, and then the National Archives of the United Kingdom with 5.6%, with one application.

- The applications of leaders' diaries in the UAE made up the largest percentage of applications in the Emirates' National Archives. Out of (10) applications provided by the Archives, (7) apps. are devoted to diaries of leaders and rulers, at a rate of 70%. This means that more than two-thirds of the applications created by the Archives represent applications for leaders and rulers, and include diaries of Their Majesty Khalifa bin Zayed since 1968, Mansour bin Zayed Al Nahyan since 1994, Mohammed bin Rashid since 1969, Hamdan bin Mohammed, and Mohammed bin Zayed, Zayed bin Sultan Al Nahyan.

3. The Archives seek the help of partners and sponsors in developing these applications

The Archives of this study sought the help of technical designers and experts to plan, design and implement applications for smartphones and laptops. Here are some examples:

- In 2005, the US National Archives sought the help of the company Accella (2020) to design and implement the Today's Doc application, so that the application would be compatible with the requirements of users and employees of the National Archives. Accela designed a graphical interface and separate versions of the application for the iPhone and Android platforms, and for each document they created four images (Thumbnail, Small, Medium, Medium and Full-size) to achieve a balance between what is stored locally on the phone and what is withdrawn from a remote database. Storing images on the phone allows the application to run more smoothly but increases the file size significantly. While accessing images from the database reduces the file size, it causes a slower operation for the application. The application also allows you to zoom in on high-resolution images to get a closer look at the document and use the calendar to set a specific date.
- AT & T Company (2020) worked with the US National Archives and the John F. Kennedy Presidential Library and Museum to create the application "JFK and Cuban Missile Crisis".

4. Objectives of Smartphone Applications in the National Archives

The objectives of smartphone and mobile devices' applications in the Archives examined in this study varied as shown in the following table:

Table 2: The objectives of smartphone applications in the National Archives

The Application/ National Archives	Objectives
Congress Creates the Bill of Rights (USA)	An interactive learning tool that offers the user the suggestions, discussions, and reviews that made up the United States Bill of Rights, and allows the user to explore the proposals, discussions, and reviews that made up the first ten amendments of the United States Constitution. The application answers many questions including: why do the United States need a bill of rights? How did Congress pass the bill of rights?
Docs Teach (USA)	A learning tool with primary materials and resources from the US National Archives to support learning activities with documents. Students can enter the class code and access the full activities, or choose from a list of educational activities according to the historical era.
Remembering WWI (USA)	A tool for sharing and interacting with the large collection of World War I images in the US National Archives, which helps explore, interpret, and reuse America's most important cultural heritage.
Today's Doc (USA)	An interactive document gallery that allows users to explore select items from the National Archives, containing 365 remarkable documents from American history with their descriptions. Users can access the calendar feature to see what happened on their birthday, and search documents by keyword. The document can be enlarged to check a high-resolution image, and read background information on it and links to related websites (Viderity Inc., 2011).
JFK and the Cuban Missile Crisis (USA)	A mobile application created in cooperation between the National Archives, the Museum and the Presidential Library of John F. Kennedy, which is a gallery that contains many pictures, documents and recordings; This allows those who are unable to visit the real exhibition to see photos and zoom in the President's remarks, read the actual secret diaries, and hear the president's words as he alerts the nation about the crisis in Cuba.
Presidential Docs (USA)	A web application to provide access to executive presidential documents; such as decisions, speeches, statements and communications of the president to Congress and federal agencies, nominations to the Senate, White House announcements, and press releases. The application includes a user-friendly search engine that allows searching by date, category, and topic.
National Archives (USA)	An application that aims to help users search the National Archives index, databases and other online search tools, review teacher's resources that the Archives suggest to instructors on subjects related to educational curricula, and view important documents related to the establishment of the United States
Old Money (UK)	An application based on data from the National Archives' documents to convert old money in documents preserved in the National Archives to its present value. The application can also be used to comprehend information in historical literature or history books.

