Current State of KaiOS in Emerging Market and Roadblocks

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Figure 1: KaiOS: Internet for Everyone.

ABSTRACT

Cell phones are an absolute necessity in this modern time, and we all must have heard two words Android & IOS. These two are the most popular operating system for smartphones that are available now. But there is also another famous operating system you might haven't heard about, which is KaiOS. KaiOS has over 150 million users, and it is also known as "Smart Feature Phone." A vast number of people aren't into smartphones but still want to use those fantastic android or IOS apps. And there comes KaiOS. This operating system allows us to use android and ios apps on a feature phone. KaiOS is intended to give a rich user experience on a low-spec feature phone while retaining core smartphone functionalities like web browsing and support for popular apps.

CCS CONCEPTS

• **Operating system** → **KaiOS.**; • **Mobile Application** → **Feature Phone Apps.**.

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KEYWORDS

KaiOS, feature phone, mobile app, operating system

1 INTRODUCTION

KaiOS was named after a Chinese word "kai" which means "Open-Sourced". KaiOS is a mobile operating system based on Linux. KaiOS is an advanced OS however, it is intended for feature phones that we call button-based cell phones and are hugely famous among the old generation. KaiOS is the developed version of Firefox OS which is also based on Linux.

Figure 2: Worldwide Office Locations.

It was developed by KaiOS Technologies Ltd. This company is situated in Kowloon, Hong Kong. Its largest shareholder is TCL Corporation. KaiOS is becoming a global powerhouse in the mobile industry. KaiOS is closing the gap between feature phones and smartphones.

Currently, a 280 people team is working behind KaiOS, and this number is just growing day by day. Though the headquarter of kaiOS is situated in Hong Kong, it also has offices around the world, such as the US, China, India, and France.

Figure 3: GSMA's GLOMO Awards.

The organization is perceived as a champion of GSMA's GLOMO Awards 2020 in the category of Best Mobile Technology Breakthrough, and furthermore positioned among TIME's Best Inventions in the Social Good category for 2019 and has won a few different honors, including the "Changing Lives Award" at AfricaCom 2019. KaiOS also ranked 11th among the top 50 most innovative companies 2020.

This Operating system is based on HTML5 and other open web technologies. KaiOS Supports 4G, GPS, and Wi-Fi. KaiOS only needs 256MB of ram to run the operating system. KaiOS can easily run apps like Facebook, YouTube, Twitter, Google Assistant, Google Maps etc. KaiOS is also not battery hungry. It consumes very little battery. As a result of these minimum requirements, the devices that are running on this platform is very much cost-efficient. Recently KaiOS is dominating the feature phone market in India. It took 35.9% share of feature phone market in India. JIO an Indian telecommunications company, was a big reason for this growth. Now KaiOS is publishing different versions regularly. Its first version was released on march 2017 and its current latest version is 2.5.4 which was released on August 2020.

2 LITERATURE REVIEW

An operating system or also known as OS is a software that acts as an interface between computer hardware components and the user. There are different types of OS available in this world we all know about Windows. It's an operating system developed by Microsoft then there is Linux and Mac OS by apple. These operating systems are used in computers. Like these operating systems to run our mobile phones that we use on daily basis we need OS. We all heard the word Android and Apple these are the most famous mobile operating system. Android was developed by google and IOS was developed by apple. There are also some other mobile OS like Symbian, BlackBerry OS, Windows Mobile etc. Now there is a new OS available in the market that is KaiOS.

Figure 4: Different Operating Systems.

KaiOS is not directly competing with android or IOS as android and IOS is for smartphones but KaiOS is for feature phones. KaiOS is offering its phone form $20. But on the other hand, a decent android phone cost at least $50. But there is a huge number of people around the world who doesn't want to spend those extra 20 to 30 bucks. But in this digital world the also wants to use apps like Facebook, Google Assistant, Twitter, YouTube and wants a very good internet browsing experience. And KaiOS became their solution KaiOS offers them all these modern features but still costs a lot less then android and IOS devices.

Figure 5: Alactel Flip 3.

KaiOS was first released on Alcatel Go Flip phone in 2017. After that the client number of KaiOS was beginning to increment quickly. It began to get well known in third world nations. Inside three long periods of presence in the market, it went to the quantity of clients

of 130 million. This growth is very much satisfying. Because of the success of Jio phone KaiOS became the second most popular mobile phone platform in India. As of February 2018, KaiOS Technologies has partnered with Mozilla, Airfind, Facebook, Google, Bullitt, Doro, HMD Global, Micromax, NXP, Spreadtrum, Qualcomm, Jio, Sprint, AT&T, T-Mobile, and Orange S.A. HMD Global is using KaiOS as their default operating system. Nokia 8110 4G also uses KaiOS.

