

## PREFERENCE OF MOBILE PLATFORMS: A STUDY OF iOS VS ANDROID

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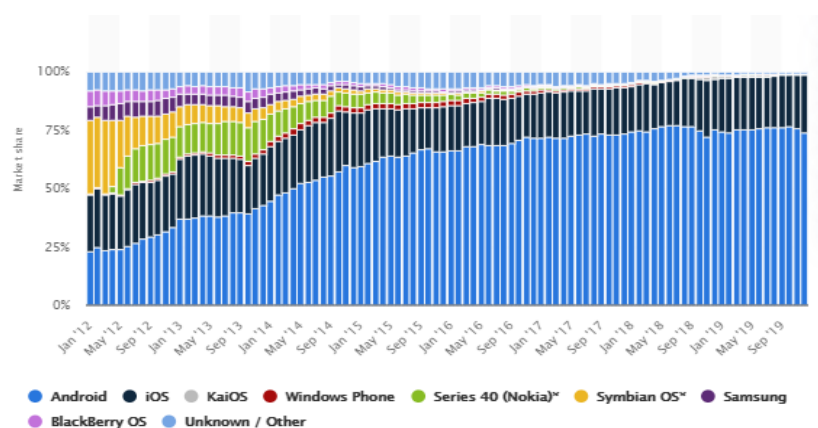
### Abstract

The alteration of mobile devices and its utility has made a massive impact on economic development worldwide and with multiple mobile platforms that have emerged in recent years has always been an arguable topic. In a short span of a decade, the smartphone has become a ubiquitous part of our lives in predictable ways, and in ways that nobody saw coming. The supply of various mobile apps from the App Stores has created a massive market value for many businesses and individual app developers beyond the world. The industry peaked with the fast evolution of mobile devices and also gave rise to contemporary operating systems. The rapid development of technology in the Operating system has most affected the users. The outcome of the paper will give a better idea of a preferable platform for mobile devices and the result obtained by this paper can guide in designing and development of applications.

**Key words:** Android, iOS, Cryptography, Digital advancement, Security changes, Design Accessibility

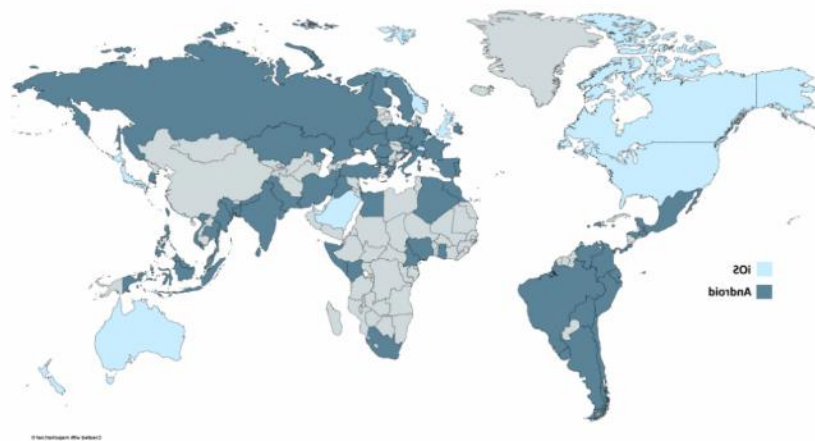
### Introduction

The evolution of technology advancement from personal computers to the laptop and smartphones is growing at every phase. Back in 2012, there were many operating systems but in the last recent years, the smartphone segment has been observing a familiar battle on a year-on-year basis. iOS vs Android is a paradigmatic competitor of the big tech, everyone competing for an acquiring large market share and predominance. Jointly, both iOS and android generated aduopoly having 70.68% of android and 28.79% of iOS in the mobile operating system market worldwide in April 2020[1]. The internet has modified the way the world works, by diminishing the hurdles and creating the world more open and helping in encouraging the digital transformation. The alteration of mobile devices and its utility has made a massive impact on economic development worldwide, creating opportunities for businesses and new entrants across the world. Figure 1 below shows the timeline of mobile OS market share worldwide.



