Current State of KaiOS in Emerging Market and Roadblocks.

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Figure 1: KaiOS: Internet for Everyone.

ABSTRACT

In a decade, as smartphones are a must have gadget, IOS and Android have become two dominant mobile operating systems, while Microsoft's Windows Phone was cleared out and indeed been forgotten, a new mobile operating system has quickly risen to the remarkableness which is known as KaiOS.

KaiOS was announced back in 2017 with a Smart Feature Flip Phone and within 3 years, with more than 130 million smart feature phones in over 150 plus countries worldwide, it has become the world's third largest mobile operating system.

But the future of an operating system like KaiOS is a little uncertain. As the innovation is progressing, people are getting wealthier and smarter every day. While money could be an issue for a user, KaiOS might become very helpful and handy. But at the same time, when income becomes sufficient enough, the people would rather have the total smartphone experience with something like Android or IOS. So, the only way for KaiOS surviving in the long term is by

gradually branching out to more premium devices and by starting to offer more and more of a comparable experience to Android and IOS.

CCS CONCEPTS

• **Hardware → Emerging technologies.**.

KEYWORDS

KaiOS; mobile applications; featurephone; costs less; offers more; mobile operating system; sustainable; cloud infrastructure; unique app store; optimized web apps; android vs KaiOS; future of KaiOS;

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1 INTRODUCTION

In 2020, We can generally sort mobile phones into three different categories. Cellphones, which can just make calls or send texts. Feature Phone, which offers more features than cell phone and Finally, Smartphones that mostly run Android and IOS. There are more than 3.5 billion people in the world without access to the internet. They are using Cellphone or Feature Phone for calling and sending texts. There is no way that they could spend more than

$100 for an Android Phone or even if they could they won't waste the money for some fancy gadget. But from 2017, KaiOS is bridging that gap rapidly. In March, 2017 they announced a Smart Feature Flip Phone which was a full success.

Release history [edit]

Version	Announced	New Features
1.0	March 2017	First KaiOS smart feature flip phone
2.0	July 2017	Major Core upgrade to Gecko 48
2.5.0	November 2017[43]	Services & 3rd party Apps
2.5.1	July 2018[44]	KaiStore, KaiAccount, & advance features, WhatsApp
2.5.2	December 2018	KaiAds and SIMbased cust.
2.5.3	July 2019	Major service upgrades, Location Service Enhancement
2.5.3.1	February 2020	Minor system updates, Notification Enhancement
2.5.4	August 2020	

Figure 2: KaiOS Release History.

KaiOS, the name was originated from the Chinese word " (kāi)" meaning "Open Sourced". It is a Linux based mobile operating system designed for Feature Phones. As we know, more than half of the world's population left out of the digital revolution, through partnerships with manufacturers and developers worldwide, the KaiOS team was able to fulfill the demand of smartphone of workers and people living in remote areas to take almost every advantage of all the internet has to offer to improve their regular lifestyle. Not only do they offer smartphones at a reasonable price but also, they include some pre-installed apps like health, finance, to-do etc. which helps the user to get the best out of their smartphones.
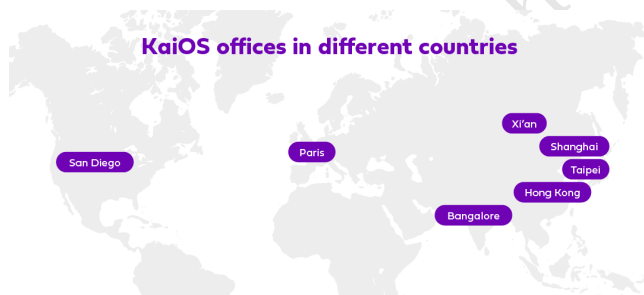
KaiOS offices in different countries

San Diego · Paris · Xi'an · Shanghai · Taipei · Hong Kong · Bangalore

Figure 3: KaiOS Offices Location Worldwide.

The team believes that, "access to the internet can change lives", which is the main motive for them to help more people to join the digital revolution.