The previous feature phones were too much expensive but the software experience was not that rich. And those phones were not advanced enough to support some advanced features like Forge or NFC.

We know about Symbian OS which was very popular operating system for feature phones. But that didn't survive. So the question comes how can KaiOS is thriving while a very popular OS like Nokia's Symbian failed. Well, KaiOS is different from Symbian. Symbian was not open sourced but KaiOS is open sourced and Symbian never had an app store. KaiOS has a full-fledged app store named "KaiStore". And this kaiStore have more than 500 apps like facebooks, viber, WhatsApp, google maps. Can you imagine, it's like by spending only 10$you are getting a smartphone. Symbian users couldn't even think of using these apps in their phones. KaiOS also offers a rich UX and web browsing experience.

Figure 6: Symbian Operating System.

KaiOS is also attracting developers. As we know KaiOS is a modified version of Firefox OS and Firefox browser engine runs the entire OS. As a result, using web apps is very easy in this OS. KaiOS apps are also based on HTML, CSS, JavaScript, that means it is based on web technologies. And KaiOS apps are processed by GecKo runtime. So if someone is a web developer, they already know the basics of building apps for KaiOS. KaiOS also have a wide range of resources which includes design guides, device emulator, reference apps and documentation in their developer portal. In December 2018 kaiOS also included a new feature in their apps which is KaiAds.

This ad feature helps developers to monetize their apps and help then generate revenue from their apps. Google is currently ruling the smartphone world with android and facebook is ruling the

Figure 7: KaiAd Introduction.

social media world. Both google and Facebook showed interest in KaiOS. Google recently donated $22 million to kaiOS. Because tech giants generate revenue mostly from their advertising network. So for them, more users mean more data, and more data lead to more advertisement. They already have caught users using smartphones, and now they want to expand their user base by investing on feature phones. KaiOS is actually closing a digital devide. Device affordability, digital literacy, and data pricing these problems are crucial to reduce digital divide but there is another important step which is to create relevant apps and continuous support and update for those apps. Specially for those who are accessing internet for the first time. KaiOS is providing these users quality apps and support. KaiOS generates revenue from in-app purchases and advertising. They offers backend service like FOTA and for these services they charge their partners.
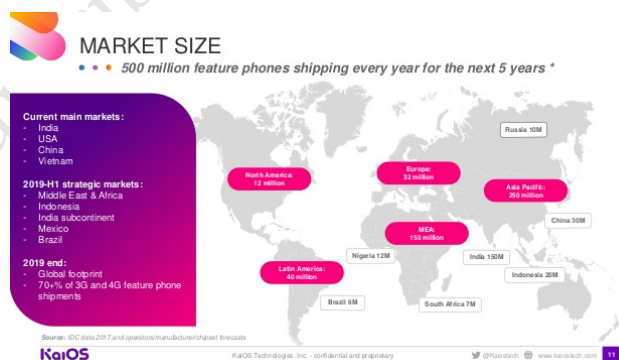

Figure 8: Market Size of KaiOS.

KaiOS mainly targets people in emerging markets. In Asia, Latam and Affrica they are focused on working with their carrier partners to make smart feature phone accessible to all through affordable decices and data plans. The above discussions give us a clear idea about the new smart feature phone platform KaiOS and the reasons behind its success.

3 CURRENT STATE

At present we know that kaiOS is very popular OS in India and Jio played a big role for kaiOS to achieve this success. Jio promoted free phone plan in 2018. Customers spent 1500 rupees to buy Jio-phone but the money was just a deposit. Jio promised them that they will return the money after 3yrs. After that a lot of people bought Jiophone and as this Jiophone used KaiOS platform as its

operating system. KaiOS soon took over 35.9% market share among feature phones. As a result KaiOS became the second most popular operating system in India. KaiOS and Reliance Jio built a digital solution that quickly became a role model to deploy smart feature phones worldwide.
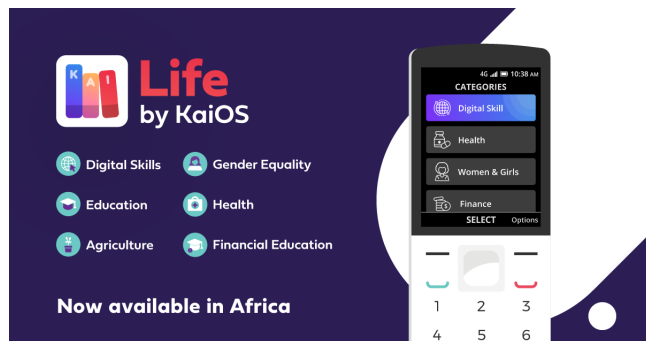

Figure 9: KaiOS in Africa.

