Concept design of high interface powerbank

To cite this article: Verry Gunawan *et al* 2020 *IOP Conf. Ser.: Mater. Sci. Eng.* **852** 012089

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Concept design of high interface powerbank

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Abstract. In this era where technology is the most valuable thing, many people demand a device that can provide multifunctional and high-speed multitasking skill in one simple device. Smartphone came with that technology and so much more advantages. Beside these advantages in smartphone, there are also some disadvantages for example power drain. After an intense study and learning the market needs, we introduce HIPO. HIPO came to cope the problem that happen to smartphone users with its feature as a power bank in a smartphone and its user-friendly interface. With a great feature such as fast charging (3.5 hour), large memory storage up to 256 GB, 32 MP camera, big battery capacity, HIPO will helps you to have your job done anywhere and everywhere without worrying that your smartphone will be run out of power. Keywords: concept design, power bank.

1. Introduction

In the era that everything's fast, many people demand for a fast technology that helps them to finish their job in a short and easy way. Products must be designed to be easy to use, safe, comfortable, not easily damaged and have a competitive price. Products like this are really needed by users, so users are satisfied with the products they have purchased. [1], [2], [3]. Many businessmen depend on the technology to have their job done [4]. One of the products that always in our pocket or in a backpack is the smartphone [5]. With many years of research, smartphone had become the most popular gadget that almost every people use it for their job. With the internet speed that reach 5G, camera more than 32 MP, and large memory room that can store many types of data, playing games, take photos, and doing the campus or business task will become much easier anywhere and everywhere. But there are also disadvantages in every technology [6]. Smartphone have its own disadvantages. One of the disadvantages is restricted data storage and power drain [7]. Therefore, we're planning to make a product to prevent these disadvantages, called High Interface Power bank or we can call it HIPO, a device to recharge our smartphone battery and include data storage that give priority for design, function, and user-friendly to increase the users productivity.

Powerbank is a device made for recharging our smartphone battery. It's lightweight, and super easy to use [8]. After spending much time learning with many references, a new device is designed to elevate this type of ordinary powerbank. It is called High Interface Powerbank. High interface powerbank is a device that uses an android processor, touchscreen interface, and can be used for data storage. We called the product HIPO (High Interface Powerbank). HIPO can do many things that the other product can't. For example, transferring data with wireless connection, editing, and working with files with many formats such as document, power point, jpg, and mp4 videos. It is so easy to work with our product. To turn it on or off, we can just press the power button on it. To recharge your smartphone, just connect HIPO with any type of

smartphone and it will recharge your device in the nick of time. HIPO include a fast and smart charging system that if you forgot to pull the charger off, it will stop charging by itself. We can store data with HIPO by connecting our smartphone with cloud system in HIPO. Easily edit and store your files with HIPO in the nick of time. Design of HIPO can be seen in Figure 1.
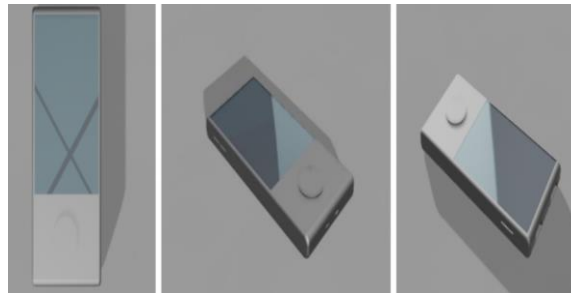
Figure 1. Design of HIPO

2. Method

2.1 Charging time

With this method, we can make an analysis for how long it will take to charge this device [9]. We assume that:

- AH: ampere hour
- mAH: milli Ampere hour
- 1 AH: 1000 mAH

If this device uses 10,000 mAH battery, and the output 2A, then:

10,000 mAH=10AH

10 AH/2A= 5H

5x60 minutes = 300 minutes or 5 hours

5 hours is the time needed to recharge this device. But with fast charging technology built in this device, it will reduce the time up to 1.5 hours so it will become 3-3.5-hour charging and stops automatically when the battery is fully charge or in some case, overheat.