National Archives (Arab Emirates)	An application that contains an integrated system for electronic publishing of the National Archives' publications in both Arabic and English languages, and users can purchase, download and read books through the application itself. It also provides information about the Archives, its services, activities, and news. Among the advantages of the application is that it contains a developed browser that has the ability to specify bookmarks for several pages, display the e-book in a portrait or landscape orientation or two facing pages, and a gallery of images and multimedia.
The audio library of Sheikh Zayed bin Sultan Al Nahyan. (Arab Emirates)	An application that allows access to hundreds of audio recordings of Sheikh Zayed which deal with various local, Arab and international issues.
Leaders and Presidents' Diary (Arab Emirates)	Applications that deal with the daily events and activities of the leaders and rulers of the United Arab Emirates in various fields (social, economic, media, political, sports ...)
Al Nahyan (Arab Emirates)	An application for the genealogy of Al Nahyan, and includes hundreds of characters. The application is characterized by its interactive way; It is possible to move from one character to another, and its content can be shared via e-mail or social media.
Web Archives (Arab Emirates)	An application for archiving and indexing government websites and tweets of VIPs and officials to allow researchers to monitor and improve the digital services of government agencies in the UAE.

From the previous table, it is concluded that the Archives included in this study aimed to create applications for mobile devices for the following reasons:

- Providing users with the opportunity to browse and view examples of rare and well-known documents related to specific incidents; like "Today's Doc" application in the US National Archives; which gives users access to a wide range of documents arranged by days of the year.

- Highlighting a group of documents related to a specific event to attract users to it after realizing its value; such as the archival documents related to "Remember World War I" application in the US National Archives.

- Enriching the educational process by using primary sources; such as the application of teaching with documents called "DocsTeach" in the US National Archives.

- Providing a quick access to the Archive's information, services and published documents anywhere at any time; such as "The Archives" application in the UAE National Archives.

- Follow up of documents and diaries of the presidents; such as the applications "presidential docs" in the US National Archives (figure 4), and "Leaders and Presidents' Diaries" in the Arab Emirates.

- Follow up of history by accessing important documents from the treasures of the National Archives arranged by the days of the year; such as "Today's Doc" application.

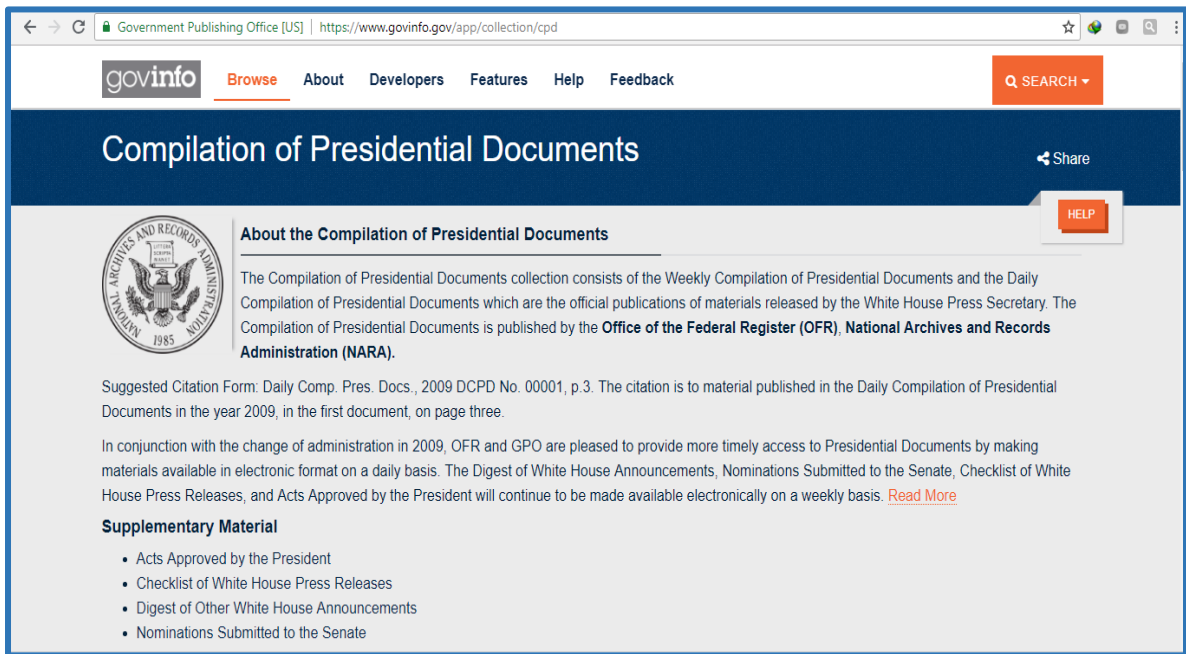- Improving reference services by text, e-mail, or phone.

