

Providing Information through Smart Platforms: An Applied Study on Academic Libraries in Saudi Universities

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Authors' contributions

This work was carried out in collaboration between both authors. Author MAA designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Author MAA managed the analyses of the study. Author AME managed the literature searches. Both authors read and approved the final manuscript.

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ABSTRACT

Information services using smart platforms have become one of the demands of this era since the much of information centres' users prefer using them for their speed and simplicity, capacity and efficiency in collecting vast amounts of information that meets the user's needs. Smartphones have spread out globally in a dramatic form, which means that libraries and information centres are now facing tremendous challenges to meet the needs of its users.

This study aims at highlighting the efforts of the Library Information Services Specialists' of providing information services by the use of smart platforms that have been applied in Saudi Academic Libraries and Centres, which have delivered the said services. The main requirements for offering information services via smart platforms in the academic libraries and Information Centers were considered the subject of the study (Saudi academic Library and Resource centres at

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Saudi Universities). However, the significance of the study relies on empowering the researchers and students to have the means of free access to the research, studies, and all sources of digital information via their smartphones.

The study consists of two parts, applied and theoretical fields in its methodology. The implementation of the applied research involved conducting a survey among the information services providers at the Saudi academic Libraries and Resource centres at Saudi Universities. Several users of the said libraries have conducted well-planned interviews with 156 information professionals and researchers to identify their views, insights, and opinions on the benefits of offering information services via smart platforms. The theoretical part took from the resources', references and websites that discussed the aforementioned topic. Also addressed were its obstacles facing the said services in the era of information technology as the study sought to find out the answer.

Keywords: *Smart platforms; Smartphones; information centers; information services; SDL; digital library; web 5.0.*

1. INTRODUCTION

Until we understand the future of provided information services in libraries and information centres, we have to know when and where information services began prior to 4000 BC. Private and public libraries throughout this period faced many transformations. The role of the information and library specialist vary, and now, they should not only be a provider of information but rather a manager, an archivist, a reference service provider, and many others. Also, selecting the proper method for sorting and classifying the information resources, which are commensurate with the needs of the end users. The resources are selected based on the objectives of the libraries and information centres. These information institutions cannot achieve the purpose of its establishment except through the indirect needs of the end user. As such, institutions provide services for the users of the information by helping them to identify what information resources they need, and to assist them in ways to use those resources through guidance and answering any questions which are often related to solving their specific problem or question in the case, and also to assist the users in identifying some basic references in the subject or to show them how to use those references to get an answer to an inquiry or a solution to a problem. Thus can be argued that the information service includes the important sources of the information and research that identifies, locates and submits that information to potential end users [1].

When the medium of information technology developed in the 21st century, this instrument was provided by highly skilled people who dealt with modern techniques and the ability to

analyse, information resulting in electronic publishing. Hence, the information institutions have developed under successive technological developments, to the extent that information services in information institutions from the beginning of the 21st century to the present, have changed radically. The availability of libraries and information centres on the Internet through web portals have greatly helped in the development of information services provided by those libraries. Now, many of the services available online where you can see the libraries' catalogues and find available collections like books, references, and other information resources. Moreover, libraries have become more than that, where users can reserve books or extend the borrowing period. Chat with an information specialist, reference specialist or access to electronic resources and academic databases that allow the full view of texts, periodicals, books, and references. The modern techniques make it easier for libraries and information centres to provide services through Platforms and smartphones [2].

Web technologies have improved the development of information services in libraries and information centres. The availability of these techniques makes the future of the Libraries more promising, as it will change many libraries' information services. With the emergence of 5th generation 5.0 networks, libraries will change the way it utilises the Internet itself. A good example of this is the www.wefeelfine.org which tracks emotional phrases on the Web "I feel" and "I am feeling", categorises them, and maps the frequency and location of clusters of feelings. As a result, the end users can find data-supported insights into questions like "What are the most representative feelings of female New Yorkers in

their 20's who post on the WWW?" or "What are the guiltiest cities in the world?" or "What do people feel in Riyadh right now?" With that said, information is and will be categorised and measured. So if interactions can then be personalised to create experiences that excite users, then the web 5.0 will be friendlier than its predecessors, which the vast majority of people connected to the Internet through Smartphones, or smart panels for shopping or virtual libraries [3].

2. LITERATURE REVIEW

Concerning the concepts of smart Information service, the Ministry of Communication and Information Technology of Saudi Arabia report in 2017 shows that the Saudi government has paid annually for the spread of information literacy in public education in the various levels at very early stages. The information literacy represents the cornerstone in the development of the skills of self-learning and continuing education, which is a requirement to enable future generations on the basis of skills. These skills make for empowered users of information and communication technology, researchers and analysts. The information helps their effectiveness and efficiency, where the Government of the Kingdom of Saudi Arabia recognised the role played by the information and communication technology in education, community development, making it special importance, and has taken steps to strengthen this trend on several levels. The Kingdom has been making great efforts in the information and communications sector that can be seen to the extent of information and communication technologies among the society such as the

proliferation of the Internet, the spread of information technology in companies, and the preparation of personal computers and telephones. All these indicators confirm the rapid growth of these techniques in the Kingdom in the second decade of the twenty-first century [4].

In the last ten years, smartphones, have been the most essential tools for accessing information services provided by Portals, platforms, and websites. The smartphone has no specific definition. However, IT professionals in the industrial sector have identified that the phone provides additional services beyond the concept of voice calls and SMS. According to Patterson, "A smartphone is a mobile phone with touch screen and/or QWERTY keyboard you use for email and web (using a full web browser such as IE, Safari, or Chrome and downloadable applications."

The use of smartphones is widespread and is unprecedented in the history of almost all technology. Apple was the first to bring up the operating system in 1993 as well as the spread of free Wi-Fi via hotspot from NFC technology to read the information. The third generation 3 G and the emergence of growing numbers of 4G LTE networks have provided many opportunities for quick and easy access to the Internet through mobile devices.

The number of mobile phone devices following the statements of the statistical portal website specialised in the field of statistical reports, where the portal expects that by 2019 there will be 5.07 billion mobile phone users in the worldwide. These statistics are referenced in the diagram (Fig. 1).

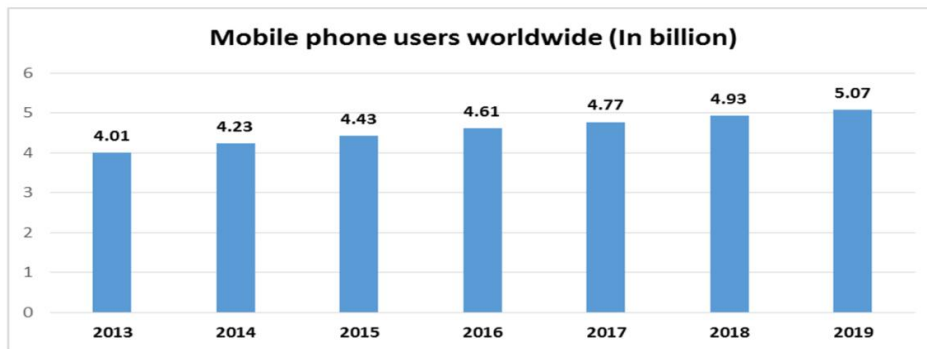


Fig. 1. Mobile phone users in the world from 2013 to 2019

Source: The Statistics Portal Website: <https://www.statista.com/statistics/274774/forecast-of-mobile-phone-users-worldwide/>

It is estimated that 5.07 billion people in the world carrying mobile phones, where 75% of the population of China carrying mobile phones, the ratio of 70% of the population of India, the ratio of 90% in the United States (that of young people), of whom 58% carry Smartphones (Statistical portal website, 2017). Tablets, Smartphones and computers have witnessed a lot of development with their uses. As well as diversified software whether a Windows-based Phone, Android, IOS or Blackberry OS. This has encouraged many of the information institutions to be provided services to a wide range of users through their smartphones and mobile phones, smart TVs and other devices.

2.1 The Basic Requirements for the Provision of Information Services through Smart Platforms

Smart services require strategies of several factors, including the technical infrastructure, information and communication technologies available to the service to be provided and the access of the end users to the service and ease of use. As well as the availability of other factors such as the rapid spread of smart devices and the high quality of mobile networks and the increasing demand for smart applications' high efficiency. Providing information services via mobile phones and smart Platforms must utilise the basic requirements set by the guide for Dubai smart government as follows [5]:

- The definition and components of the smart service
- The identification of appropriate services that can be converted to smart services
- Identify the target audience for each service
- Determine the criteria for the selection of services that will be transferred

The conclusion of the conversion of the process to smart applications start from the analysis of the service nature to be transferred to the Intelligent Platform will go through many steps. Each service requires certain functional characteristics for use within the application without prejudice to the convenience of the user or technical characteristics of the design. The platform of choice will be the development of the application from which the essential step must be taken to obtain the best results. Each having its advantages and disadvantages, the system here

is the nature of the services and the decisive factor in the selection process.

According to UAE Telecommunication Regulatory Authority guide for the smart government, select the appropriate approach to the provision of information services through smart platforms should be the following:

- 2-1-1 **The analysis and understanding of the target audience:** through the identification of the basic requirements for the end users or through their understanding and analysis of the types of devices that are used with modern trends prevailing, whenever the opportunity was available.
- 2-1-2 **Development Costs:** if the financial cost or lack of technical resources might hinder the development of smart applications, it is recommended to use smart applications, as the primary source, while requiring a separate development process necessitating specialised competencies for each individual Development Platform.
- 2-1-3 **Cross-compatibility:** it is necessary to correspond to the provided services with multiple platforms, instead of developing multiple applications to provide the same service across different platforms, we can resort to the more efficient methods through the use of hybrid intelligent web application to access to the public.
- 2-1-4 **The application lifecycle:** the lifecycle of the original application is relatively short, and that the Commission was competent to take the decision on determining the age of the application prefers choosing the applications with long life, where they do not represent the original applications is always the best option.
- 2-1-5 **Take advantage of the characteristics of the Mobile Phone:** if the nature of the service requires integration with original features for smartphones (such as a camera, GPS) where web applications provide that, we can resort to the original hybrid, applications that can take advantage of the characteristics of the mobile phone. The original applications offer a better user experience in many ways with special movements, sensors, graphics and other features offered by smart platforms.

