iJRASET
International Journal For Research in Applied Science and Engineering Technology

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 3 **Issue:** III **Month of publication:** March 2015

DOI:

www.ijraset.com

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International Journal for Research in Applied Science & Engineering Technology (IJRASET)

A Review on Modular Smartphones: Phonebloks

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Abstract— What would be the first thing which comes in mind when accidently your mobile falls on the solid floor and brakes up? Obviously! You would go to the repair shop and get your mobile repaired. But what if the camera gets damaged or broken? It cannot be repaired or replaced by other camera. The only choice which remains with you is buying a new mobile. So is it affordable to buy a whole new mobile for a single piece of damaged camera? Well! Its not. The same situation was faced by a Dutch designer named "Dave Hakkens". His mobile's camera was broken due to accidental fall of mobile, so he got an idea about why to replace the whole mobile, why not just the camera? Usually the mobile is integrated with various components in a single solid form. "why not have a mobile whose parts can be replaced or swapped in or out, or need to be upgraded when broken?", said Dave Hakkens. So he proposed the concept of modular mobiles termed as "PHONEBLOKS"[1]. According to him the phonebloks was a kind of mobile having a base on which all the detachable components like camera, processor, memory etc. will be mounted together, which can be unmounted when required. The concept of modular mobile will reduce the cost of buying the whole new for just a small piece of component.
Keyword- Phonebloks, Modular Smartphone, Dave Hakkens, Customizable mobile.

I. INTRODUCTION

Mobile phones have become a very vital part of humans life. Also its one of the greatest invention of human being. In early days when concept of mobile was first introduced the main motive of mobiles was just for calling the person we want to talk to. But as the technology and human demands grew many other components like camera, RAM, fast Processors, larger Battery, and many other hardware component were integrated on a single solid chip. In the world of fast growing technology we have smart phones which provide with all the feature we want in our mobile. But everything as darker side, huge percent of total E-waste in world is due to e-waste from broken mobile phones. On an average, Americans exchange their cell phones every 22 months. As a result, from 2006 – 2010 handheld wireless devices contributed 85,000 tons of waste to American landfills and incinerators[2]. And main part of reason for such a large amount of waste occurring is because in order to keep up with the latest software or newest technology, buying a new phone is a necessity.

Phonebloks is a modular Smartphone concept proposed and designed by a Dutch designer Dave Hakkens primarily to reduce electronic waste[1]. Phonebloks is a concept for a phone made of swappable components that fit together like Lego bricks, with each component containing a different function. It means that components can be replaced or upgraded without having to throw away the phone. Its just like desktop Pc if you want to upgrade the RAM just get the RAM from the shop and upgrade it, if your hard-disk is corrupted just buy a new one that's it. As a result, instead of replacing the entire phone when it becomes obsolete or broken, we could simply replace the defective or performance-limiting part. It's a new kind of phone, its made up of detachable bloks. They are all connected to the base and the base connects everything together ,electrical signals are passed throw pins and two small screws locks everything in place.

II. PHONEBLOKS

Phonebloks uses modular technology in order to build a cellular device that will be longer lasting in the hopes of sustaining our technological dependency without producing excessive amounts of waste. These phones will be made of multiple parts that can be exchanged and substituted independently instead of as a whole device. Users will be able to customize their device and support different brands depending on what they are looking for in a phone. It aims to turn your phone into a complete different phone which will always be latest. Consumer can upgrade his phone with any latest or high capacity part anytime and anywhere. Just like the appstore that is available online , over the internet to download software in our Smartphone, Blokstore will be available where one can upgrade his old Blok with the new ones. All the blocks are available in most desired shape and structure. Blocks can be manufactured by any manufacturer that means these blocks are not manufacturer specific.[3].

A. How Modular Technology is used in Phonebloks?

In Phonebloks, every hardware component called Blok. Bloks usually are display, wifi, RAM, camera etc. Each Blok consists of four pins which are in connection with other Bloks by using base as intermediate to transmit signal. All the Bloks are put

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together with the help of two screws at the bottom of the mobile phone. Bloks can be upgraded with the help of Blokstore available in desired shapes.