KaiOS is also very much popular in Africa. Countries in Africa are mostly 3rd world countries. They can also buy these phones starting form 20$whereas smartphones cost no less than 50$so a 30$gap gives the Africans a reason to buy these KaiOS supported phones where they can use all the necessary features a smartphone offers spending less money.

Figure 10: KaiOS Updates.

KaiOS was first released in 2017 and the first phone to use this platform is a flip phone named Alcatel Go flip. KaiOS received a major update in July 2017 and the new feature was update to Gecko 48. In November 2017 KaiOS got another update this time te new feature was services and 3rd party apps. After that in July 2018 KaiStore, KaiAccount, WhatsApp was introduced. In December 2018 KaiAds and SIMbased Cust was introduced. Major Service update and Location service enhancement was introduced in July 2019, Minor system updates and notification enhancement was introduced in February 2020. Its current running version is 2.5.4.

The features that are currently available in KaiOS are:

(1) KaiOS have 2.4inch non touch display.
(2) KaiOS have 256MB RAM and a 512MB of expandable storage.
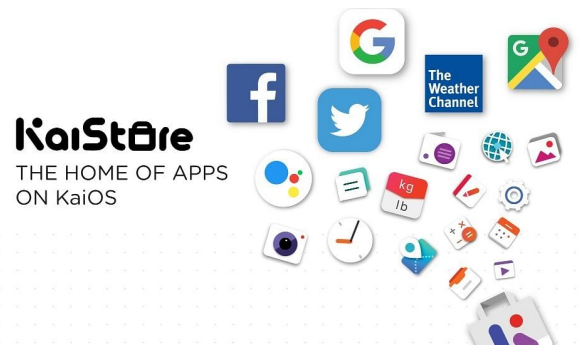(3) KaiOS has a 1.3Ghz unisoc chipset.

Figure 11: KaiOS Appstore.

(4) KaiOS have a 2000mah battery, dual sim slots and a 1.2MP camera.
(5) KaiOS supports google assistant which helps overcome some of its limitations due to keypad. Using google assistant users can open or close apps easily.
(6) KaiOS supports google map, and using google map, they can easily find places.
(7) KaiOS supports social media apps like Facebook, WhatsApp, Viber. So KaiOS users can connect with other peoples around the world easily.
(8) KaiOS supports 4G. As a result, users of KaiOS can surf the internet faster.
(9) KaiOS also supports WiFi. As a result, KaiOS users are not only dependent on their sim cards for internet access. They can get access to the internet using a router.
(10) KaiOS supports Bluetooth so file sharing is also possible in KaiOS.
(11) KaiOS have a very lightweight operating system. As a result, its bettery life lasts a lot longer than some low budget smartphones.
(12) KaiOS have a great navigation system. To go to the camera section the user has to just click the right direction key. Pressing the up direction key takes the user to the quick toggle settings menu. The user can go to app drawer just by pressing the center key. End/Reject call key button serves as the back button and center key lets you choose whatever is highlighted.
(13) KaiOS comes with KaiStore. This KaiStore is one of the reason KaiOS is so famous. Here in KaiStore the user easily finds different types of apps. The user can search apps games by category. The user can find first party apps like Facebook, Youtube, WhatsApp, Twitter etc. Some apps are paid apps, some application have in-app purchase system but good thing is most apps are free.

Here are some KaiOS supported phones users can find in the market:

Reliance Jio's

JioPhone, JioPhone F30C, F101K, F120B, F220B, F211S, F221S, F250Y, F271I, F10Q, F41T, F50Y, F61F, F81E, F90M, LF-2401, LF-2402, LF-2403, LF-2403N, all branded as LYF, JioPhone 2, F300B, F310B. HMD Global's Nokia 8110 4G, 2720 Flip, 800 Tough, 6300 4G, 8000 4G. All

these Jio phones was developed by KaiOS Technologies. And these phones brought popularity of KaiOS in India.

Figure 12: KaiOS Devices.

DIXON XK1
DIXON XK1 was launched in South Africa and its the first open market KaiOS device in South Africa

Figure 13: Nokia 80004G.

Nokia 8000 4G
This HMD Global Nokia 8000 4G is packed with smart, essential features in a premium package.

GeoPhone T15
Geo Phone T15 is the world's first smart feature phone with a built-in IR thermometer.