2.2 Power loss

With this method, we can make an analysis for how long it will stay on power

If HIPO have 10,000 mAh. The output of powerbank is

(12V/12V) x 10,000 mAh = 10,000 mAh

And we calculate the power loss of HIPO is 15% when it used for video etc.

10,000 mAh – (10,000 mAh x 15%) = 10,000 mAh – 1.500 mAh = 8,500 mAh

This system in HIPO can make HIPO endurance of power battery longer lasting

2.3 Data transfer

Speed of data transfer is the amount of data, transferred in a time [9]. If we assume that

- 1 megabyte = 1024 kilobyte

  For example, 25 MB data is transferred within 2 minutes, how much data transferred per second?

1 MB = 1024 kilobyte

25 MB = 25 x 1024 = 25,600 kilobyte

2 x 60 second = 120 second

25,600 kilobyte/120 second = 213.3 kilobyte

So, it is 213.3 kilobyte per second for 25 MB data.

3. Results and discussion

HIPO's specification were based on the customer needs and ergonomics study that will determine its aspects and other technical parts that include material choosing, weight, dimensions, processor, and the other specification. Based on the market research and customer needs, these are the specification in our product shown in Table 1 and design direction in Figure 2.
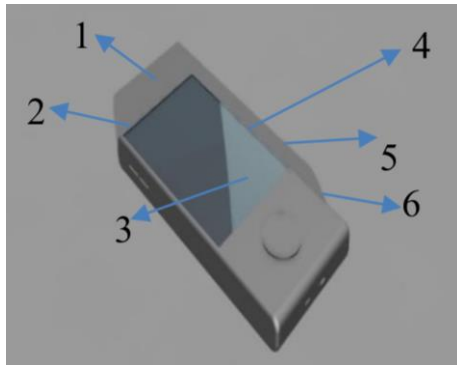
Information:
1. 2 USB ports 12V 2A
2. HIPO volume button
3. Aluminium body 152.3 mm x 78.7 mm x 14 mm
4. Super AMOLED capacitive touchscreen 16M colours
5. OM/OFF button
6. Charging port

Figure 2. Design direction

Table 1. Specification of HIPO

Dimension	152.3 mm x 78.7 mm x 14 mm
Weight	333 g
Body	Aluminium
Screen Type	Super AMOLED capacitive touchscreen 16M colours
Resolution	720 x 1280 pixel
CPU	Octa core
RAM	2GB
Memory	16GB up to 256GB
Chipset	Qualcomm 600 series
Connectivity	Usb 2.0, output port 2
Power Requirement	12v 2A
Battery	Li-polymer 10,000 mAH
Other Features	Digital indicator, fast charging, overcharge protection
Support system	Video, Photo, Word, Power point, pdf

These specifications are needed to optimised our product and it could be changed due to market condition or situation that might happen while developing this product to cope the market price in the middle class level. The advantages of the specifications obtained include: dimensions 152.3 mm x 78.7 mm x 14 mm and a weight of 333 grams hereby assessing the ergonomics to be easy to grip and not too heavy when carried [10], aluminium body material selection is because aluminium has the properties conducts heat so that aluminium conducts excess heat on the HIPO out so that it does not overheat and electrical short circuit and aluminium has sufficient toughness and strength, Super AMOLED capacitive touchscreen 16M colours This screen type was chosen because it has a high brightness level in appearance with RGB tuning features that make the colour of the photo or video is more stable so that the display is brighter

and sharper and can save 40% of the power emitted by the HIPO and has a fast responsive speed. Octa core CPU is used because when processing data in the form of editing, viewing videos, photos, etc. HIPO can offer maximum satisfaction to users because it processes data quickly and saves power [11,12]. Memory 16 GB - 256 GB choose the amount of storage because it suits the needs of users according to the survey that has been distributed by the team [13,14,15,16]. Qualcomm chipset is used because it can support CPU performance so that it can work more optimally and can prioritize power efficiency. The next important part is that this type of Li-Polymer battery is used because of its light weight, thin and flexible shape so that it can be formed according to HIPO requirements, more durable because the self-discharge system is very low, and safer because the risk of electrolyte leakage is very low [13,14,15,16].