- 2-1-6 **Security Considerations:** there are original applications involving certain risks, because the characteristics of the information stored inside it, could allow the original applications to persons who are not authorised to enter private information stored on the device. So while the storage of information safe but features provided by smart platforms can make security problems, where extraneous points keep track of the location of the device through the same applications.
- 2-1-7 **Integration:** when applications need access to the systems or existing databases, integration is inevitable, impossible or extremely complicated to use. Therefore, if the goal is to enable the end user to access immediately, then it's recommended to use smart web applications, as the original applications because the end user needs to search for and download it first while accessing smart web applications directly.
- 2-1-8 **The user experience:** the original applications are an alternative that can be used when the application requires the interaction with the user. They are easy to navigate through the web pages and contribute to making a better user experience, which can be achieved in the case of smart web applications. Moreover, this allows the original applications' user to modify settings to customise the applications in a way that suits him/her (especially applications that are used on a regular basis). In other words, the original application provides

personalised service to the users and access to the services of the smart web applications without connecting to the network.

The Table 1 shows comparison options for intelligent information services (Table 1):

2.2 Types of Native Platforms

A several years ago, most mobile devices needed to improve their services. At that time there weren't as many applications, and some mobile phones were able to access and use e-mail, but they lacked touch screens that could be used without a pen. Older model phones also had a small screen to display that it does not suit some browsers and websites. It has been dealing only with simple text, the form of links, and a picture. This means that those who owned this type of mobile phone were either business people, email addicts or Internet predators. Then came Apple and changed everything with the introduction of the iPhone, where the applications use the Web technology which was the beginning of the smart revolution that the world is witnessing today. (Andre Charland and Brian LeRoux, 2011). Many applications are available on Smartphones. Here are the most important applications:

- **Google Android:** It is a system owned by Google and is available to most companies asking for permission. It is found in a number of companies such as (HCT), Samsung, Motorola, Sony, LG, Acer, as well as (PDA). The game of Smartphones also launched the operating system Android, and in a short period was able

Table 1. Comparison options for intelligent information services

	Original applications	Smart applications HTML5	Hyper applications
Graphics	Original application programming interfaces	HTML,Canvas, SVG	HTML, Canvas, SVG
he performance	Check-in	Slow	Slow
The general impression	Check-in	Emulated	Emulated
Distributions	short	Internet	Store APP
Life cycle of the application	App Store	Long	Long
Access to the device	short	Impossible	Accessible
Notifications	possible	Impossible	Accessible
Storage	loaded files	SQL Subscribe	Security system and shared files
Website Identification	Yes	Yes	Yes
Connect to the Internet	without a connection	often requires Connections	without a connection
Technical skills	Objective C, Java	HTML5,CSS,Javascript	HTML5,CSS, Javascript

to achieve a widespread success. While the ubiquitous Google is free to make the system deploy in any number of powerful and advanced devices. The Android system is a flexible system that is also available on a number of devices and applications as it is an open source and any company can modify it to suit their needs.

- **Apple iPhone OS:** The system is owned by Apple, and is available on Apple only, such as iPhone, iPod, and iPad. When this system was released, the ordinary user accepted it as it was easy to use and not as complex as other smartphones at that time. This system has emerged from several modern versions and provides some other devices in the company such as iPod Touch and iPad, and the system is still successful and acceptable.
- **Microsoft Windows Phone:** A system owned by Microsoft, which is one of the most used operating systems for Smartphones was in control of the market for advanced mobile phones and soft aids, but the share of the system began to decline and even reached the lowest levels in recent times, which is why Microsoft released the developer version of Windows Phone. The most important features of this system take advantage of Microsoft services such as Messenger and Office system is intended for individuals, not institutions.
- **Blackberry OS:** Designed and operated by Research in Motion. The company offers its services like the PDA and allows browsing the Internet, email and media, an operating system like the Android system and Windows. It was adopted upon its first release, and initially, BlackBerry was using a multi-tasking system completed by Nokia, where the phone could handle the input received, and the operating system which supported the technology of Java MIP (MIDP). This system has a version (10.3), and features of this system are compatible with Android applications and the ability to communicate between mobile phones, PCs or tablet devices.

2.3 Saudi Academic Libraries and Technology

Academic libraries play an important role in the educational process in universities, especially in

the area of informatics culture and lifelong learning. This is evident in the services provided by the electronic libraries in linking the electronic education, where the new generation of libraries provide traditional sources of information to electronic sources, and those libraries provide information services using the latest technology that enables students and faculty to access the resources required at any time or place. Libraries have become a part of the pillars of innovation and learning. It contributes to the organisation through the deliverance and facilitation of information and knowledge [6].

Smart platforms became the first source of information in Saudi Arabia. According to a study by APP MAKR in 2015 for the mobile applications, indicated that Saudi Arabia has become the third largest smartphone user in the world (72.8%), followed by the United Arab Emirates (73.8%), Korea (73%), Singapore (71.7%) and Norway (67.5%) respectively. This makes smartphones to get the particular importance for academic libraries as they seek to deliver their services in the best way to users (Graduate and postgraduate, Faculty Members and Researchers).

The academic libraries in Saudi Arabia support higher education to improve the quality and output of education. Besides, providing the necessary information resources for scientific research. This enhances the value of the information services in academic libraries. Where established by one of the pillars of the human, economic and social development in Saudi Arabia, researchers in the current study sought to address the impact of information technology on academic libraries. The smart platforms have been one of the most important modern technologies that have affected the provision of information services. Because that the graduate and postgraduate students obtain their information needs through mobile more than any other resource. In the near past, a book where the primary source of information, but today the implementation of new applications on the smartphone in the information sector changes the role of information services in libraries. This study had stated that the use of mobile phones spread frequently when youth who did not go to use another source for their information needs. This put academic libraries in Saudi Arabia in big challenges in the provision of information services or collection development. Moreover, providing the requirements information for

students to attract them to use the services provided by the academic libraries. Several studies concentrated on the traditional libraries in Saudi Arabia how struggles to stay in front of the digital libraries became. Suggestions by Saudi Academic faculty member published in Middle East newspaper agreed with many of libraries in Saudi Arabia resorted to merging the core activity of providing modern equipment and tools, to increase and save its users. Another survey from Al Belad newspaper published in 04/23/2018 report on the public, academic and special libraries was the role in the renaissance of intellectual and literary life in the Kingdom of Saudi Arabia. However, after the development of the technology and the existing of electronic books and electronic libraries, some academic and researchers believed that the libraries have become empty. Because some users have been unwilling to go to obtain the various information sufficiency of their platforms. This made the current study exclusivity showing aspect of modern applications in Academic libraries in Saudi Arabia.

Many institutions in Saudi Arabia have applied the use of smart platforms to offer its services. One of the most important examples is King Saud University (KSU). In the case of KSU, the standardisation of contributions in electronic information databases has been in place for nearly five years to minimise the costs. Members of the union increased from eight to twenty-four universities. Also, the number of databases increased from seven to 30. As for the database, it contains thousands of scientific journals, such as the ISI, Science Direct, IEEE, and OVID. The ACM Citation analysis carried out training and awareness for members of the faculty. KSU has inaugurated the University City project, which works on smart applications and the utilisation of technologies. Moreover, development of the infrastructure for the electronic education systems in all university facilities and makes use of the Deanship of e-learning in the implementation of their projects. The most important and latest techniques in this area are the halls (smart classrooms), studios, visual communication, visual broadcasting systems, digital studios, runways, and other educational services. We note that it is closely related to the Smart platforms following technological developments that have become renewed and change day after day.

A recent study from the researcher [7] this study revealed several results including 70.8% of Saudi

Academic libraries do not use a cell phone in providing information services. The most significant reasons led to lack of using a cell phone in Saudi Academic libraries represented in the absence of training and awareness for the employee about the importance of technology and how to deal with it, according to the study results. The researcher provided certain recommendation including the necessity to allocate a budget to develop hardware and software needed to apply cell phone technology in providing information services in libraries. The study also recommended the necessity to provide training courses to Academic libraries personnel in the field of cell phone applications and information services.

2.4 Smart Platform Services in the Saudi Academic Libraries

The major trend in the library automation industry since about 2008 involves the development of products to address both the failings of the traditional integrated library system and the advent of this new age of cloud computing. This new generation of library services platforms brings together more approach that is comprehensive for providing support for the current library [8].

According to ALA, the term library services platform describes a type of library resource management system with a set of characteristics that differ substantially from the longstanding genre of integrated library system, library services platforms. It must be noted that it describes a set of products that each embody a somewhat different set of conceptual, technical, and functional characteristics. While I continue to see library services platform as a helpful term to describe this set of products, the lines of distinction remain blurry [9].

New technologies create great opportunities as well as challenges when academic libraries provide multimedia collections and services. Since the successful establishment of a video streaming server in 2009 [10]. The library services through a smart platforms firm model of computing. Where the technological tools of the basics of academic libraries in the provision of services of all sizes, including the large-scale deployment of smart applications. Academic Libraries have proved successful in providing its services and programs using modern technology that enables the management of print and electronic sources scattered across the web

platforms, workflows simplified through embedded knowledge bases.