*Figure 1- Market Share of operating systems[2] (Source: Statista)*

The below Figure2 shown is the global map depicting the leading market share of that area, grey (iOS) color area cover most of North America, the whole of Australia, and some part of Europe whereas black (Android) color covers the developing nations like Asia, South America.



**Figure 2 - Worldwide distribution of iOS and Android [3](Source:DeviceAtlas)**

### **Introduction to Selected Platforms**

**Android** is based on Linux operating system and an open-source as well. It was originally established by Android Inc. but afterward, in 2005, it was acquired by Google. Google provides services like Google Search, Gmail, YouTube, Sheets, Translate, Maps, Google Drive, etc. It is an open-source platform; it delivers pliability to modify the device as per the user's inclinations and also improves the Operating system permissions according to the user's need. It can moreover run different sets of implementations including the outsider, middleware applications, media, and causes its clients to be more beneficial. Being an open-source model, it is slightly more endangered to hacking and cyber threats. The openness and fragmentation of installing apps in the device that are more often from third-party make the Android operating system more susceptible to security concerns. On the contrary side, **iOS** is an operating system that is developed by Apple Inc. Initially, this OS framework was created for the iPhone, and later it was expanded to be implemented on other devices of Apple, such as iPod, iPad, Apple TV. These devices are likely to be more expensive than any other but also stable other than any manufacturer. It has a Unix-like framework for operating, which, since its first category, a few components of the Mac OS X system[4]. Its main advantage is that Apple allows the updating of the OS for earlier devices. Apple dispense updates to the iOS framework through the over-the-air (OTA) interface. iOS Operating System doesn't bolster the Flash multimedia application of Adobe, for product policy reasons. The user experience, Apple operating system provides a simple and clean interface, that is accessible. As per the security of Apple iOS, it restricts in offering access to information, areas, and contact data to your Apps.

### **Objective**

The study mainly concentrates on two major competitors of an operating system that is iPhone OS and Android OS and their essential features. Also, the various factors influencing the purchase decision made by the buyers and help to know the diverse challenges faced by the marketer for outreaching its target users.

### **Review of Mobile Operating System**

A few differentiation studies are done between these two OS exist here which are related to its built, architecture, and features issues. There are some examples, which show a correlation identified with varying elements that impact the security part on the two stages, for example, application permissions, application provenance, encryption mechanisms, and application isolation is bestowed[5], [6]. A correlation of the two OS planning along with a given framework and characteristics for application improvement; a few instruments for cross-portable application advancement are seen in[7]. Likewise, a contrast dependent on the accessibility and abilities of various arrangements of UIs is portrayed in the paper [8]. The kind of the particular norm for sensor applications are given by iOS equipment. iOS equipment incorporates assorted kind of attributes like a total

sound/video input/yield, miniaturized scale regulatory framework, it additionally has included characteristics like screen interface and has a wire and remote-based system for the user [9].

Besides, many papers in writing understand correlation dependent on nitty-gritty investigations of the market share of advanced mobile phones having diverse versatile working frameworks, along with the comparison of iOS and Android-based on issues in security, extensibility, advertisement, cost and availability of the application for buyers where Operating Systems have had an enormous effect in the manner the organizations, individual work [10], [11]. The drastically diminished expense of smartphones especially for Android made individuals in India, and numerous different nations on the world show enthusiasm for versatile innovation, which is a roundabout way to help in the advancement of the mobile sector [12].