4. Conclusion
HIPO is a breakthrough that extract all the potential inside an ordinary powerbank with many kind of references, market research, and intense idea development. With a great specification such as large storage room, and super AMOLED touch screen, HIPO will helps you to have your job done anytime and anywhere without concerning that your smartphone will ran out of battery.

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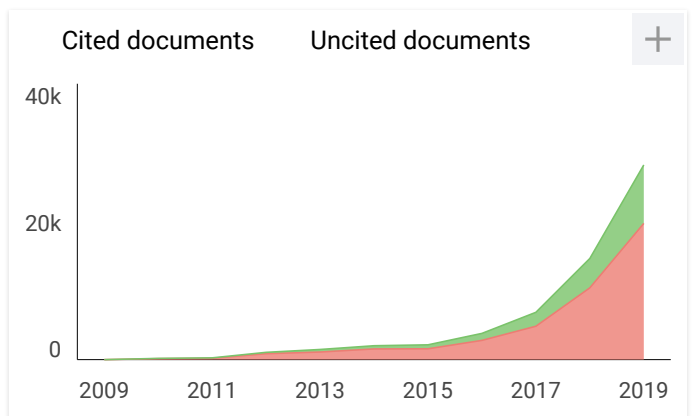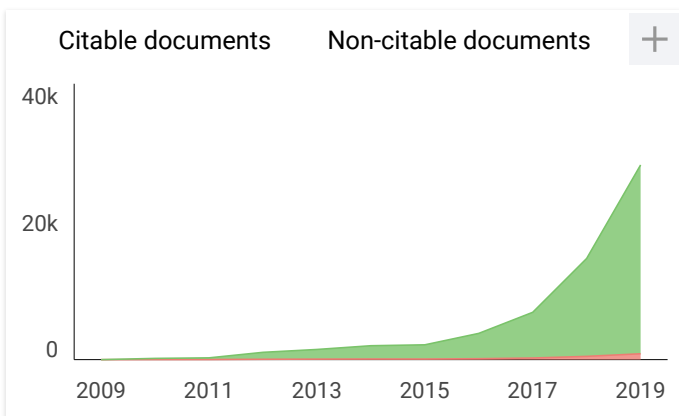
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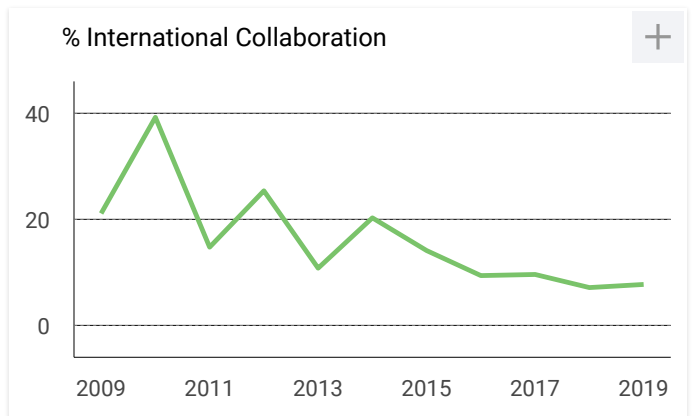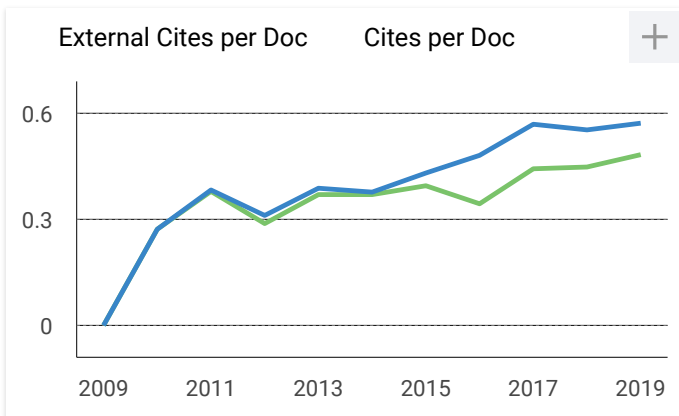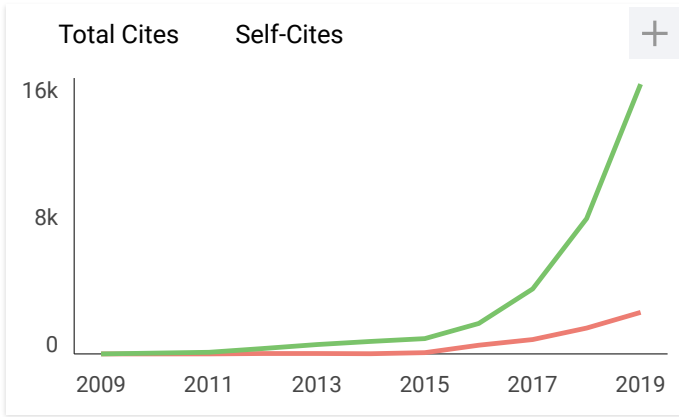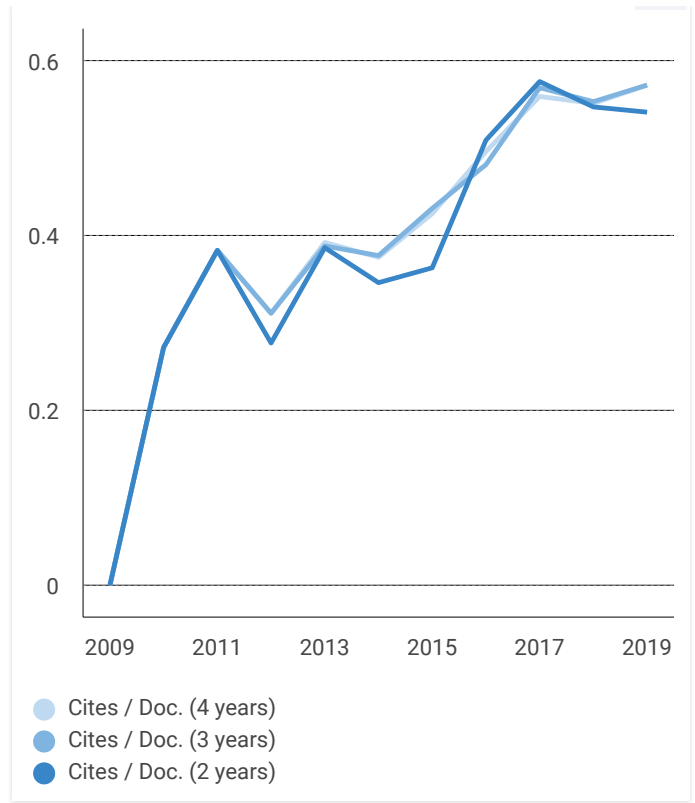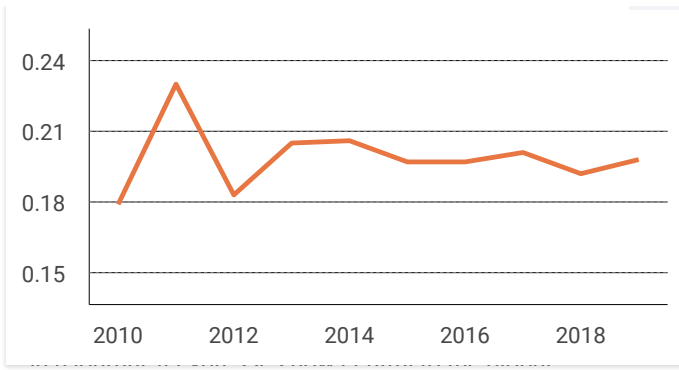
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