Many academic libraries in Saudi universities sought to apply a technical assistance to facilitate access to the information resources among these libraries and the King Abdul Aziz public library. The library of King Fahd University, University of Princess Noura Bint Abdul Rahman, Effat University and Al Faisal University and many more are linked to the King Abdul-Aziz library. The Deanship of Libraries of the University of Imam Abdul Rahman Bin Faisal developed an application in the smart library called Brow Zine, This application helps users and makes it easy to read and observing thousands of disruptions and Publishers.

This application is transferred distinct technological information services at academic libraries in Saudi Arabia. Another experience provided by the Deanship of Library Affairs at King Saud University that can be obtained through smart devices, contribute to the empowerment of the users to communicate with their libraries in any place and at any time. Moreover, it allows them to interact with all services through smartphones. They represent an important qualitative development in the world of information. Especially, in light of the continued increase in the transformation of the users to Smartphones. This would enable the users through their smartphones to subscribe to databases and have access to the library and other libraries, whether inside or outside the Kingdom. In addition to the possibility of requesting the information resources, study rooms, seminar, and the guided tour, learn about all the activities carried out by the library, such as conferences and seminars held in all disciplines and in all parts of the world.

A third experience provided by Arab Union Catalogue called the application of AUC on Smartphones, this Service is to provide database search service contents of the unified Arab through Smartphones running Android or Apple IOS operating system, from this application the users can be used all available search strategies at E-Gate of Arab Cataloging Union and get all library services (AUC Website).

Another application for the smart platforms in the Ministry of civil service. This application aims to

shed light on the selected services of the Ministry of civil service. These services provide access to information resources.

And documents provided by the users of the Ministry as well as other services. However, the concern is the provision of documents and information resources services from the information centre in the ministry to the user. Also, the message service which can receive messages from the ministry.

Overall, it is clear that The feature of all regulations in academic libraries that work on smart platforms is easy to use as all the needs of the users is an I-pad or I phone, or other smart devices with the availability of the property connecting to the Internet through WIFI or G3. Some academic libraries designed a mobile site website to be accessed on a mobile device such as a smartphone or tablet. This website allows access too much of the same content of the library original website but is easier to view on a smaller screen. Mobile sites in academic libraries always are free and don't need to be downloaded from an app store.

2.5 Type of Information Services through the Smart Platform in Saudi Academic Libraries

There are many different types of information services used in academic libraries using smart platforms. Indeed, applications of these platforms can be downloaded at any time from the Google Play Store. The following services are offered via smart platforms in academic libraries as follows:

- 2-5-1 **Library catalogue services:** users can visit library online catalogue, manage the account, Check library hours, Check due dates and renew books online/... etc.)
- 2-5-2 **SCRIBD –World books:** design for helps users to access an unlimited number of the best books, audiobooks, news, magazines, documents, and more.
- 2-5-3 **SMS notification services:** One of the important features of Information Systems in Saudi Academic libraries is the possibility of sending SMS text messages to the users.
- 2-5-4 **Formal Education, Distance Learning, and E-learning:** Academic libraries can harness the advantage to lead the implementation of library services through mobile devices to support distance learning, formal education, and

research activities in eLearning environment by making the information resources ubiquitous. Library services should also blend with teaching and research practice of colleges/universities, scientific community or other patrons whom they serve [11].

2-5-5 **Database Browsing:** In a study by researcher Ashwaq Ghayet Al Ghayet, 2014 [12], addressed the information services launched by the library at King Abdulaziz University in 2012, which can be obtained through Smartphones. The important result of this study is when the questions study society on the preferences of access electronic information sources using the computer the ratio was 84%. E-Readers were 10%. The smartphone was 28%. This is an indication that the culture of using a smartphone in academic libraries was not commonly used 4 years ago for postgraduate students in Saudi Arabia [13]. However, the study revealed that the reasons for the low percentage were because the students did not know of the existence of electronic information sources over the phone and 84% of the participants where agreed.

2-5-6 **My library:** King Abdul Aziz public library in Riyadh in April 2017 launched a new intelligent application called "My library". It was in the event to celebrate World Book and Copyright Day. the first free application for Arab users that could allow them to sort and classification of libraries through easy steps on a practical application. Moreover, the academic library systems could integrate with this application to take advantages of the services provided by the application and provide feedback toward the library and the application for preparation of the future version.

2-5-7 **Library guide:** A guide was conceived to discover library services and collections of the Academic libraries as well as print and electronic resources through the application. Either from inside or outside the university campus. The guide helps in the simple and advanced search for information resources through the library catalogue or search the databases. Also, searching in the digital library or electronic resources provided by the library. It works as a guide to the user to easily

access the library services and resources.

2-5-8 **Library Virtual/ Audio Tours:** Some Saudi academic libraries develop introductory video/audio for the library via mobile applications. Enabling the users to have a tour on the content and services provided by the libraries and all the Library programs. The good example of this kind of video is the Video Tour of libraries at King Abdul Aziz University which reviews all the facilities and services at the library.

3. RESEARCH SIGNIFICANCE

The mobile revolution has revolutionised lifestyles. Contributed to the creation of new business activities [14], and made it widely available in Saudi Arabia as one of the fastest growing technologies in the Gulf region. Information sectors and academic libraries were not immune to the impact of this information revolution. The importance of the current study see-through the importance of the information services available in academic libraries, by using smartphones tools for accessing information by Saudi youth. Therefore, the current study aims to achieve the following objectives:

- 3-1 Definition of smartphones, and smart platforms and their impact on the provision of information services in academic libraries.
- 3-2 Introducing available information services through smartphone applications.
- 3-3 Knowing the opinion of information services specialists towards the use of smart platforms applications in Academic libraries.
- 3-4 Recognising the most important types of smart platforms applications used by the Saudi academic libraries to provide information services.
- 3-5 To identify the most important problems and obstacles facing the use of smart platforms applications in academic libraries.

4. METHODOLOGY

Based on the objectives of the study and its questions which seek to answer them, the analytical descriptive method and the case study that are appropriate to this study through the use of studies and documents that dealt with the subject and benefit from the study through reference to the literature of the subject in

information services via smart platforms in academic libraries and then use descriptive approach Analytical analysis and description of the current realities on the ground regarding the nature of the information services across smart platforms and the reasons for the availability of this service, its characteristics and its results on the performance of Saudi academic libraries. Highlighting the efforts of academic libraries in Saudi Arabia to provide their services through smart platforms by describing and analysing the reality of providing information services in Saudi universities.

This is a qualitative research. 70% of the data is based on opinions and views expressed by questionnaire, 30% of the data has been taken from reference, so the researchers used the statistical approach and adopted statistical methods to analyse and interpret the data collected from the study population.

5. DATA COLLECTION

The following tools are the primary sources for collecting the data of the study:

5-1 **Survey (Questionnaire)** To identify the library staff point of view on the advantages of the smart platforms to provide information services in the Saudi academic libraries

5-2 **Direct observation:** The researchers working in the field of the information sector and they have experience in teaching information search skills to the users of information services through smart platforms in academic libraries in Saudi Universities.

6. THE PARTICIPANTS

A questionnaire was designed on Google doc and distributed to the Saudi Academic library staff through their emails, WhatsApp, and Facebook messenger. The questionnaire link was sent to more than 350 participants; replies were only (156 responses). Also, the researcher conduct interview for qualitative research with selected Information and library expertise and selected users from different Saudi Academic libraries, which dealing and using information services through smart platforms for measuring the information services.

7. DATA ANALYSIS AND DISCUSSION (FINDINGS)

In this study, the researchers included selected academic libraries in the Kingdom of Saudi

Arabia that have smart platform services accessible through mobile applications. The charts and graphs give information about the conclusions reached through the results of the study. Our goal was to measure the quality of information services provided through smart platforms, with the aim of developing the services provided by academic libraries, to improve toward the highest levels of efficiency and quality in accordance with international standards. Since one way to evaluate these services is by measuring the degree of satisfaction of the staff providing them, the researchers surveyed information specialists to obtain their views and feedback on this subject.

7-1- The survey received responses from 156 Saudi academic library staff and professionals. The below pie chart illustrates the study participants, sorted by gender:

Male	Female
101	55

The pie chart shows the percentage of participating male and female professional staff in Saudi academic libraries. We note that the proportion of male participants is higher than that of female participants. This is due to the challenges faced by the male researchers in communicating with and distributing the survey to female information specialists, due to specific cultural issues within the Kingdom of Saudi Arabia. This may be a limitation of this study, which could be improved by future research.

7-2- The below pie chart gives percentages of professional staff in Saudi academic libraries, sorted by educational background. The chart illustrates that half of the participants in this study have Bachelor's degrees.

Overall, when sorted by educational background, the largest proportion held a Bachelor's degree (50%), the Master's degree (15%). Doctorate degrees holders represented 13%. The numbers decline for Ph.D. holders because they are often recruited for administrative jobs in academic libraries, as managers or as deans of libraries.

Ph.D.	Master	Diploma	Bachelor	Other
24	36	25	53	18

7-3- The below bar chart shows the percentage of the types of smart-platform system application in Saudi academic libraries, as evaluated by the studied community. About 48% use the IOS

system for receiving information services through a smart platform. For Windows and Android users, this figure decreased to 26% each. However, the smart platform system application used in Saudi Arabia depends on the desires of the studied community and the smartphone systems they are accustomed to using.

Windows system users	Android system users	IOS system users
45	45	66

7- 4- How satisfied are you with the design of the mobile application in your library?

