



**COVER PAGE**

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## Introduction

In this modern era of speed and dynamicity, mobile phones hold an important aspect. It has become such an integral part of our system that we simply can't fathom inching a single step towards any direction for the very reason that it not only makes our lives easier but it saves time. But for a layman, the result of such advancements in technology is leading an easy, healthy life. And perhaps this is the only reason we always look forward to new inventions or advancements of such sort. And while reaching the summit of advancement if we end up subverting the environment in any way then such an advancement becomes a lose-lose deal both ends be it mankind or nature. For the very reason that in order to attain our advancement goals we are corroding the life span of the whole mankind itself. And mobile phones and their phenomenal progress in development are perhaps an advancement of such sort. Therefore, this report dwells upon the aspects of how cell phones are hampering our mother nature and would look for possible ways to make the product more sustainable for nature.

## Description of the scope of product

**Environmental Concerns:** A smartphone consists of 40% metals, 40% plastics, and 20% ceramics and resin (*Mobile Phones 2020*). And out of that 40% of those metals, most of them are rare or conflict materials. A substantial part of the materials that our smartphones are made of probably came from one mine in China. The Bayan Obo mine produces more than 95% of the world's rare earth elements; for example, 'lanthanum' gives smartphone screens and their smoothness and color pop; neodymium's

super-high ‘magnetism’ puts microphones, speakers, and vibration units all in the palm of our hands and silver, nickel and lead in the circuit board; cobalt, zinc, and copper in the battery; as well as arsenic, chromium, and selenium (*An eco-friendly way to make smartphones* 2020). And all of these metals come at a cost to the health of our mother nature. Besides these ‘conflict materials,’ there are also grave concerns over inadequate supply chain management as well. Where ever there is mining is involved in a system there are chances of malpractice of labor laws. And lastly not to forget the humongous amount of fossil fuel and water is being used in order to manufacture such sort of mobile phones and the amount of greenhouse gas they emit in the environment.

**Main design feature:** Therefore, to make the product most sustainable some pivotal features must be incorporated in its design.

- The recyclability of every single product or material used in manufacturing such mobile must be enhanced.
- Use of less reusable plastic in the phone so that it becomes sturdy as well as eco-friendly.
- Need to invest more in finding a safer way to extract rare earth elements (REEs) – the vital material in our smartphones – that could end up saving the planet.
- Use of less water and fossil fuel must be incorporated into the system of manufacturing mobiles.

**Scope of the product:** Since people around the globe are being aware of the precarious ever effacing environmental condition that the earth is going through, an inclination towards investing

in a sustainable product of giving preference to the same can be discerned among the consumers at this concurrent time. And there are very few cell phone companies except Alphabet (Google), Apple, LG, Sony, and Fair-phones that are trying to incorporate sustainable clean energy to manufacture the same. Therefore, if such a phone can be manufactured with aggressive pricing it can create its market and brand value, and give tough competition to the aforementioned mobile phone manufacturers as well.

### Framing of Product in a sustainable development context

Even though framing a sustainable product that is mobile in this case may sound promising but the task is not an easy one. While developing or framing a product as such, there are numerous aspects that the manufacturer needs to keep in mind. And out of all the aspects, the one that holds the value of seminal importance is the attitude of the stakeholders of the very product. And far as a sustainably developed mobile is concerned, the attitude of its primary stakeholders like the consumers or the end-users, retailers, manufacturers, government & regulators that hold the most important part.

**Attitudes of consumers:** Several studies and researches have corroborated the fact many a time that with passing time consumers are inclining more towards buying sustainable and eco-friendly products for example according to ‘CGS 2019 U.S. Consumer Sustainability Survey’, more than two-thirds of Americans consider sustainability when making a purchase and are willing to pay more for sustainable products (*Consumers Willing to Pay Up for Sustainability 2019*) or

according to a research conducted by a consulting firm ‘Accenture’ customers are likely to spend more on the products that are sustainable or reusable or recyclable in nature. And as much as 83% of them believe that it is extremely important for companies to design products that are meant to be reused or recycled (Mathur, 2019). Therefore, it can be inferred very easily that if their desires are met and the product is framed accordingly it might yield a great response in the market even if the end products are a bit on the costlier side.

**The attitude of the retailers and manufacturers:** The better the market or the consumer response of a product the better the attitude of the retailers and the manufactures towards the same. And in some cases, retailers’ Sustainability efforts translate into positive consumer responses as well. For example, the phenomenal success of IKEA, a 5-billion-dollar company, in selling only sustainable products is a crystal-clear sign of positive and encouraging consumer response to a retailer’s sustainability effort (CatClifford, 2019). Therefore, in this case, if we accentuate more upon the aspect of the sustainability and environment-friendliness of the product then it can develop an encouraging as well as promising attitude of the retailers as well as the manufactures of the product in the market.

**The attitude of Government and Regulators:** With this passing time and age, in this era of advancement of technology when we are subverting our nature and environment, eroding its ecological balance in every way possible. Despite all the measures or steps taken to curb carbon emission and the average temperature of the environment, it is touching new summits every other day. Therefore, to put an end to this numerous governments from all over the world are formulating

new laws and regulations that give more emphasis on sustainability of the product and framed encouraging perks like tax rebates or import or export duty exemption for the companies that develop sustainable or eco-friendly goods. For example, recently the GST council of India has slashed its GST slab to 5% from 12% and also some extra perks like exemption of duty on importing lithium, the main ingredient of creating its batteries (*Sikarwar, 2019*). Just to encourage people to buy more vehicles as such and to give a boost to the companies that are trying to set their business in that country. Therefore, this goes to show that governments are getting more tilted towards such companies that manufacture products that are sustainable as well as eco-friendly in nature at this concurrent time and framing or regulating their policies accordingly. From this, it can simply be inferred that governments of various states would look forward to a company that manufactures sustainable mobile phones to set up its business in their country.