Figure 4: Application of "Presidential Docs" in USA

5. Smartphone and mobile device applications according to the application category

Smartphone and mobile device applications can be classified in the National Archives according to their subject and category, as shown in the following table:

Table (3): Smartphone and mobile device applications classified according to their category

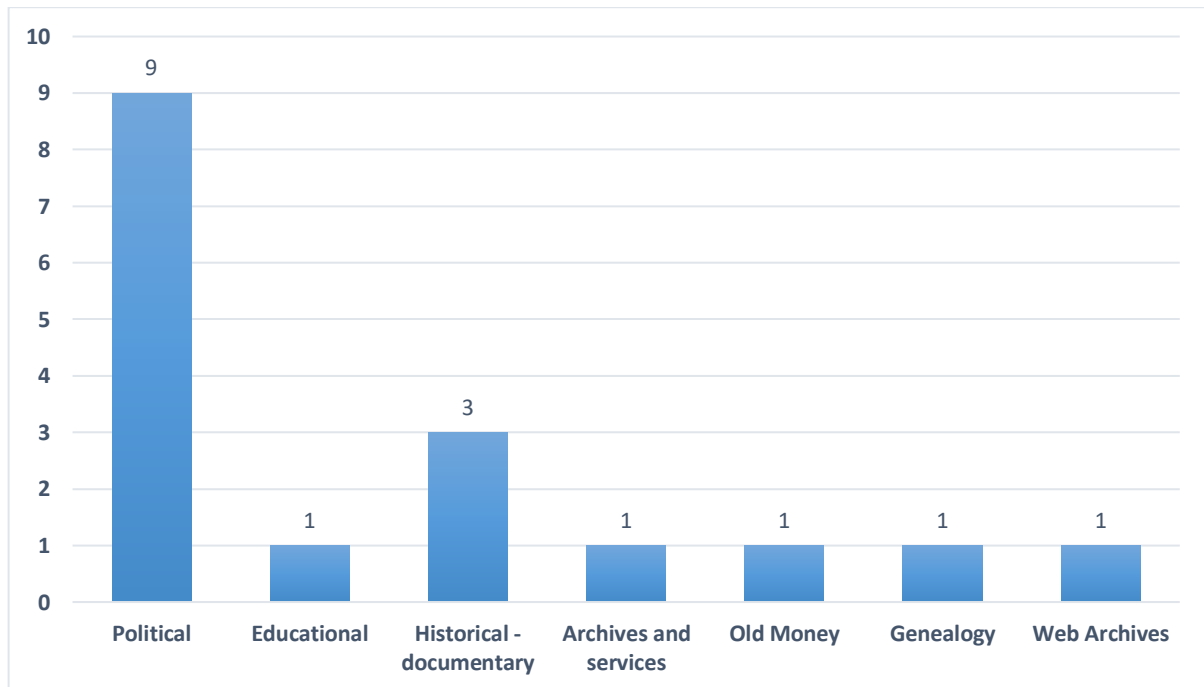| Application Category	Application name	National Archives			Total	%
		USA	UK	UAE		
Political	Leaders and Presidents' Diary, The audio library of Sheikh Zayed, Congress Creates the Bill of Rights	2		7	9	50%
Educational	DocsTeach	1			1	5.5%
Historical - documentary	Today's Doc., JFK and the Cuban Missile Crisis, Remembering WWI	3			3	16.8%
Archives and services	National Archives	1		1	2	11.2%
Old Money	Old Money		1		1	5.5%
Genealogy	Al Nahyan			1	1	5.5%
Web Archives	Web Archives			1	1	5.5%
Total		6	1	10	17	100%

Figure 5: Smartphone and mobile device applications classified according to their category

From the previous table and figure, we can conclude the following observations:

- More than half of the applications created by the National Archives belonged to political category by 50%, and include applications such as: political documents, Congress creates the Bill of Rights, leaders and presidents' diaries, and the audio library of Sheikh Zayed bin Sultan Al Nahyan. This high percentage is due to the fact that out of (10) applications developed by the UAE National Archives, (7) applications are devoted to political topics.