For this question, the results showed that the majority of those surveyed (75.50%) were satisfied with the design of the mobile applications in their libraries. This indicates that the designs of mobile applications in Saudi academic library systems perform all the functions and objectives of the libraries. Overall, the library staff agreed that they are fully satisfied with the implemented applications. Only 1.6% were dissatisfied.

7- 5- Are the library's services well-presented and clearly explained on the smart platform?

Very clear	Clear	Not clear
61	88	27

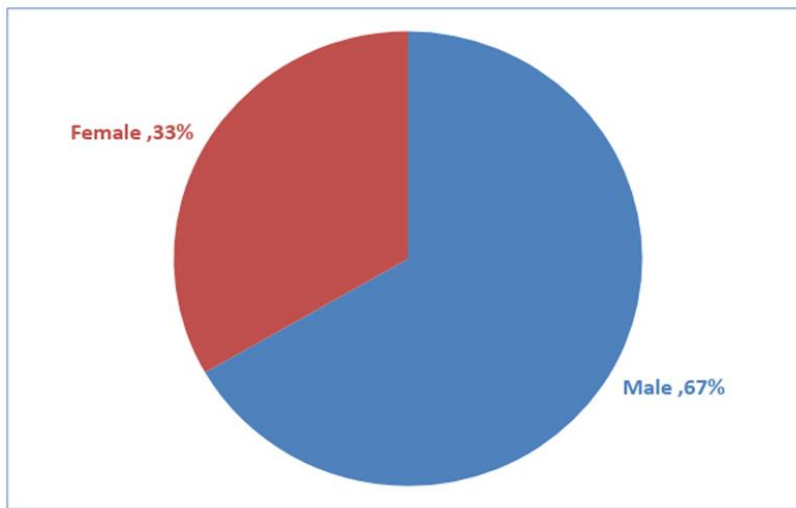


Fig. 2. Librarians and Information professional in Academic libraries sort by Gender

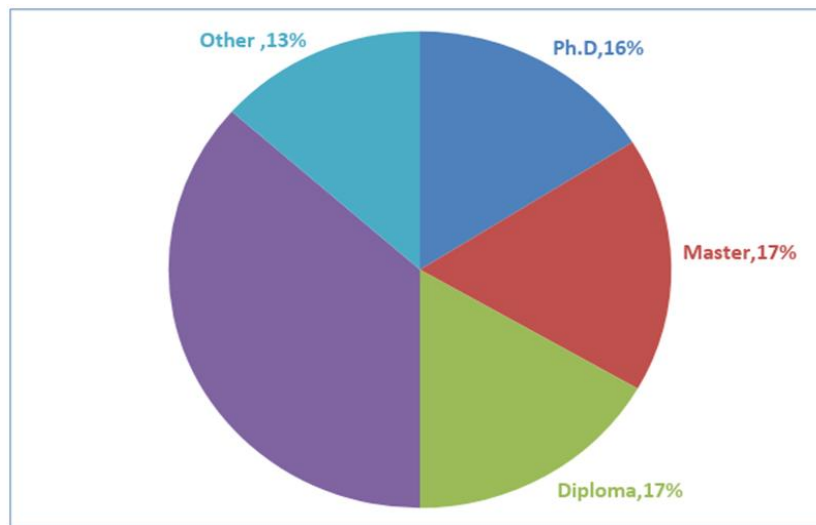


Fig. 3. Educational Background

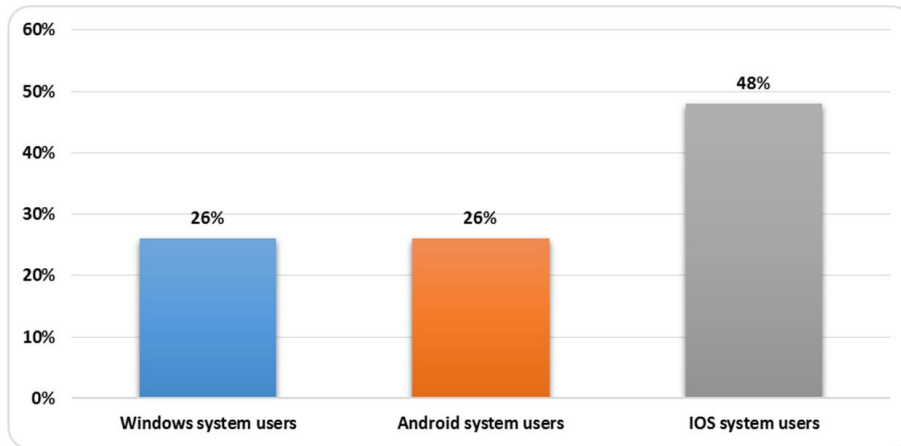


Fig. 4. Type of Smart platform applications in Saudi academic libraries

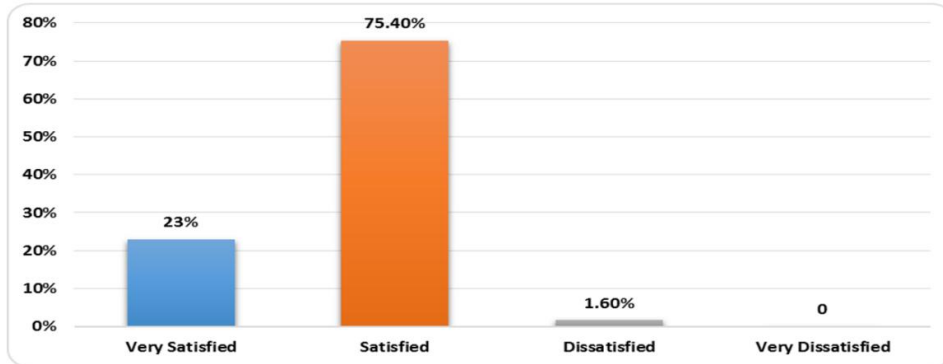


Fig. 5. Satisfied with the design of the mobile application in Saudi Academic libraries

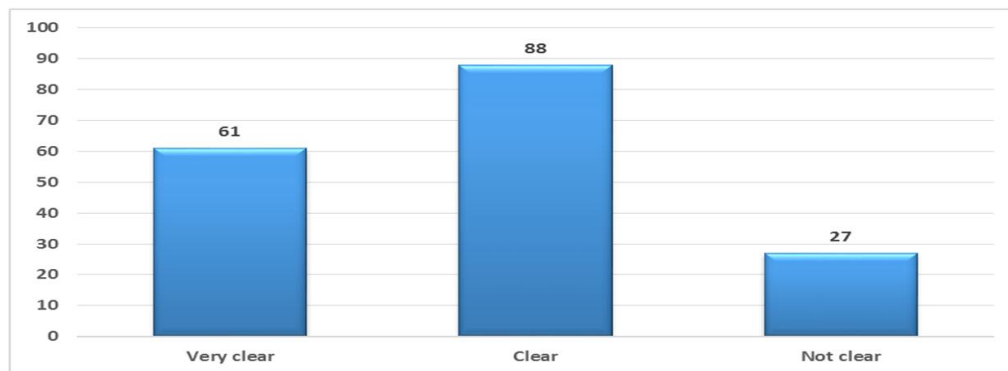


Fig. 6. The explanation of electronic services through smart platforms

The (Fig. 6) bar chart shows the studied community's opinions regarding the explanation of electronic services through their smart platforms. 69% say the explanations are clear, and 23% see them as very clear, while only 8% believe it is not clear. Overall, we can conclude

that the explanations of information services are clear.

7- 6 - Does the library offer training courses to help to develop the staff's skills and ability to provide smart services?

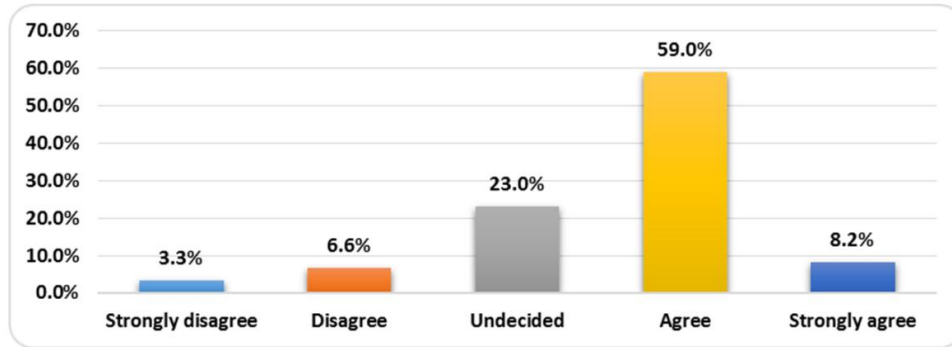


Fig. 7. The Saudi academic library offer training courses to develop the staff skills and ability

The bar chart (Fig. 7) shows the availability of training courses to help the library staff understand the new applications that their library offers, and how to access and use the new features to get the most out of the smart services. This is important to help to improve the services provided through smart platforms in academic libraries. 67% agreed that training courses are offered in their libraries, while 23% were undecided, 6.6% disagreed, and only 3.3% strongly disagreed.

Overall, based on the applied study results, training courses are available for the staff in Saudi academic libraries. However, they are not sufficient: more intensive courses are needed, which should explain clearly all topics relating to the provision of information services through smart platforms.

7- 7- Are the basic requirements for offering library services through smart platforms available in Saudi academic libraries?

The Fig. 8 bar chart confirms that the majority of Saudi academic library staff who have implemented smart-platform applications agree that the basic requirements are available in their

library to provide smart services through the application. 57% agreed with this view, 18% strongly agreed, 6.6% disagreed, and 3.3% strongly disagreed. Overall, it is clear that most libraries meet the basic requirements for providing information services through smart platforms.