LANIX U340
LANIX U340, the first KaiOS-enabled smart feature phone in LANIX's mobile lineup.

BKav C85
This KaiOS phone was launched in Vietnam with Viettel. Its their

first carrier launch in Vietnam. Viettel the largest telecommunications provider in the country.

Figure 14: Nokia 63004G.

Nokia 6300 4G
It's the most affordable KaiOS device in the Nokia lineup, Nokia 6300 4G brings smart features and 4G connectivity to a trusted favorite, drawing inspiration from the original Nokia 6300.

Ghia KOX1
Ghia KOX1 allows its users to access 3G network, and other smartphone-like features such as Bluetooth, Wi-Fi, the Google Assistant, and Google Maps.

Telkom Kenya T-Smart
This KaiOS phone was launched in Kenya. T-Smart allows Kenyans to access the Internet via 3G/4G/LTE and Wi-Fi.

TNM Smart 4G
This Phone was launched in Malwai. TNM Smart 4G have access to 4G network, and other smartphone-like features such as Bluetooth, Wi-Fi, the Google Assistant and GPS.

Alpha B10
The Alpha B10 is a regular KaiOS phone that have access to 4G network, and other smartphone-like features such as Bluetooth, Wi-Fi, the Google Assistant and GPS.

Altan K26
This Altan K26 was launched in Mexico. KaiOS partnered with ALTAN redes to launch this phone. They aims to increase mobile internet access in Mexico.

Econet Atom 3G
This KaiOS phone was launched in Zimbabwe. And it's the first kaiOS phone launched there. The Econet Atom 3G supports 3G network.

There are many other devices that supports this amazing operating system

4 ROADBLOCK

We know that KaiOS is trying to reduce that gap between smartphones and feature phones. They are doing this nicely but is enough? We know that smartphone gets large and major updates every year. And technology changes very. So, there is a question will KaiOS be able te keep up with these changes and updates that are happening around the world.
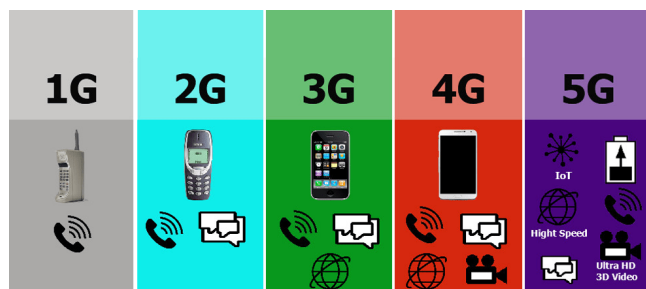

Figure 15: Network Evolution.

Smartphone is moving toward super-fast internet technology which is 5G. We have seen that most of the smartphones that are being released nowadays have 5G support. 5G will be available within some years we can definitely say that. But will KaiOS users be able to enjoy this 5G service from their feature phones that's a big question for KaiOS. As this will require both hardware and software updates that is big issue for KaiOS as they want to make their phone cheaper. But these updates will cost money, which is a concern for them.

Then there is camera issue. We saw that KaiOS supported phones doesn't have any decent camera whereas nowadays we can see smartphones even the cheap ones have good cameras. People like to take pictures but with this feature phones they are not being able to fulfil their desire of capturing good quality pictures.

KaiOS app store is also not that rich. KaiOS have necessary apps but the number is only 500 plus. But if we look into play store it has 2.87 million apps and app store have 1.96 million apps. Compared to these numbers 500 looks nothing. So KaiOS should increase the number of apps they have. For this they have to take actions that attract developers to develop apps for this platform.

There is also some security issues in KaiOS phones. There's a possibility of data leak in KaiOS phone, If the corporation wants, they can easily add some data miners and it will be very hard to notice this leak as they have a very limited feature available in these phones.

5 CONCLUSION

Cheap Android smartphones do not offer the greatest experience in the world, as they are trying to do everything that a more expensive Android phone can do like better processor, large storage, large RAM, large screen, good battery backup, good UI/UX with much less hardware software capability. So the user experience will not be same as expensive smartphones.

And we also know that the world is becoming digital day by day but billions of people still is remaining disconnected from the internet and that leads to a large demand for affordable, accessible smart feature phones. Research says More than 800 million people are impacted by the digital divide in Africa alone.

But KaiOS is the solution to these problem as it doesn't need the best quality hardware or software to run smoothly. It's also so cheap that anybody can afford these phones. Buying these cheap smart feature phones anybody can get access to faster internet and necessary apps. And KaiOS Technologies have a lot work to do as they strive to make the internet's valuable digital resources available to all.

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