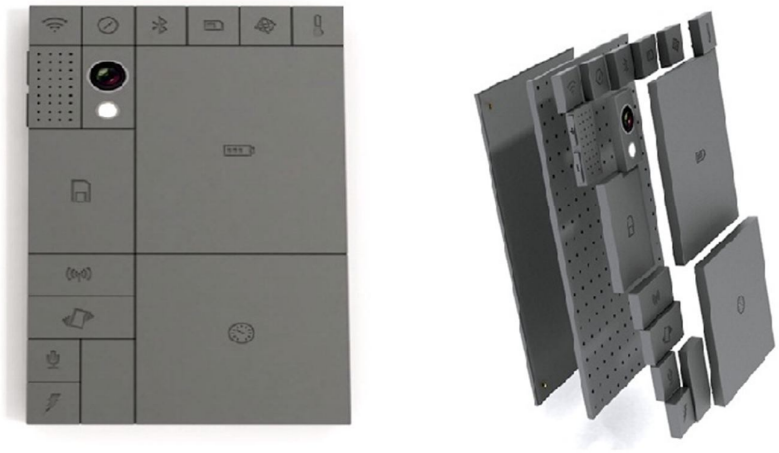

Fig. 1 Phonebloks

B. Reasons for replacing the Bloks.

The Bloks in this Smartphones are replaced because of following reasons, if

1) Bloks are damaged.
2) Any upgrade is required.
3) Broken Bloks.
4) Unused components.

If someone like to store everything on cloud then just replace the memory Blok with larger battery Blok. And if somebody is fond of photos, then he can replace the old camera with the new one.

C. Components in Phonebloks

Phonebloks is a modular Smartphone and it compromises of two main components[1]:

1) Base

The base is a motherboard drilled with many holes in it. Base is like a spinal cord in human being. Base is responsible for connecting one Blok to all the remaining Bloks. The Bloks are injected into the base with the help of the pins present in each Blok. Blok is connected to the Base and the Base connects to everything over the Base.

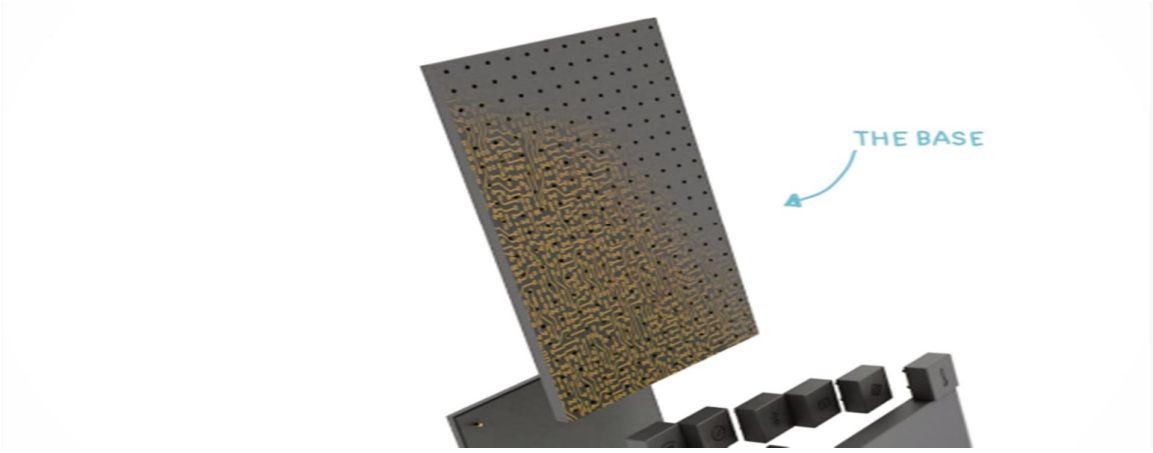

Fig.2 The Base

2) Bloks

Bloks are basic building parts of phonebloks. Bloks are the hardware required to make entire phone. Bloks are placed over the Base to communicate with all other hardware with the help of Base. Each blok compromises of 4 conductor pins which get injected into the drilled holes of base, which helps the Bloks to communicate with each other. Each have a symbol over it ,which defines the functionality of that blok.