7- 8-Do the smart platform applications in Saudi academic libraries make information resource retrieval easy and accessible?

The study result showed 80% agreement that smart-platform applications in Saudi academic libraries make retrieval of information resources easy and effective: the applications comply with z39.50, and with most tools for search and retrieval of information resources -- for example, library online catalogues (OPAC) and indexes, and search result browsing in academic databases. The results confirm that integrating modern technology, such as smart search engines, can help to improve the design of smart-platform applications.

9- Do smart-platform applications in Saudi academic libraries help increase the rate of use of digital books?

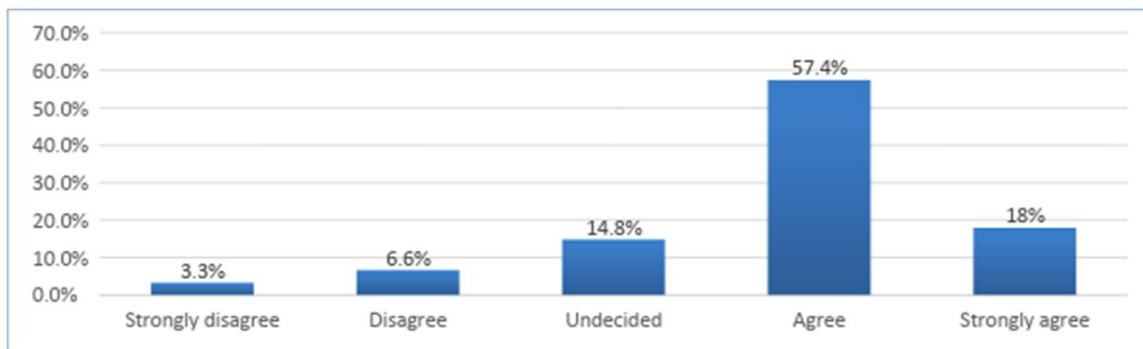


Fig. 8. Basic requirements for providing academic library service through smart platforms

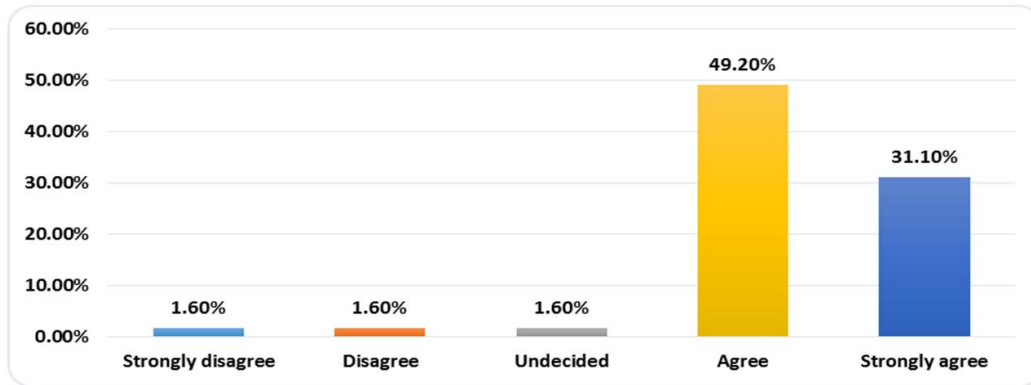


Fig. 9. Smart platform applications make the retrieval of information resource easy and accessible

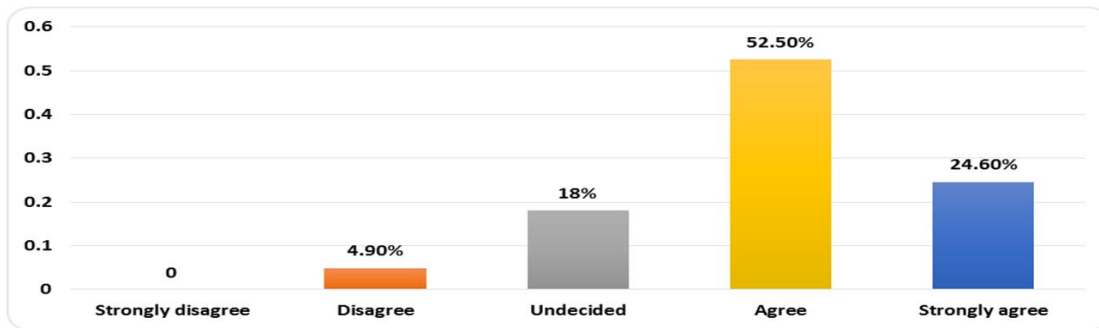


Fig. 10. Smart-platform applications help to increase the rate of use of digital books

The bar chart illustrates opinions about whether smart-platform use helps promote e-book distribution in Saudi academic libraries. 52% of respondents agreed that they do, 24% strongly agreed, and only 5% disagreed. Overall, it is clear that smart platforms are very helpful for e-book distribution.

10- Do smart-platform applications help users participate in events and activities in Saudi academic libraries?

The bar chart illustrates whether smart platforms help to announce academic libraries' events and activities. 77% agreed that the application is important for advertising the academic library and all its events and programs. The results clearly show that smart-platform applications support the distribution of library news.

7- 11- Are the information services provided through smart-platform applications in academic libraries offered to users in the language of their choice?

The bar chart shows views on whether information services are provided to users through smart platforms in the appropriate language. This includes reference services, guidance services, and circulation services for reserving information resources and references. Notice the large gap between the professionals who agreed and disagreed --about 3/1.

Overall, the results confirm that information services are provided through smart platforms in the appropriate language. This has an impact on the following result.

7- 12- Have smart-platform applications in academic libraries increased the number of library users?

The (Fig. 11) bar chart shows that smart platform applications in academic libraries help to increase the number of library users. The reason is that the library services can be accessible to every user who has a smartphone connected to the Internet, and who downloads the application on his/her phone. About 80% agreed with this view, and only 6% disagreed.

Overall, it is clear that smart platform applications in academic libraries increase the numbers of library users.

7-13-Through smart-platform applications, can librarians identify the information sources needed by users?

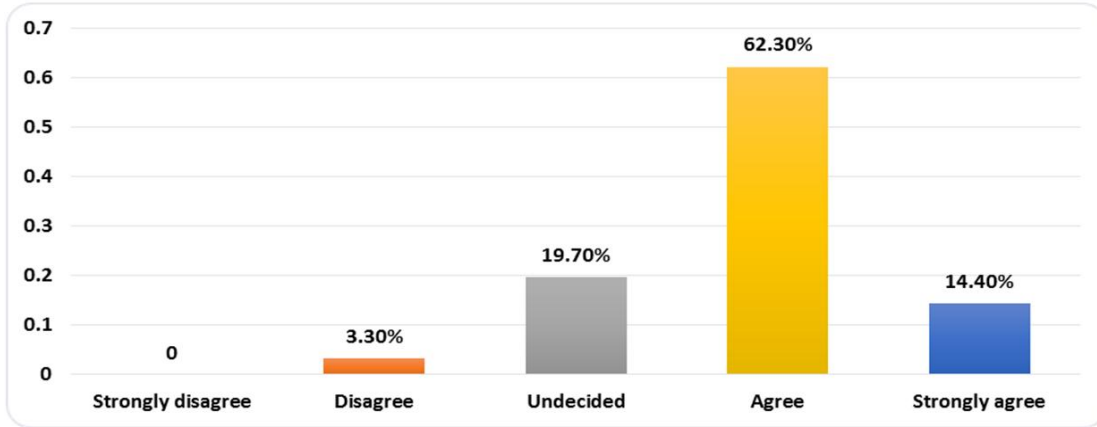


Fig. 11. Smart-platform applications help users to participate in the library events and activities

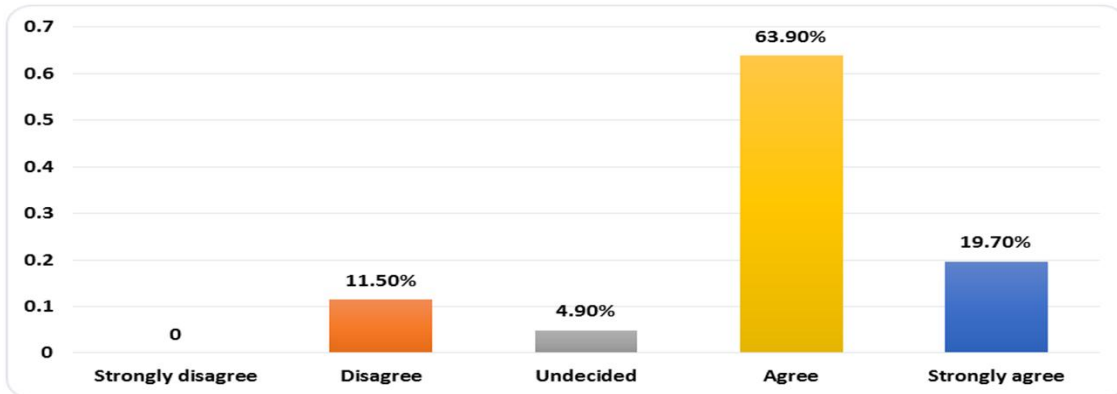


Fig. 12. Information services through smart-platform applications offered the language options

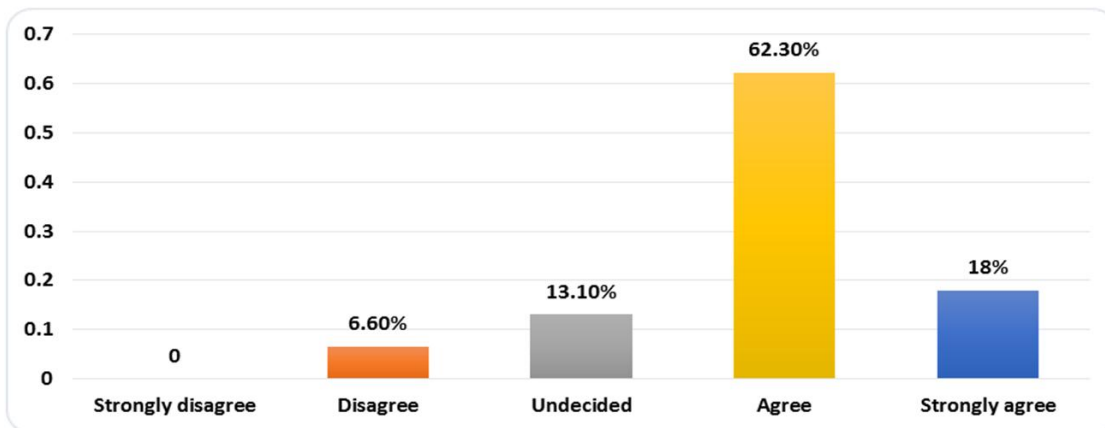


Fig. 13. Smart-platform applications increased the number of library users

The (Fig. 14) bar chart shows that smart-platform applications help in collection development. This is similar to their effect in increasing library users. About 70% agreed that the applications have contributed to collection development in their libraries because it is easy to know what is available and not available in the library.