- In the second place come apps belonging to historical category by 16.8%, and they provide images of documents related to historical topics such as apps: remembering WWI, John F. Kennedy and the Cuban missile crisis, or today's doc. in the National Archives of the United States.

- Among the distinguished applications in the Archives, which reflect the value of information in documents, come the old money application, which helps in converting the amounts of money contained in the documents into the corresponding value in the present time, and Al Nahyan application which highlights the importance of documents and the information in it in tracing genealogy.

6. Smartphone and mobile devices applications in the National Archives according to the application launch date:

The following table shows the date on which the National Archives launched its applications for smartphones and mobile devices, and which years witnessed the launch of the largest number of apps:

Table 4: Smartphone and mobile devices applications in the National Archives according to the application launch date

Year of launch of the application	Applications	The number of applications	%
2009	Presidential documents	1	5.6
2011	Old Money	1	5.6
2012	John F. Kennedy and the Cuban Missile Crisis, Today's Document	2	11.1
2013	Diary of Khalifa bin Zayed, Diary of Hamdan bin Mohammed, Diary of Mohammed bin Zayed	3	16.6

2014	The Audio Library of Sheikh Zayed, the diary of Mansour bin Zayed Al Nahyan	2	11.1
2015	Congress Creates the Bill of Rights, Mohammed bin Rashid Diary, National Archives (United Arab Emirates)	3	16.6
2016	Al Nahyan, Web Archives	2	11.1
2017	Diary of Zayed Al Nahyan, Remember the First World War	2	11.1
2018	DocsTeach	1	5.6
2019	National Archives (United States)	1	5.6
	Total	18	%100

From the previous table, we conclude the following:

- The National Archives of the United States launched its first application for smartphones and mobile devices in 2009, which is the "Presidential Documents" application, then the National Archives of the United Kingdom launched in 2011 the "Old Money" application.

- The latest smartphone applications in the Archives analyzed in this paper were the "DocsTeach" application in 2018, and the "National Archives" application in 2019 in the National Archives of the United States.

- The biggest number of mobile device applications was launched in 2013 and 2015, at 16.6% for each year. The biggest share was for the National Archives of UAE; as it launched the applications of diaries of leaders Khalifa bin Zayed, Hamdan bin Mohammed, Mohammed bin Zayed, Mohammed bin Rashid, and the application of "National Archives."

- The National Archives of the United States suspended the "Today's Doc" application after its launch in 2016 because it did not fit the current operating systems, and the Archives does not have a timetable for any currently planned updates to this application (US National Archives, 2017).

7. Applications according to the fees of their services

All services available in the applications included in this study are free of charge, with the exception of the application "National Archives VR" in the National Archives of the Emirates, which included digital purchases within the application.

8. Applications according to the language

With the exception of the "Congress Creates Bill of Rights" application, provided in the National Archives of USA in several languages (English, Dutch, French, German, Hungarian, and Japanese), the other applications of the US National Archives and the UK National Archives are available only in English. However, the National Archives of the Emirates was keen to make its applications available in both Arabic and English languages.

9. Applications according to operating platforms

Among the most important platforms or operating systems currently widespread are: iOS, Android and Windows (Mobile Marketing Association, 2015). IOS was developed by Apple for Apple products only (iPod, iPhone, and iPad). However, Android was developed by Google as a "multi-party" operating system that every manufacturer (such as Samsung, HTC, Huawei, LG, Xiaomi ...) could customize for its smartphones and tablets, and as a free and open-source Linux-based system. "It was established in Palo Alto, California in 2003" (Agarwal, 2020). The Windows Phone system was developed by Microsoft as an operating system for smartphones. The following table shows the smartphone and mobile applications of the National Archives categorized according to operating platforms:

Table 5: Applications according to operating platforms

The National Archives	The name of the application	Operating platforms		
		Android devices	iOS devices	Mobile site
United State	Congress creates the Bill of Rights	√	√	
	Education with documents		√	
	Today's document	√	√	
	Presidential documents			√
	JFK and the Cuban Missile Crisis	√	√	
	Remember World War I		√	