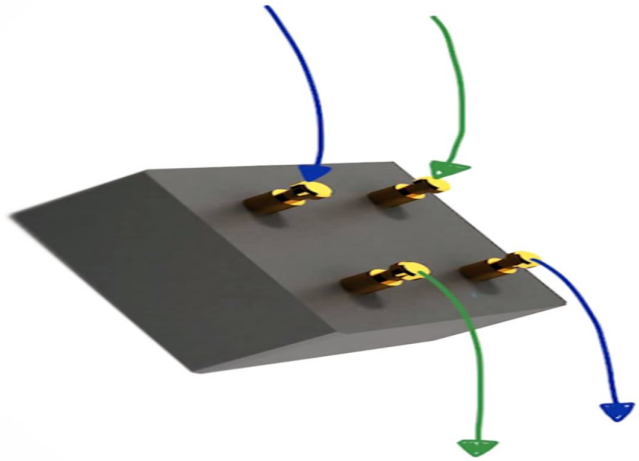

Fig.3 The Blok

III. HOW PHONEBLOK IS BETTER?

Phonebloks are better compared to the Smartphones available in the market because:

A. *It is green* :-Phonebloks main focus is on the device's "greener" nature. As consumer can upgrade phone parts at will, consumer would never have to throw away full mobiles. If something breaks one would just be able to replace a block instead of the whole phone. The rate at which people like to upgrade, its not sure just how much Smartphone trash we could be saving the world from. It suppose in the long run it would help.

B. *A Modular Smartphone*:-This is a revolutionary device employing a smart-base compatible with detachable bloks that allow the user to easily modify the hardware to suit their lifestyle and changing daily needs. Bloks are secured to the base with a few small screws giving the customer the convenience of quickly an seamlessly upgrading the phone.

C. *Customization to its fitness*:-Phonebloks would give you the ability to make a phone truly yours. By customizing it depending to consumers own needs. If I put a huge focus on battery life, I would get a bigger battery and get rid of other blocks. Well you can also choose what kind of screen you would like, how much RAM your device would have. Its amazing, there would be no limits.

D. *Open source platform*:-Never before has a phone company openly involved the customer in development of both hardware and software. Phonebloks will make this happen. Phoneblok will launch a free collaborative innovation platform for consumers as well as developers to create new hardware and software in order to generate best fit solutions.[4]

IV. MERITS AND DEMERITS

A. Merits:

1) Customer Empowerment:- It allows the consumer to interact and give feedback on the mobile phone they want through our integrated online **customer** platform.

2) Customizable -Open platform allows the consumer to customize a Smartphone to suit the highly Specific demands of their lifestyle.

3) Flexibility in price –Modularity of the product allows it to compete in the lower- and higher-priced Smartphone segments.

4) Strong partners –Partnership with Motorola and Google in modular phone technology.

5) Innovative Product –Collaboration between Smartphones producers and customers continuity of unlimited creative input.

6) Green and sustainable product –Open modular platform has the ability to upgrade with biodegradable Bloks that can reduce e-waste.[4]

B. Demerits:

1) Partner-reliant business model–The product development is reliant on current partners and probability to attract new ones

2) Software compatibility –The necessity to develop cross-functional software that is compatible to modular hardware components
3) Low brand awareness –Most smart phone users are not aware of Phonebloks and its benefits due to little advertising
4) Financial and legal stability –Relying on crowd-funding and Motorola as well as intellectual property protection hurdles with existing patents
5) Economies of scale and scope –The Phonebloks is a start-up company starting in a highly competitive industry which gives the company the disadvantage of economies of scale and –scope.[4]

V. FUTURE SCOPE

Phoneblok is the future of modular Smartphones. When Dave Hakkens introduced the concept of Phonebloks on September 2013 publicly, Motorola was working on similar concept with project named 'Ara' and announced it publicly on October 29 2013 and said they will be working collaboratively with Phonebloks[6].So Phonebloks and Motorola collaborated together and started working on project ara. Project ara is a code name given to the initiative taken to make the open hardware platform modular Smartphones. The platform will consist of a structural frame (endoskeleton) which will hold the other components like camera , battery etc. The endoskeletons will use electropermanent magnets to hold the components together. The endoskeleton will have a internal battery.

Fig.4 Project ara

The other modules can be swapped in or swapped out whenever required, providing long lifecycle to the handset. So to release the modules, you have to tell Android to release them and it'll switch the magnets off but while they're on they won't fall out and you can't pull them off – it really feels like a solid phone. Its been heard that some good ideas for solar modules, to add solar charging will also be added in future. Well nothing can be said clearly , the future can be integration of heath modules that can check the blood pressure, sugar level of the body, temperature sensing modules, etc. anything is possible. So that was all about project ara. And it can be said Phonbebloks formed the base for modular phones.