Overall, the results confirm that the use of smartphone applications in academic libraries has an impact on collection development.

14- Can users create a library account through smart-platform applications?

The bar chart shows that users can create a library account through smart-platform applications. 80% of the participating information specialists see the possibility for users to create their library account this way. Overall, this confirms that users can establish a library account, and, through this, take advantage of all

library services and obtain full answers to questions and inquiries.

7-15- Is it easy to develop and maintain library services through smart platforms?

The bar chart Fig. 14 represents opinions on the development and maintenance of library services through smart platforms. As the chart shows, 73% of the responding information specialists agreed that library service development is easier and faster when users accessed the services through smart platform applications. The interaction of the users with a smartphone application gives the results, and their evaluation of the service, faster than using the library website [14].

16- Is it easy for users to access the library's smart services through smart platform applications?

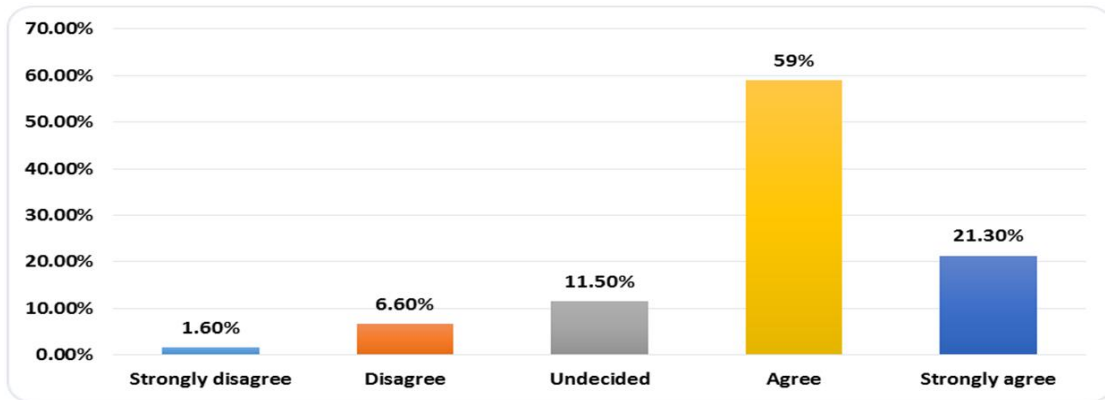


Fig. 14. Smart-platform applications help librarians to identify the user's needs [15]

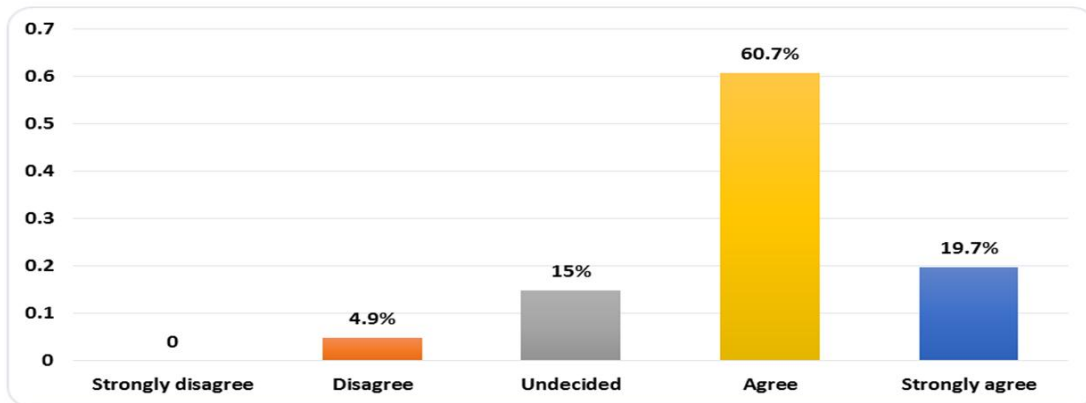


Fig. 15. Academic library users can create their account through smart-platform applications

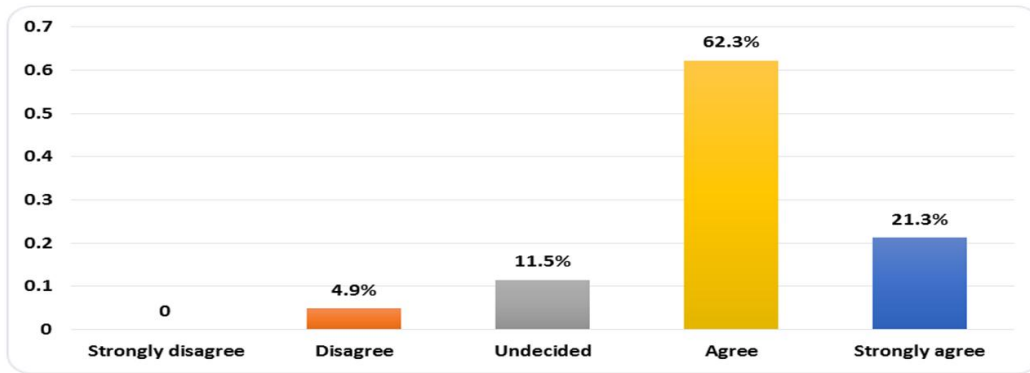


Fig. 16. It's easy to develop and maintain the academic library services through smart platforms

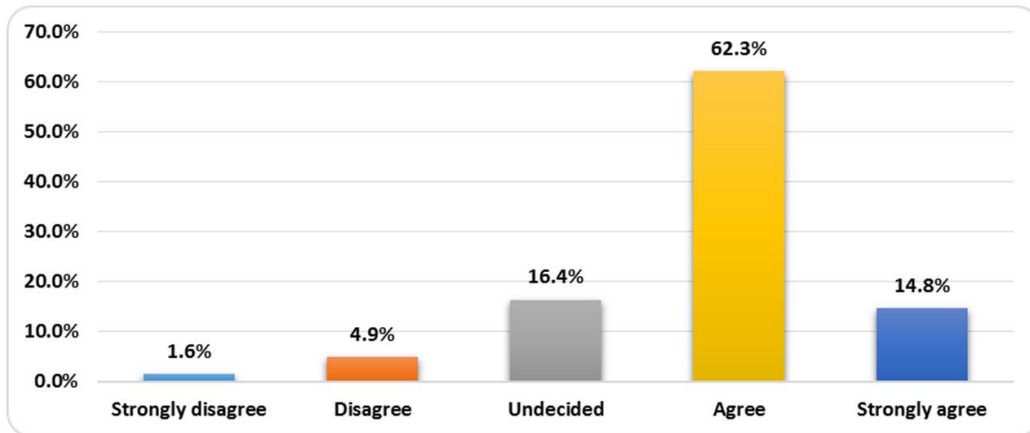


Fig. 17. It's easy for access to the library's smart services through smart platform applications

The applied study asked about the ease of access to information services through smart platforms. The survey found that 77% of library staff confirms the ease of access to information services through smart platforms, based on there being no user complains about the services accessible [16]. Only 6.5% report technical problems, and 16% are undecided.

Overall, the study confirms the quality of access to library smart services through smart-platform applications.

7- 17- Is smart service available anywhere, 24/7, through any operating system or intelligent device platform?

The bar chart Fig. 18 asks the library staff whether smart service in the library is available 24/7, at any place, through any operating system or intelligent device platform [17]. The chart shows that 72% of library staff agree that smart service is available any time during the day,

while 20% are undecided, and 8% disagree. Overall, this result confirms the availability of smart services in academic libraries throughout the day.

7-18- Is the provision of services in the library through smart platforms compatible with international standards and procedures?

The bar chart Fig. 18 shows whether the libraries have smartphone applications that correspond with international standards, in accordance with the results of the survey to the staff of the libraries under study. The chart shows that 49% of the information specialists agree, 13% strongly agree, 10% disagree, and 1.6% strongly disagree. Overall, we find that the library applications follow international standards [18].

19- Is there coordination between library departments to provide smart services?