The National Archives	The name of the application	Operating platforms		
		Android devices	iOS devices	Mobile site
	The National Archives	√		
United kingdom	Old Money		√	
The United Arab Emirates	The National Archives	√	√	
	The Audio Library of Sheikh Zayed bin Sultan Al Nahyan	√	√	
	Diary of Khalifa bin Zayed	√	√	
	Diary of Mansour bin Zayed Al Nahyan	√	√	
	Diary of Mohammed bin Rashid Al Maktoum	√	√	
	Diary of Hamdan bin Muhammad	√	√	
	Diary of Mohammed bin Zayed	√	√	
	Zayed Diary	√	√	
	Al Nahyan	√	√	
	Web Archives	√	√	
	Total	18/14	18/16	18/1
	%	%77.8	%88.9	%5.6

From the previous table, we conclude that:

- The Archives has been keen to diversify the operating platforms for the applications it launched to reach the largest number of users. In this context, the National Archives of the UAE was the first for its keenness on the presence of its applications in the iOs and Android operating platforms, whether for smartphones or tablets. It is followed by the National Archives of the USA, then the National Archives of the UK.

- The National Archives of USA created a Mobile Site for presidential documents, a site designed specifically for mobile phones, and contains mobile-friendly features or content, and these features can be rearranged on mobile (Budiu, 2016).

- The commonly used operating platforms at the level of applications were iOs for iPad (2020) and iPhone by 88.9%, then Android platform by 77.8%, then mobile web application by 5.6%.

Results and discussions

The National Archives are considered as the main repository for preserving the documents of cultural, historical, and archival importance. Rather, it became a component of national culture and is the first repository of research tools in national history. In its endeavor to apply information technologies in modernising and developing the services it provides, the Archives decided to use smartphone and mobile devices applications to contribute in achieving its goals as national information centers. The results of the study come up with the following conclusion:

First: There are (18) applications that have been developed in three National Archives in the United States, the United Kingdom, and the United Arab Emirates that help users to identify the Archives, its services and publications, and access its website and social platforms, which is a high number of applications in relation to the number of Archives. This indicates the awareness of the National Archives of the three countries of the increasing use of smartphone technology and mobile devices by the public who expects more services on these devices, and the desire of the National Archives to update and enhance the methods of providing their products and services to the public. The orientation of the National Archives to develop applications for smart devices to support the services provided is consistent with what Al-Otaibi's study indicated of the importance of smart phones and their applications in obtaining information quickly, saving time and effort, and developing culture and knowledge (Al-Otaibi, 2014). On the level of the Arab countries, excepting of the National Archives of the United Arab Emirates, none of the other Arab Archives have so far tended to benefit from smartphone applications and mobile devices.

Second: The National Archives in its use of smartphone applications aimed to modernize and enhance the services it provides. They aimed to enable the public to browse and review examples of rare and famous documents related to specific incidents and highlight a group of documents related to a specific event to attract the public towards it after discovering its importance. Moreover, they enrich the educational process by using primary sources; follow up the documents and diaries of the presidents; and accessing important documents from the treasures of the National Archives arranged by the days of the year, from anywhere at any time. The orientation of the National Archives to support the services provided is consistent with the study of Nowlan (2013) of the importance of smart phones

and their applications in accessing and interacting with the library through their phones and access to the library index, which is the most popular resource

Third: The topics covered by smartphone and mobile device applications in the National Archives varied, including political, educational, historical, genealogies, ancient money, and web Archives for government institutions, in addition to providing information about the Archives and its services.

Fourth: Half of the applications created by the National Archives covered political topics at 50%, followed by applications of historical topics by 16.8%, and the remaining 33.2% constituted applications for distinct topics, such as "genealogies" and "web Archives for government institutions."

Fifth: The National Archives were keen to cooperate with researchers and historians to seek their opinions on ideas for applications for smartphones and mobile devices. This is what the National Archives of the United States did in developing the "Today's Doc." application, and what the National Archives of the United Kingdom did in developing "Old Money" application.