VI. CONCLUSION

If you are person with taste of variations in upcoming technologies and want to remain updated every time then phonebloks is right choice. Customization is the key motive of phonebloks and this features just let the person decide how his mobile should be. It provides much functionality in compact manner and are much flexible as compared to legacy phones. Also its collaboration with project Ara will give success for sure. It will bring the era of modular Smartphone. And also this will help to reduce the e-waste problem to much extent

VII. ACKNOWLEDGMENT

We would like to thank our honourable Principal, Dr. R. P. Singh, our Head of Department, Prof. D. D. Patil , & our special thanks to our guide, Prof. R. A. Agrawal & sincere thanks to all the respected teaching faculties of department of computer science & engineering. Our special thanks to all the writers of reference paper that are referred by us.

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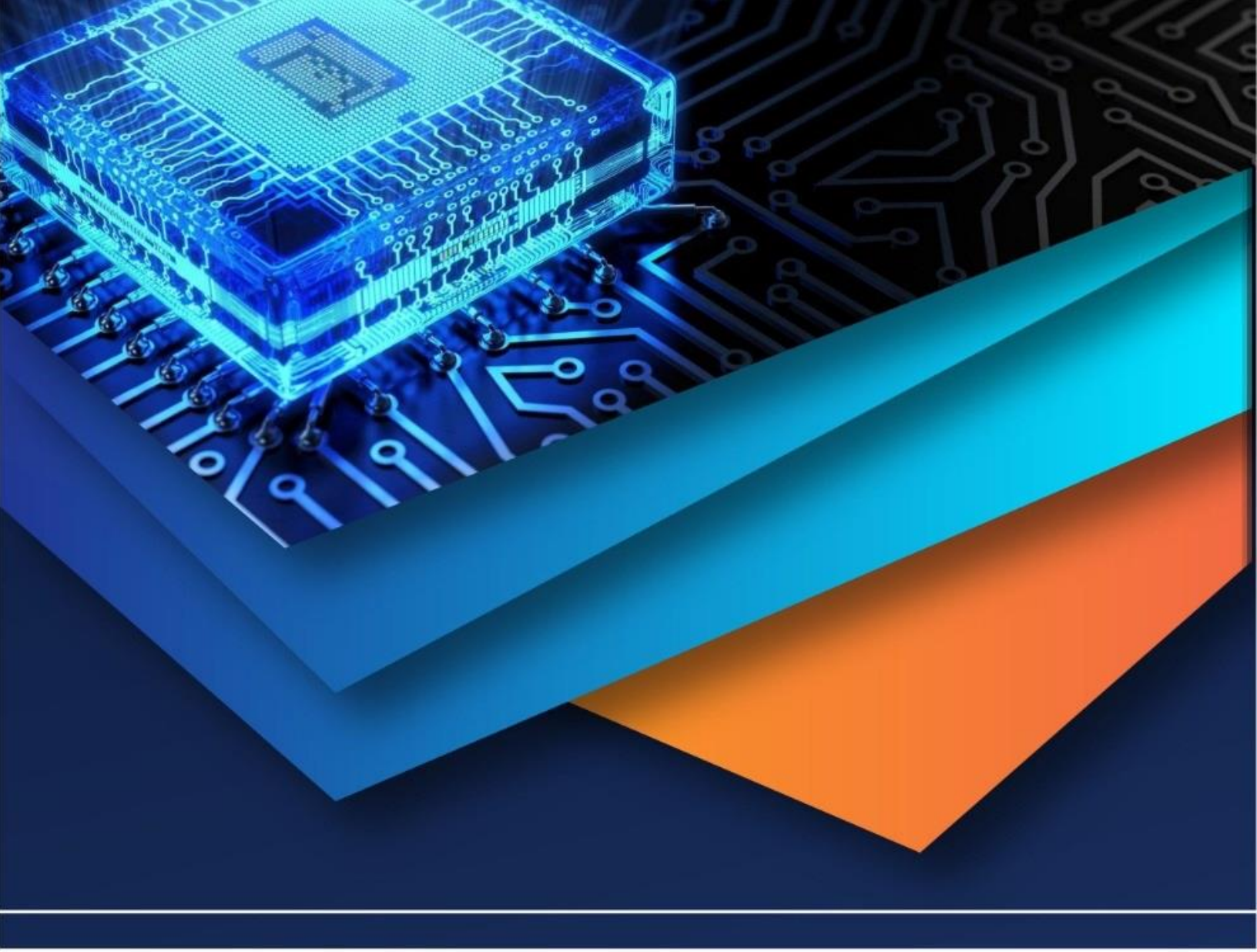

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