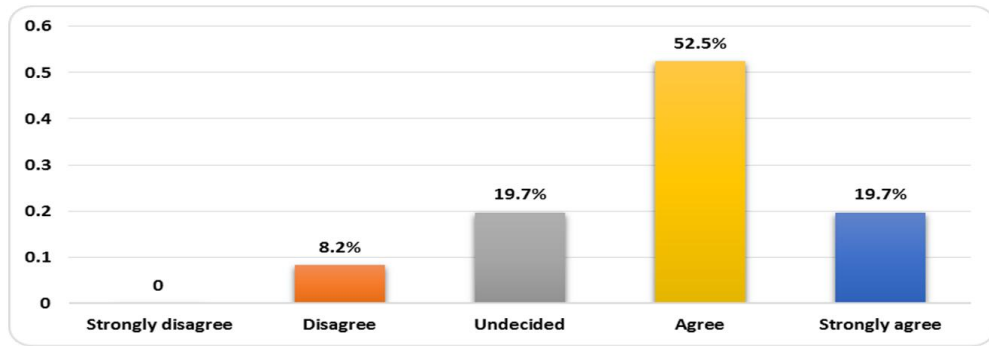


Fig. 18. Smart service available anywhere, anytime 24/7

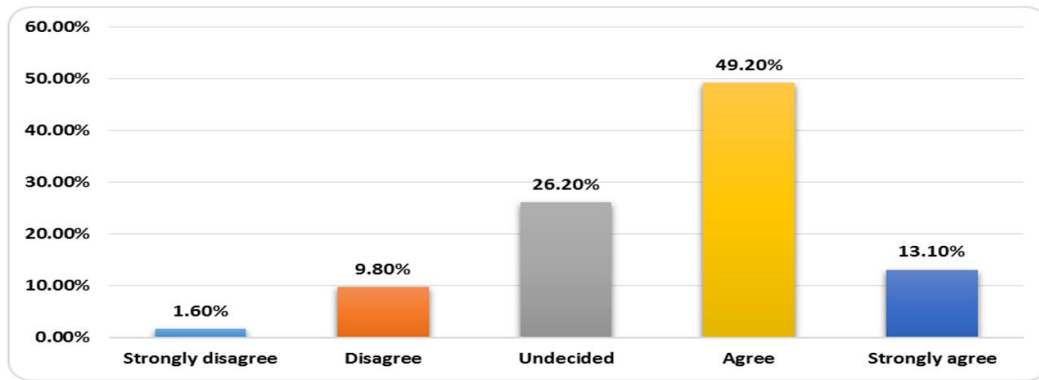


Fig. 19. International standards and procedures are applied in the academic library services through smart platforms

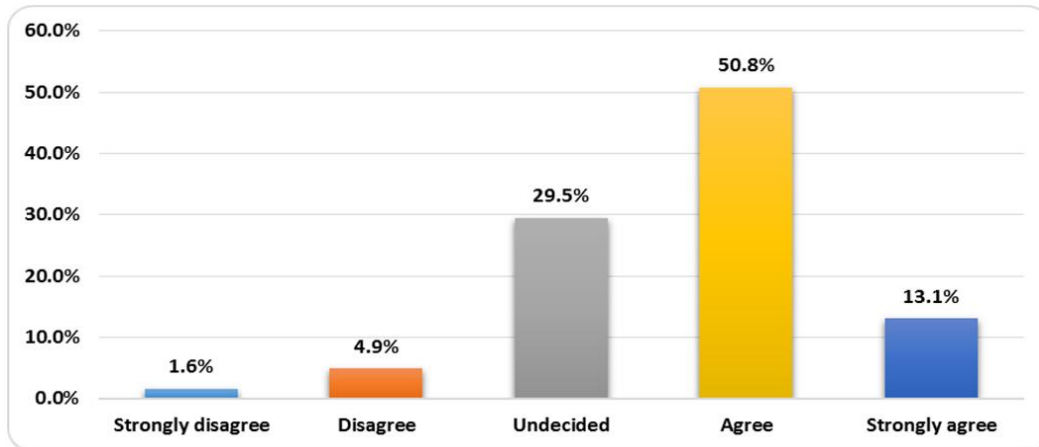


Fig. 20. There is coordination between the library departments to provide smart services

The bar chart illustrates differences in library staff's view about coordination between library departments to provide smart services. 64% say there is a full collaboration between library departments, while 6% disagree. It is noticeable that the percentage of undecided respondents is about 30%. This result was not expected,

because the library staff was expected to be more knowledgeable about whether cooperation exists or not. Overall, this result may not have achieved a sufficient answer to this question.

20- Are physical brochures available to library users to explain the library's electronic services?

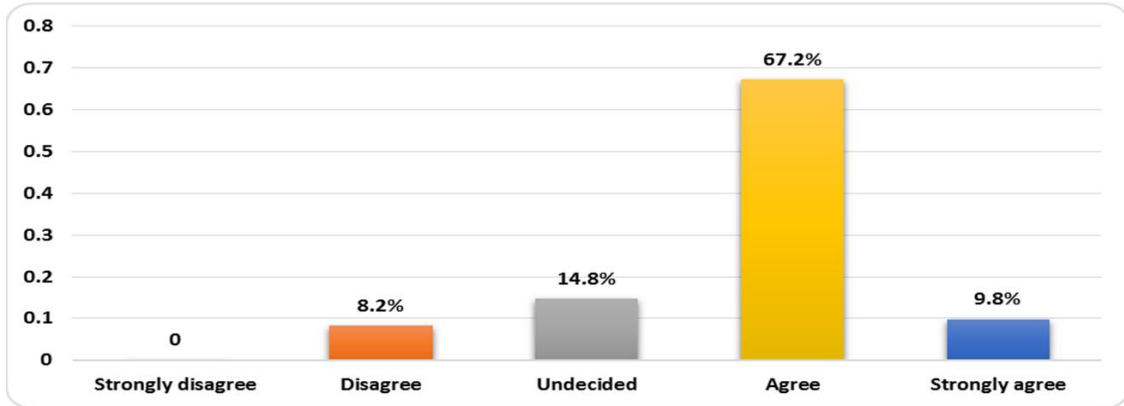


Fig. 21. Availability of physical brochures to academic library users

The bar chart Fig. 21 shows the importance of physical leaflets to explain the e-Library platform to library users. 77% agreed with this point, while 8% disagree and 15% were undecided. Overall, it can be seen that diverse information resources are available for library users.

21- Is a user guide available in smart library applications, including information about how users can take advantage of library services?

The bar chart (Fig. 22) shows responses about user guide contents and how they help users take advantage of library services. 77% support this statement, while 5% disagree, 1.6% strongly disagree, and 16% are undecided. Overall, we find that the libraries have available user guides that help to access all the library services [19].

22- Are document delivery services available to users through the smart-platform applications?

The bar chart (Fig. 23) shows the availability of document delivery services for users through the

smart-platform applications. 68% agree that this service exists, while only 8% disagree, and 18% are undecided. Overall, this result indicates the availability of document delivery services.

7- 23- Is smart video available on the platform, including a library tour of the provided services?

The study found that 61% of library staff confirm that smart video is available on the platform, including a library tour showing the provided services, while 16% disagree, 1.6% strongly disagree, and 21% are undecided.

Overall, more than half of the surveyed agree that video tours are available, but they are not available in some academic libraries with smart platform applications.

24- Are qualified staff available in the library to implement the services provided through smart platforms?

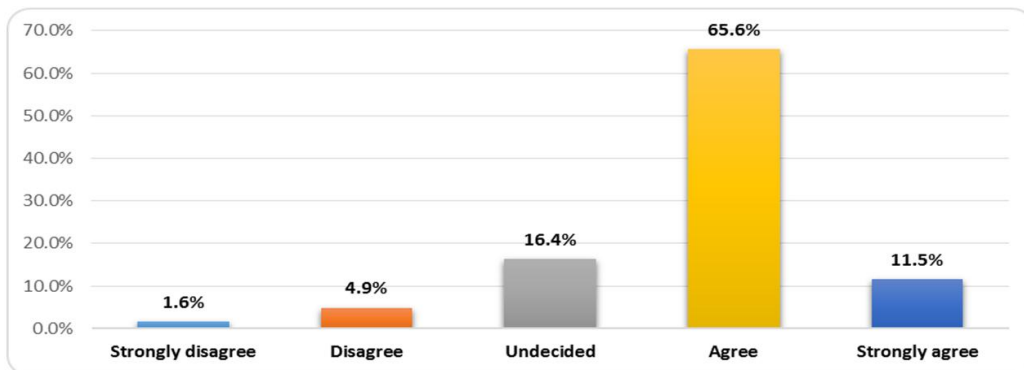


Fig. 22. Availability of the user guide in smart library applications

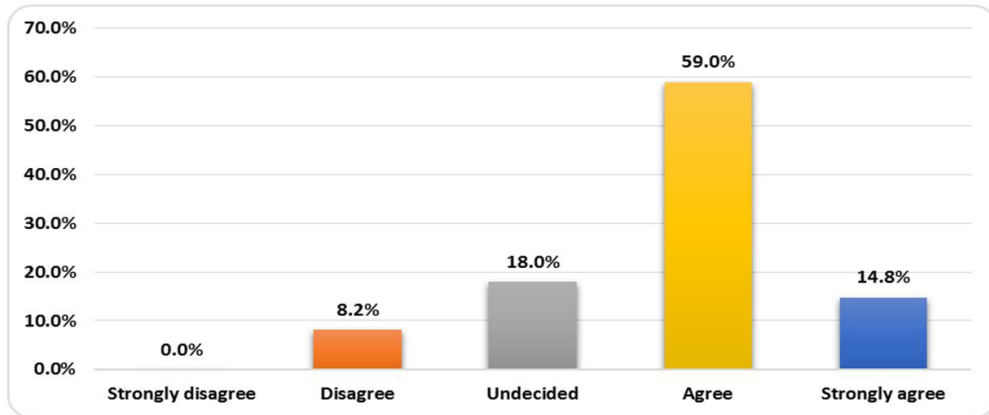


Fig. 23. Availability of the document delivery services in smart library applications