Sixth: The Archives included in this study did not seek to prefer a smartphone platform over the other (Android or Apple iTunes), but rather aimed to reach the largest number of users. In this context, the National Archives affirm its neutrality and does not endorse products or opinions over others.

Seventh: Among the challenges the Archives faced in designing, implementing and launching applications for smartphones and mobile devices were:

1. Lack of sufficient experience or ideas for smartphone applications that are compatible with the needs of users, which prompted the National Archives of both the United States and the United Kingdom to cooperate with historians and beneficiaries.

2. Lack of technical expertise to design and implement applications for smartphones and mobile devices, which prompted the National Archives to cooperate with specialized companies and technical experts in designing and implementing their applications.

3. The Archives suspended one of its smartphone applications due to a conflict with the operating systems in achieving the design requirements while ensuring efficiency in the application's performance. This case appeared in the National Archives of the United

States, where it suspended the application "Today's Doc." after several years from its launch. The application is an interactive exhibition of mobile platforms for iPhone and Android which offers 365 wonderful documents written and photographed from the American history, in addition to metadata to identify them, as well as links to sites with additional information.

4. The Archives' keenness to search for sponsors to meet the cost required to develop distinct applications for smartphones and mobile devices.

Eighth: Although the development of smartphone applications has become a very profitable business, the aim of the archives' endeavor to implement such applications was not to obtain profit.

Recommendations

The Archives strive hard to provide more services via mobile devices to spread awareness about the Archives, their services, and their document possessions. The challenges that the Archives faced, which the study referred to in discussing the results, reveal that Arab Archives, in turn, need to plan to develop applications for smartphones and take advantage of the capabilities they offer. To achieve this, they can consider the following recommendations:

First: The Arab Archives should include among its aims, using smartphones as information tools to raise awareness of its role and services, and to increase access to its possessions of documents.

Second: The Arab Archives should carry out a periodic survey of researchers, historians, and users who visit the Archives, its website, or its social platforms to find out their ideas for applications related to documents, to know the mobile devices they use, the operating platforms of their mobile devices, the services that deserve priority in developing applications for smartphones, and the support the Archives can receive from persons or IT companies.

Third: The Arab Archives should search for sponsors or partners and study the types of mobile device services they want concerning the Archives' activities, and benefit from their support in planning, designing and implementing successful mobile applications in the Archives, and reduce costs especially with the use of an open-source program.

Fourth: The Arab Archives should develop a comfortable user interface with a simple navigation system based on design instructions. The application should be user friendly, easy to navigate, as well as attractive in appearance.

Fifth: iOS and Android are the most popular platforms and are important for the success of the smartphones and mobile devices applications. Therefore, the Arab Archives should keep its applications free of charge to ensure the success of application, increase the number of users, and to affirm that the archives is a non-profit organization.

Sixth: The Arab Archives should benefit from media to make advertisements and promotion of the archives' applications for smartphones and mobile devices on its website and social platforms.

Seventh: Although the Internet is available almost everywhere, it is still important that the application works well without an internet connection and provides access to the features and content of the application.

Eighth: The Arab Archives should test and improve its applications constantly to ensure high performance.

Conclusion

Based on the role of the National Archives as centers responsible for preserving the memory of the state and society, they do their best to reach the public of users, from researchers, historians, genealogists, media professionals, and others. To achieve this aim, the National Archives benefit from any technological developments to enhance their role in society, improve their services, and increase access and interaction with the public. This study analyzed how some national archives can benefit from the technology to develop smartphone and mobile devices applications. Arab archives that have not yet started planning and designing successful smartphone applications can benefit from the results and recommendations of this study to implement ones, and benefit from the experiences of the three national archives of the United States, the United Kingdom, and the United Arab Emirates.