KaiOS is mainly designed for Feature Phones. It is based on HTML5. It supports 4G and Wi-Fi which are huge features of this operating system. Also, it does not consume much battery life and last longer than a smartphone. For a phone that costs only $20 to $30, these features are a blessing. Not only do they give us some important pre-installed applications, they also offer an App Store with more than 500 plus apps (as of April 1st 2020).

Many people mistake KaiOS for Firefox OS. Although the operating system is based on the original Mozilla project, KaiOS has evolved into something unique and interesting. Firefox OS was

Figure 4: KaiOS x Mozilla.

a completely new operating system built by Mozilla, which was developed for smartphones and smart televisions. KaiOS is actually using the features of the Firefox OS, when their project was discontinued. But there is a reason why KaiOS is still running and getting popular day by day when Firefox OS have failed.

2 LITERATURE REVIEW

There are not only Android or IOS in this world. There are many alternative operating systems like Microsoft's Windows Phone, BlackBerry's BlackBerry OS, Samsung's Bada etc. but whenever the question arises, "can this OS be the future of mobile operating systems?" The answer was always maybe not. As every single OS which gets released will be compared to Android or IOS to determine its full functionality. Android and IOS operating systems, being in the smartphone market for a long period of time is the reason why it is nearly impossible for a third-party operating system to join in and compete.
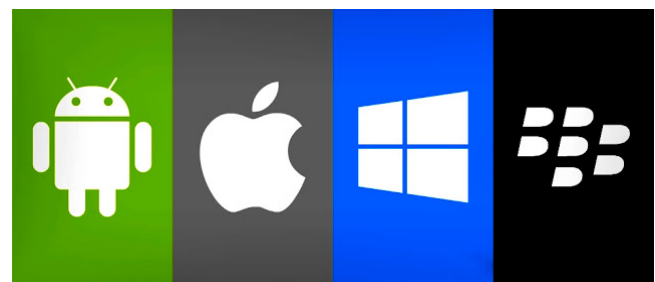
Figure 5: Mobile Operating Systems.

But KaiOS did not introduce itself as a smartphone operating system. Even though KaiOS got a potential to compete from Android as there will be many people who will be choosing between these two because KaiOS is offering their phones in a price point (starts form $20) that Android could and will never offer. But people will say why compare a $20 KaiOS phone with a $400 Android phone? I am not. KaiOS phones do not need to be as good as an Android smartphone as they are basically not a proper smartphone, some might call it a semi smartphone and it can be bought at the price of a broken Android Phone. So, there is literally no competition here.

If this answer is not good enough, the number of KaiOS phones sell will back it up.
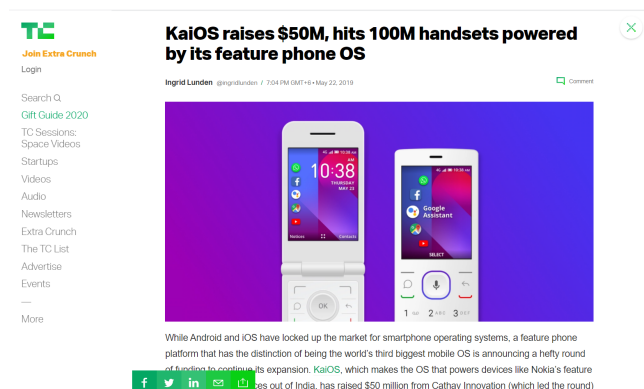

Figure 6: KaiOS Sell Numbers.

From March, 2017 when the first KaiOS feature phone was announced, the user number of the phone was starting to increase rapidly. It started to get popular in 3rd world countries. Within 3 years of existence in the phone market, it came to the number of users of 130 million. This much of user number, in terms of percentage growth, that is far beyond what Android or IOS is or ever was.