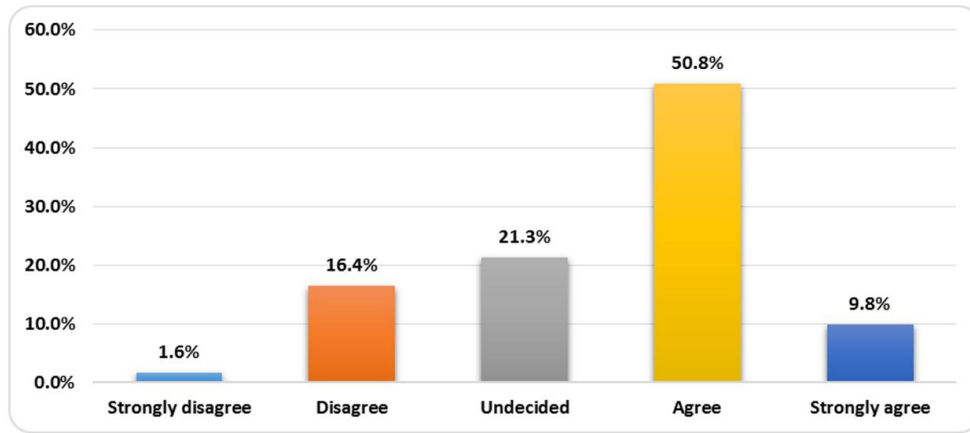


Fig. 24. Availability of the library tours and video in smart library applications

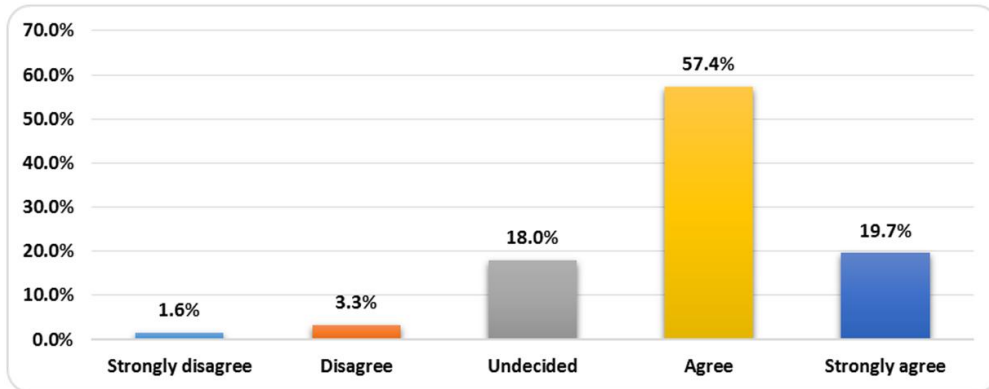


Fig. 25. Availability of qualified staff to implement the services through smart platforms

The study found that more than 77% of academic library staff have the qualifications and skills to provide information services through smart platform applications, while only 5% see the contrary. Overall, the study result presented compelling evidence that academic library staff is

qualified and skilled to manage the information services through smart platforms.

25- Is the security and safety of information services protected through smart-platform applications?

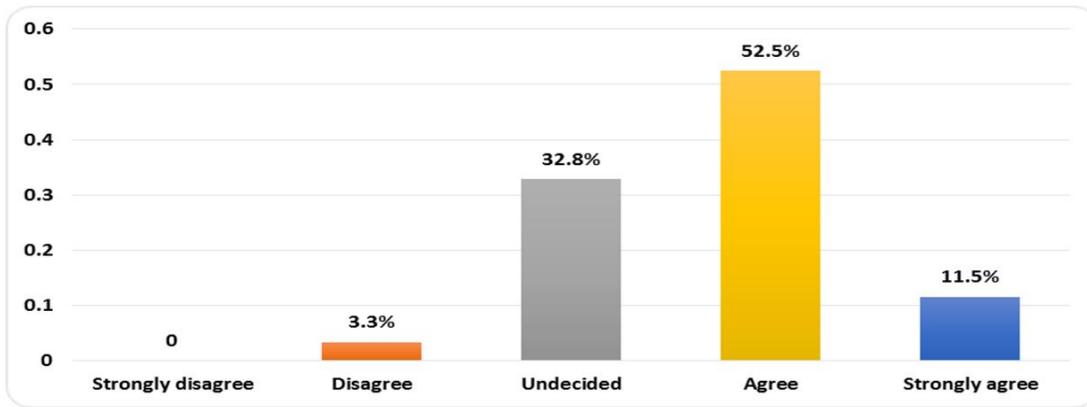


Fig. 26. The security of information services available through smart-platform applications

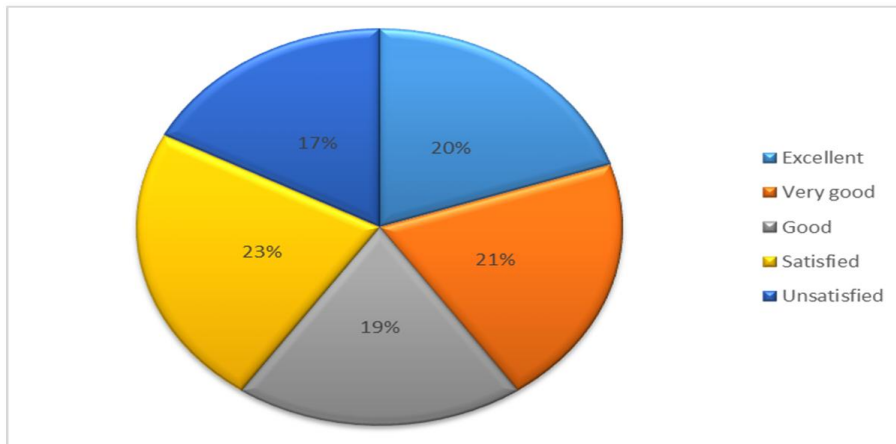


Fig. 27. The quality of the smart services offered through smart platforms in academic libraries

The bar chart (Fig. 26) shows views on the security and safety of information services via smart-platform applications. 64% of library staff affirm that this is the case [20]., or more than half of the academic libraries that offer information services via smart-platform applications, while only 3.3% disagree, and 33% are undecided. Overall, we can see most academic libraries are seen to provide security and safety of information services.

7-26- What do library staff think about the quality of the smart services offered through smart platforms in academic libraries?

Excellent	Very good	Good	Satisfied	Unsatisfied
31	32	30	36	27

This question is not compulsory in the survey, so only a few participants answered this question,

and there is not a lot of data regarding the quality of the smart services offered through smart platforms in academic libraries. That said, it is clear from the results that 20% of the library staff see smart services provided through smart platforms in academic libraries as excellent, 24% see them as very good, and 36% see the services as satisfactory, while only 4% are unsatisfied. This indicates the relative quality of the service, according to the library staff's viewpoint. However, some of them recommended that the library services provided through smart platforms can be developed in the following ways:

- More literacy and training
- Adding smart-platform applications on the library websites
- The deployment of smartphone platform applications
- Development of interactive environments

- Increasing interest in the smart platform applications
- More interactivity with library users
- More information about how to Download the applications

8. DISCUSSION

- The application of smart platform systems used in Saudi Arabia depends on the desires of the studied community and the smartphone systems they are accustomed to use [21].
- Most Saudi academic libraries meet the basic requirements for providing information services through smart platforms.
- The use of smart platform applications in Saudi academic libraries helps them increase the numbers of library users.
- The use of smartphone applications in academic libraries has an impact on collection development [22].
- More than half the survey respondents agree that video tours are available. However, they are not available in all academic libraries with smart platform applications.
- There is compelling evidence that academic library staff is qualified and skilled to manage the information services through smart platforms.
- Most Saudi academic libraries are viewed as providing security and safety in their information services.
- The services in Saudi academic libraries provided through smart platforms be developed in different ways.

9. CONCLUSION

Smart platforms provide new opportunities for promoting academic library information services [23]. Using them, users can access information easily and effectively. The integration of new technology, such as search engines, with smartphones, is changing information services in academic libraries to become more accessible and add new functions [24]. Smart platforms also improve the size, quality, and accessible hours of library services, and make it unnecessary for users to physically go to the library and use local computers to access library services. This adds a great deal of value, especially in academic libraries, where students and faculty often don't have enough time to visit the library building.

Smart platforms have shortened distances and time: Users can access information services from any place and at any time [25].

In light of the recent tremendous development of smartphone technology across Saudi society in general, it is imperative for academic libraries to work to benefit from this technology.

Further, academic libraries are an important source of research. Since development depends on the implementation of research results [26], the Information Society which is called for by the Saudi Vision 2030 initiative cannot be achieved without developing academic libraries, which are the mainstay of universities and scientific research centres. The impact of academic library services affects social development in general [27]. Thus, we can hope that the use of smart platforms in providing information services will have a lasting positive influence in Saudi academic institutions.

The current study has found that smart-platform applications for information services in academic libraries are among the most important smart applications. They can be a solution to offering smart and innovative services to library users in all categories. With the proper approaches, they can help users access and download library resources for research purposes, as well as strengthening the institutional culture to support and promote a culture of reading and knowledge among students, researchers, and faculty members at Saudi universities. This can be achieved by providing cutting-edge knowledge information resources, making electronic infrastructure a priority, and creating areas for reading and creativity in academic libraries [28] in the Kingdom of Saudi Arabia. Finally, one potential weakness is that providing information services through smart platforms in academic libraries may not have the desired impact unless there are sufficient publicity and promotion of these services.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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