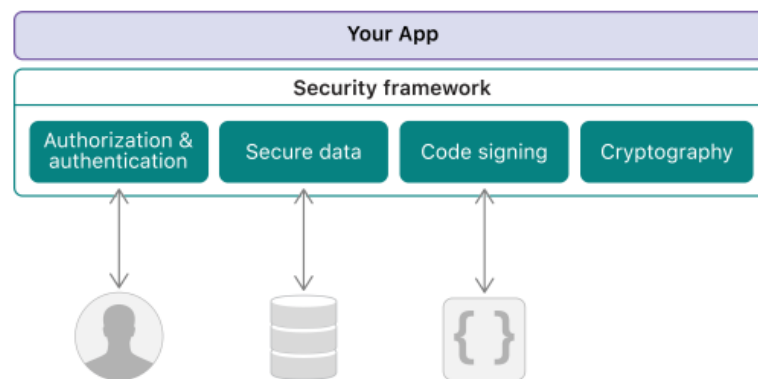
The total security differentiation of driving Smartphone OS to see whether one of them has a verge over the other. On account of, their research concluded that the newcomer user doesn't know about the consents they have conceded at the hour of installation especially of the Android Users [13]. They removed the undermining authorizations from the application dependent on their usefulness and our research provided the second level of security to the clients, without adjusting the fundamental structure of Android OS [14]. The research finding observed that the comparison of Android versus iOS, is constructed of various characteristics and measures, shows the protection types, the qualities, and the shortcomings of both [15],[16]. Some of the safeguarding mechanisms are applied in both and some are distinctive for one another and this makes the security a potential character in both. The vulnerability in Android is more than those in iOS and this appears in the comparison. The qualities in iOS are extra by a little than those in Android. Accessibility of solutions and antimalware items for Android is more prominent than iOS [17]. The two classifications in the correlation are both won by iOS. Finally, Android is the forerunner in the race of business rivalry yet the investors of Android's advancements ought to accomplish more endeavors as far as security to keep forerunning because iOS stills a solid competitive nemesis and it gives a prime concentration for executing security innovation [18].

Computing on smartphones is mushrooming, and regardless of platform choice, a course regarding the matter will probably be oversubscribed [19]. Either iOS or Android will empower staff to introduce the key thoughts of mobile computing; fortify understudy programming aptitudes that will serve them in great stead regardless of what platform they end up composing on was supported by [20].

## **Methodology**

This study comprises of descriptive method of research by gathering significant materials. For this purpose, the use of the Internet, research papers, journals, articles, reports, and presentations as sources of information. To acquire some fundamental knowledge about security threats for applications the supporter looked into architecture, malicious history, security motivation, threats, malicious approaches, and vulnerabilities. Also, regarding the application development concerning the change in technology and excessive use of internet streaming through a mobile platform. The use of a questionnaire checklist as a survey instrument to determine the level of security awareness and practices of Android and iOS users, based on design accessibility and then implementing the data using SPSS software for data analysis.

Apple has a good recognition for staying on the pinnacle of security. The company stringently reviews all the apps available in its App Store to avoid allowing malware through it. Apple's OS is a close framework. It doesn't share its source code to application developers, and it can't be adjusted by others. This makes it more difficult for programmers to discover weaknesses on iOS-controlled devices. IOS uses the security system to protect data, make trust, and control access to the product. These security administrations reinforce objectives to set up the user's information that is a verification and afterward approval, secure information both on disk and in moving over a system network connection, and guarantee the legitimacy of code to be executed for a specific reason.



**Figure 3 - Security framework of iOS [21](Source: Apple Inc.)**

Figure 3 gives the basic idea of the iOS security framework, where you can use lower-level cryptographic assets to make new security administrations. They also focus to ensure that devices have the latest version of the iOS installed (which typically includes security updates) and encourage accumulation upgrades. Due to their reputation and overall popularity, breaching Apple's iOS would be a splendid accomplishment for any hacker. The iOS data storage format does not have external storage and difficult for the undesired code to access built-in storage and even it has an enhanced permission system where you can pick and choose which data can an app gets access.

The design accessibility of iOS attracts the consumer toward it like its screen resolution of the latest version has 180x180 px and even the arrangement of icons makes it exquisite.

The Android OS gives permissions to the system for an individual app as it relies on open source systems. At the point when it installs an App from Google App store or outside source. It will display an inventory of assets or authorization required by the App to execute. Too much dabbling, a user might make a shortcoming in their device's security. If a phone manufacturer develops another device with an alteration to the Android OS and there's a weakness in that code, the hacker tries to discover it. So, the user at the time of installation only proclaims that the list of permission App required ought to be given or not. Permission may be for Reading USB, Internet access or GPS area, and so on. Users can have two options either give all the authorizations to App require or not to install the App by any means. In any case, it is up to the user that they focus on the authorization while installing and give the consents or essentially deny it to not install the App. But it may usually, neglect this rundown of authorization which is a security breach. Android Material design bit can be treated as an upgraded version of level structure with skeuomorphism, a well-known plan idea of making things spoke to take after their certifiable partners.