The second thing in favor of KaiOS is that the developer team and their support for the systems sustainably is fast. Every update they release a new feature, it always contains a variety of changes. The operating system already supports and has built in Google Assistant. This is a life changer for a feature phone user. Changing a voice to text or asking any small question is much easier with the Google Assistant. It only does direct a user to the browser and that is enough for a user to learn more about something that the user is interested in or is not aware of. It's not as rich as its android smartphone but it will always surprise, how well it keeps up.
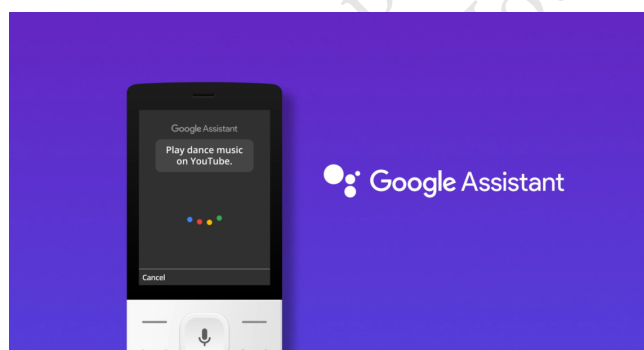

Figure 7: Google Assistant in KaiOS.

The KaiOS feature phones are cheap because of no touch screen support. Using numerical keypads for users to access the phone is tough but with the help of Google Assistant support, the problem comes near to nothing and makes it super user friendly. The computing of Google Assistant is done by Google's text to speak engine

and not by some built in features of the KaiOS feature phone, makes the Google Assistant as fast as any other Android phone or similar devices.
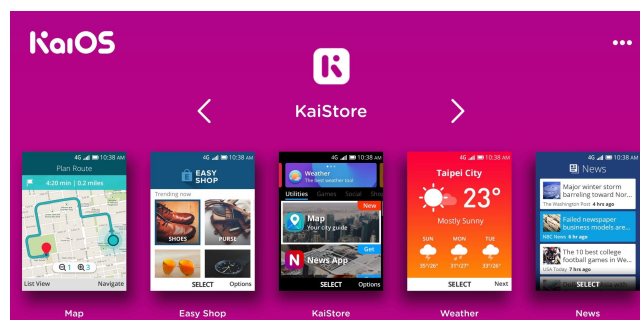

Figure 8: KaiStore.

Also, KaiOS is generally super-fast because it was built with hardware limitations (256mb of ram) and only performance is the main priority. It's so weird and funny at the same time to think that KaiOS is able to build a proper ecosystem like this, especially when more established companies like Microsoft, Samsung and BlackBerry have all failed to build their own operating system.

If you think about a new operating system like KaiOS to survive, it will mostly face two main problems. First one being the usage of very little processing power as it is built for a cheap device with very cheap components. And the second problem is it must have an app ecosystem. As in 2020, it's very difficult to convince app developers to port their app to a new platform. Sometimes the developer might say no or demand a huge amount of money for porting. But KaiOS made their built-in native app platform where they only accept the most optimized application in their App Store. KaiOS mostly uses web apps which most of the app developers already have and they take the most optimized one because of their hardware limitation. Another thing KaiOS does is, offloading most of the heavy-duty processing tasks to the cloud servers instead of running them on the device's memory.
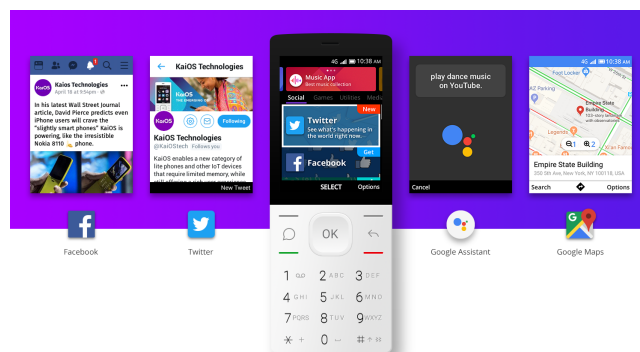

Figure 9: Feature Phone Application Support

KaiOS has GoogleMap which is a little weird compared to using it on a large touchscreen but everything works fine as it should be.