References:

Accella .*A digital interactive agency specializing in designing and developing websites and mobile applications*. (2020). https://accella.net/. Visited 19/3/2020

Agarwal, T . (2020). *What everybody ought to know about Android : Introduction, features & applications*. https://www.elprocus.com/what-is-android-introduction-features-applications/)

Al-Jamal, Samir Suleiman. (2015). *The negative effects of smartphones on students' behavior from the point of view of educational counselors and school principals in southern Hebron*. http://www.qou.edu/arabic/conferences/isdcrConf/researches/drSamirAljamal.pdf

Al-Otaibi, Amera Fares. (2014). *University youth's uses of smartphones and the gratifications achieved from them: a survey study on a sample of communication and media students at King Abdulaziz University*. Jordan: Yarmouk University. (Master Thesis)

Al-Qarni, Dania Ali (2014). *Mobile technology applications in providing information services in Saudi university libraries*. King Abdulaziz University.PhD thesis. https://www.kau.edu.sa/Files/306/Researches/65786_37196.pdf

Apple Store (2020). https://www.apple.com/itunes/ . Visited 4/3/2020

AT & T Company (An American multinational conglomerate holding company). (2020). https://about.att.com/pages/company_profile . Visited 2/5/2020

Breeden, J. (2012). The 10 best federal mobile apps. *GCN*, June 22, 2012, https://gcn.com/Articles/2012/07/16/Agencies-build-digital-government-with-apps.aspx?Page=1

Budiu, R. (2016). *Mobile Websites: Mobile-Dedicated, Responsive, Adaptive, or Desktop Site?*. https://www.nngroup.com/articles/mobile-vs-responsive/

BuildFire (App Development Platform). (2020). *Mobile App Download Statistics & Usage Statistics*. Visited 17/6/2020

Federal Government Mobile Apps Directory. (2020). https://www.usa.gov/mobile-apps. Visited 23/5/2020

Google Play. (2020). Available at: https://play.google.com/store . Visited 4/3/2020

Guillaume, M. & Menerat, R. (2015). *Concevoir une application mobile : Cahier des charges & budget*. Paris : Mobile Marketing Association. http://www.fdcom.coop/export/sites/default/fr/federations/les-scop-communication/_media/docs-fede-communication/Etudes/963-GuideConcevoirApplicationMobile.pdf

Gutierrez, A., Dreslinski, R. G., Wenisch, T. F., Mudge, T., Saidi, A., Emmons, C., & Paver, N. (2011, November). Full-system analysis and characterization of interactive smartphone applications. *In 2011 IEEE International Symposium on Workload Characterization (IISWC)* (pp. 81-90). IEEE. https://ieeexplore.ieee.org/document/6114205/

International Bank for Reconstruction (2012). *Maximizing from the mobile phone: an overview*.http://siteresources.worldbank.org/INFORMATIONANDCOMMUNICATIONA NDTECHNOLOGIES/Resources/2013000181ARAara001_Low.pdf

Mobile Marketing Association (France) (2015). Concevoir une application mobile : Cahier des charges & budget, Editeur : *la Mobile Marketing Association France (MMAF)*. www.Downloads\Documents\Guide-Concevoir-une-application-mobile.pdf

Murphy, J. (2010). Using mobile devices for research: smartphones, databases, and libraries, *Online*, 34(3), 14-18.

National Archives of Australia (2013). Australian Communications Media Authority Report 3— Smartphones and tablets - *Take-up and use in Australia January 2013*. https://apo.org.au/sites/default/files/resource-files/2013-01/apo-nid32808.pdf

Australian Communications Media Authority. (2013). *Report 3-Smartphones and tablets: Take-up and use in Australia*.

Nowlan, G. (2013). Going mobile: creating a mobile presence for your library. *New Library World*, 114 (3/4), 142 - 150

RevelMob. (2020). Old Money app. http://www.revelmob.com/currency-converter

Remembering WWI . (2020). https://itunes.apple.com/us/app/remembering-wwi/id1153610517?mt=8

Statista. (2021). Mobile app usage - Statistics & Facts. https://www.statista.com/topics/1002/mobile-app-usage/#dossierKeyfigures. Visited 14/10/2021.

Theimer, K. (2014). *Outreach: Innovative Practices for Archives and Special Collections*. USA: Rowman & Littlefield.

US National Archives. (2017). Today's Document. https://www.archives.gov/social-media/todays-doc-app.html . Visited 17/4/2020

US National Archives. (2020). Mobile Apps from the National Archives. https://www.archives.gov/social-media/mobile-apps.html . Visited 15/2/2020.

Viderity Inc.(2011). Today's Documentmobile App. http://viderity.com/wp-content/uploads/2015/08/Todays-Document-Mobile-App.pdf . Visited 11/4/2020