The use of SPSS software's text analytics for Surveys program helps to review administrators reveal amazing bits of knowledge from reactions to open-ended survey questions. SPSS isn't the main statistical software however there are numerous others that you may come across if you pursue a career that requires you to work with data. A portion of the other regular statistical packages incorporates Stata and SAS. The ANOVA test to be applied that will reveal to us whether there is a noteworthy contrast between the methods for at least two degrees of a variable. In this way, we've got more chances that we have multiple levels it won't let you know between the various pairs of means the difference is significant. Along with this, we have to perform a post hoc test to locate this out.

## **Result & Analysis**

This is a collection of both primary and secondary data where we have gathered the information from questioner were more than 150 people participated and gave their input and various websites.

### Overall Analysis

There was a statistically significant distinction between age groups as exhibited by one-way ANOVA ( $F(4,157) = 2.681$ ,  $p = .034$ ) as highlighted in figure 4.

ANOVA						
		Sum of Squares	df	Mean Square	F	Sig.
In your opinion, how user friendly is your operating system?	Between Groups	.880	4	.220	.439	.781
	Within Groups	78.780	157	.502		
	Total	79.660	161			
How is your user experience with your operating system?	Between Groups	2.058	4	.515	1.028	.395
	Within Groups	78.584	157	.501		
	Total	80.642	161			
Which operating system smartphone you currently own?	Between Groups	.973	4	.243	2.681	.034
	Within Groups	14.243	157	.091		
	Total	15.216	161			

Table 1- ANOVA Test

A Tukey post hoc test showed that the age group of 31-40 tends to buy more often that is statistically significantly further than the age group 25-30 ( $p = .033$ ) and 40-60 ( $p = .021$ ). According to a questionnaire survey, most of the smartphone buyers are not working i.e. 61.7% and almost 89.5% of people operate an android-based operating system. Considering the feature preferences of the Operating system most of the users look for battery life, cost of the smartphone, and the user interface of the operating system as shown in figure 5 below.

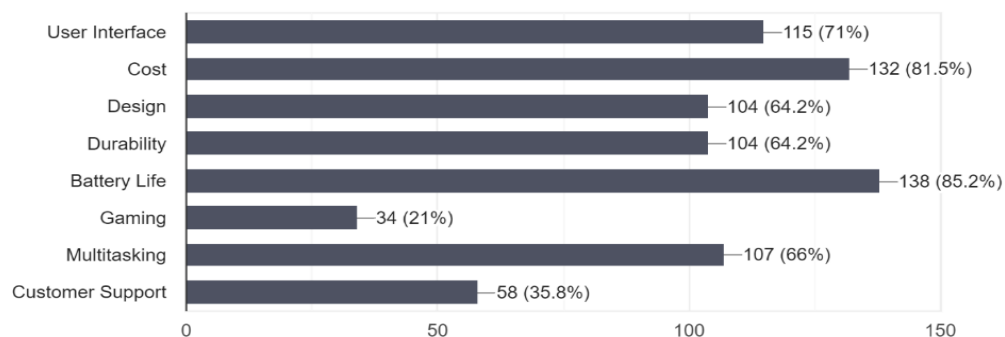


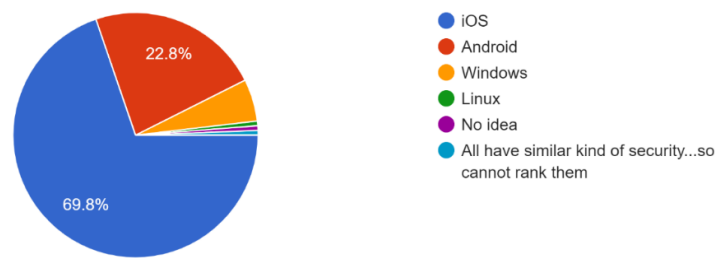
Figure 4-Features of OS

### Security of OS

iOS is thought about as one of the highest most secure about OSs for mobile phones. As, it has an unbending authority over its various segments like equipment, working framework, and applications. The designers of Apple organization fortify their model to stretch out to a model that can give out any third-party antivirus. Two alternate points of view of the iOS security model are introduced. One of the models remains on four columns that are referenced in and are Data Security, Network Security, Device Security, and Application Security.