It got a YouTube app which is just the web app version of YouTube but videos works perfectly fine. Imagine a user who never had a smartphone and bought this $20 KaiOS feature phone, exploring these new stuff will be unbelievable for him. The phone has already got support for Facebook, Twitter and WhatsApp. And it's a matter of time it will start giving support for Uber, Instagram, Reddit etc.

The sustainability of this operating system is impressive. It has an App Store just like all those operating systems which have failed in the past. But unlike them this KaiOS already has the user base of more than 130 million people to support it. There is a very little chance for this operating system to fail. As it already has this big of a user base the will for the developers to now come on board and work hard to make more new features is already happening.

In December, 2018 they have added KaiAds to the apps to monetize the applications for its developer. Which means there are a lot of developers who are ready to start making new apps according to what the user needs most in a feature phone to compete with smartphones.

With all these features from a $20 feature phone is a solid reason why the user base of this operating system is increasing rapidly. As KaiOS promised that they will continue to explore additional innovation and improvement, we can hope that their plan for KaiOS will not go in vain and users from different age and class will be able to enjoy its feature as much as they might enjoy from using an Android device.

3 CURRENT STATE

The current state of KaiOS is quite impressive. With more than 130 million users it has become the third largest mobile operating system in the world.
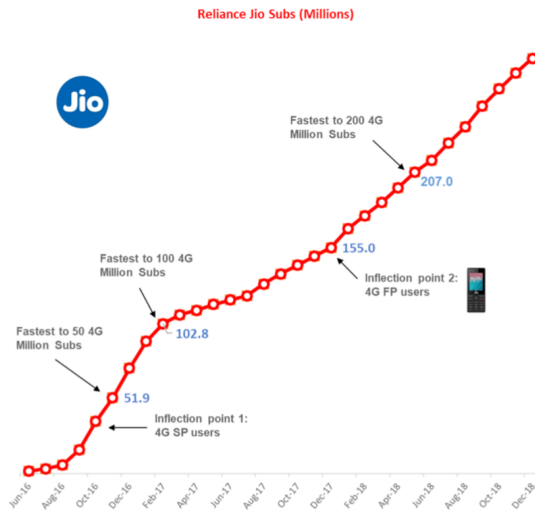

Figure 10: KaiOS x JIO.

After KaiOS was announced in 2017, a business man and one of the richest men in India made a deal with this company. Mukesh Ambani, CEO of Reliance JIO made a marketing strategy which was a customer will pay 1500 INR which is about $20 and they will buy a JIO Phone operating KaiOS but the money was a deposit and they will get back their money within 3 years. So Basically, a user can buy a KaiOS operated feature phone (JIO Phone) in 2017 if he/she is an Indian citizen.

In 2018, a year later after JIO announced the "Free Phone (JIO Phone)" plan, it dominated the feature phone market in India by taking 35.9% of the phone market share. Within one-year KaiOS became the second largest mobile phone operating system in India beating IOS. Today the KaiOS global market share is 0.2%.
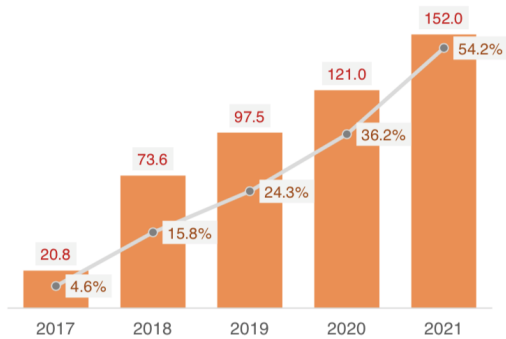

Figure 11: Feature Phone Shipments.

After that in 2019, KaiOS earned a $50 million Series B round of funding led by Cathay Innovation. According to the CEO of KaiOS, Sebastien Codeville stated that their target audience is the first-time internet users in emerging markets. Research found that KaiOS feature phones still accounted for almost 25% of all mobile phone shipments in 2018 and estimated that there is about a $28 billion market opportunity in the future of this company.

Sebastien Codeville said, "This is a key strategy for many of the largest companies: reaching the next billion users. Today, the only way to reach then is with KaiOS, because these users cannot afford a smartphone."

Nowadays, there is some significance to this KaiOS feature phone. Feature Phones are smaller, lighter and it has more than enough battery power for using the most out of it for a day. There are many situations where even someone with an Android or an IOS might prefer to take a KaiOS phone to a vacation. Its low cost which means you will not worry about losing it and as it is powerful enough to stay fully connected whilst not being so powerful and so capable that it becomes distracting might actually make the perfect balance for some people. So, KaiOS can also be a secondary phone for someone who already has a proper smartphone.

To this day, KaiOS has shipped over 130 million devices in more than 150 countries worldwide.

4 ROADBLOCK

KaiOS is Linux based mobile operating system which is designed to provide a user a rich experience on low-spec feature phone hardware with a very low price, whilst having functionalities like browsing social media and support for popular applications. The KaiOS team is already fulfilling their vision, which is to help bridge

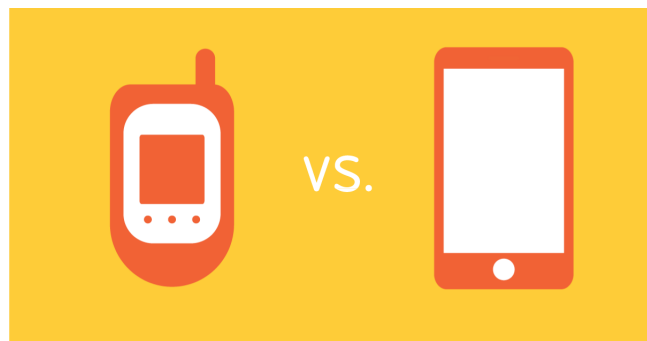the digital divide there by having everyone be part of the digital revolution.

Figure 12: Feature Phone vs Smart Phone.

But not to mention, there are a few problems with KaiOS. As it is based on an unfinished or modified Firefox OS, hence multiple bugs and problems should also present in KaiOS. There is a chance of Data Mining with this particular phone. The corporation could easily add some data miners without anyone noticing. With a limited feature available on the system, it would be hard to notice data leaks. Limited applications in the App store is also another problem. We know the most optimized apps are only available in store for its performance. But still more than 130 million devices which only have just more than 500 apps, is just imperfect.

As mentioned above, for long-term surviving and competing with other mobile operating systems it must improve its quality. Premium devices within low price will be a huge add-on for this KaiOS. If they want to make this phone peoples primary device, there is no way other than introducing premium devices.

5 CONCLUSION

With 4G connections becoming mainstream and available in developing countries KaiOS is developing and modifying the operating system in a way, that even devices made with cheap components can finally start taking advantages of the cloud infrastructure. Cloud infrastructure is a smart software strategy. Not many of the mobile use it for their main task as they offer expensive processor and more than enough memory to run the phone. But KaiOS implementing this strategy is making feature phones really cheap and helpfull.

KaiOS was released 3 years ago and within 3 years it gained so much support from the user makes it invulnerable. Unless they introduce something unnecessary to their system, its user base will increase time to time. There are many people in the world, despite of being rich, they like to live simple. There are many aged people in a country who do not or can not use a smartphone, because of it being complicated for their age, KaiOS can be the perfect device for them. It has internet access which they can use for their daily needs. It has no unnecessary application means less chance of virus or spam attack. Having their KaiAds implemented to their apps creates limited advertisement. Unlike Android or IOS apps, less advertisement makes it less annoying for aged people. The KaiOS having limited features makes the system light and easy to use.

KaiOS is not just a piece of software. It is a potential lifestyle changer. Especially in developing countries, this phone will give people access to a completely new way of living. If KaiOS keeps doing what they are doing now properly, they will find many users in near future and go one step closer towards their vision.

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