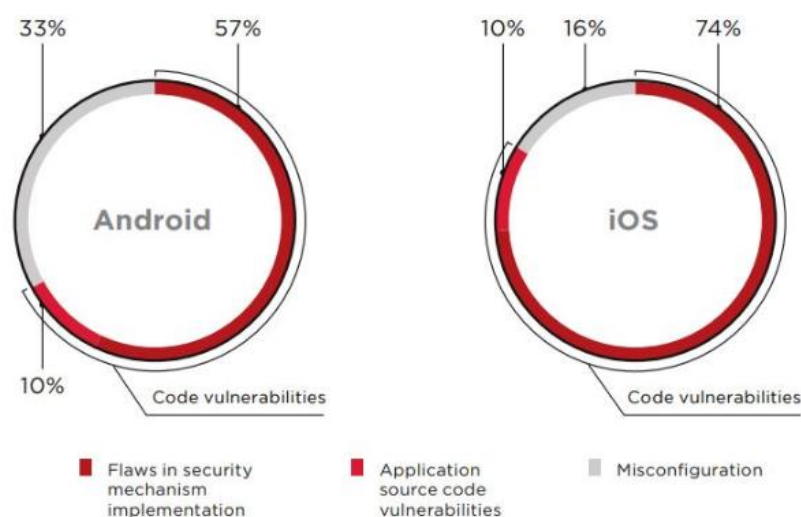
Android is a popular operating system and is developed by the Open Handset Alliance led by Google to be a competitive mobile operating system. The security features are Components Protection, Memory Management Unit (MMU), Application Permissions, Type Safety. So, when asked users about choosing a better operating

system regarding personal data protection 69.8% of people were with iOS and only 22.8% of people went with Android as shown in figure 6.



**Figure 5- User's distribution using Operating system**

According to figure 7 below that has taken as secondary research shows uncertain inter-process communication emerges during designing of correspondence interfaces between application parts and is classified as an error in the usage of security systems. Errors in security components are the reason for 57 percent of weaknesses in Android applications and 74 percent of weaknesses in iOS applications.



**Figure 6 - Vulnerabilities by type [22](Source: Ptsecurity)**

### Design Accessibility

iOS latest version has built-in accessibility APIs, accessibility features, and developer tools. It provides an exceptional opportunity to deliver a high-level mobile experience to each customer, including those with special requirements. Features include Voice-over, the comprehensive screen reader for blind and low vision users, playback of closed-captioned, Switch Control or audio described video, Guided Access, Text to Speech, and more.

Android design is created under universal design principles, and backing them will help your app meet basic usability standards. Cohering to universal design and empowering Android's accessibility tools will make your app as accessible as possible. Vigorous support for accessibility will increase the user app base.

According to the survey do most of the suggestion for improving operating system were ease in accessibility of apps, overheating issue during heavy usage, RAM management, bugs issues, availability of a wide range of

apps, Customization of OS according to my personal preferences, UI scaling and icon choice, graphical interface, and New features such as AI and ML included in the OS for better prediction of human behavior. Most of these issues have been improved in iOS latest versions, but android is still working on it.

### Conclusion

This paper has shown, iOS and android both have inconsistency as a mobile platform. Though Android holds more market share to iOS in 2019. If we compare according to cost, Android can be purchased at a much cheaper price than iOS. The error report quality of iOS is quite suggested than android as it gives live support to the users. iOS has proved to be a safer choice in terms of security. Apple company have been improving their security in all aspects. As for the Android operating system, they are still trying to improve their security basis. When it comes to design accessibility iOS providing distinctive accessibility captivate most of the users, but Android has easy accessibility that any user can use without being restricted. Far-reaching comparison state that iOS is a superior inclination than android however on-premise of cost android is best.

Future Work areas: Security analysis of the App Store application distribution and In-App Purchase system.

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