### Lifecycle of the product

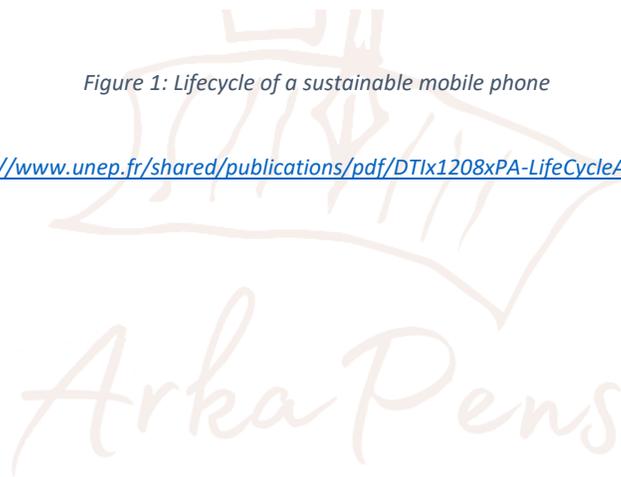
Life cycle management is the systematic progress of organizing, analyzing, and managing sustainability impacts throughout the entire life cycle of a product, which in this case is mobile phones. First, the raw materials will be extracted in as much sustainable way as possible then the mobile will be manufactured. No component or raw material that are not sustainable or reusable like single-use plastic or certain kind of resins will be used in manufacturing the same. Then the product will be marketized and reached before the consumer through various means. After using for a certain period of time there will be collection counters for the same where consumers will be able to sell their used phones and the companies will be ready to collect them to make a new phone out of it. After collection, every single part of the body will be disintegrated be it its chassis, its screen, battery, and remaining accessories. Thereafter the recovered parts will again be sent to the

manufacturing unit to mold accordingly and make a new phone out of it. And the remaining landfills if any that can't be reused in any way must be biodegradable.



Figure 1: Lifecycle of a sustainable mobile phone

Source: United Nations, <http://www.unep.fr/shared/publications/pdf/DTIx120&xPA-LifeCycleApproach-Howbusinessusesit.pdf>.



Matrix of Lifecycle Stages

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Lifecycle Stages	Sustainable Development Impacts
<b>Extraction of Raw materials</b>	Since advanced eco-friendly technologies will be incorporated, there will be no severe impact whatsoever upon the environment.

<b>Manufacturing</b>	As mentioned before since the manufacturing units will solely run on renewable energy and there will be very little water consumption, therefore with this people will be able to enjoy the modern technological advancements without harming the environment.
<b>Selling</b>	The more such mobiles are sold the more people will get inclined towards using such eco-friendly sustainable mobile phones, which will be better for the environment in various ways.
<b>Service &amp; Repair</b>	The more serviceable or repairable the product is the lesser the need of manufacturing individual pair parts. Therefore, lesser extraction of raw material for nature. Which in the long run would help nature sustain itself in every way.
<b>Collecting &amp; Recycling</b>	If the mobile itself can be recycled then there will be less manufacturing of the mobiles which leads to minimal use of raw, natural resources.
<b>The disintegration of Batteries, Display, Chassis, and other accessories and are remolded</b>	This lifecycle stage is the most pivotal one and contributes most to the environment. Since every single part of the mobile can be disintegrated and remolded then there will be no need to extract any natural resources lanthanum, neodymium, silver, nickel, zinc, copper anymore or in a very little amount. At this not only there will lesser harm to the environment but also, we don't have to face the scarcity of the resources in the near future.
<b>Re- send to manufacturing unit</b>	The manufacturing unit can make use of the resources again that had already been extracted for nature way before, by this there will be lesser wastage materials.
<b>Trivial Bio-degradable landfills</b>	It should be imperative to make sure that the trivial landfills left are must be bio-degradable and should be of such a category that on dumping those not only the health of the land get subverted but on contrary will be exalted in various ways.

Table 1: Matrix of lifecycle stages of a sustainable mobile

## Design opportunities

Three major ingenious design opportunities that would improve the sustainability of mobile are its modularity its recyclability & reusability, and incorporation of newly designed feature phones.

**Modularity:** The newly designed phones must be modular in every way possible. The more modularity the better will be its usability. The design should be made in such a fashion that if any particular part of the mobile gets damaged the user can still use the mobile without dumping it. Therefore, people won't need to change their mobiles for or any trivial damages now and then and can use it to its last ounce. And at this, there will be a Lesser need to appropriate more natural resources or raw materials. Which would not only contribute to the sustainability of nature but also to the phone itself. Which in the long run would help to fortify the goodwill of the manufacturing itself.

**Recyclability & Reusability:** The phone and every single part must be recyclable and reusable for the very reason that it would contribute towards the longevity and repairability of the product. Which not only will contribute to the sustainability of the mobiles but also to the goodwill of the manufacturing company itself.

**Incorporation of newly designed feature phones:** This is another ingenious design opportunity that would contribute substantially to the sustainability of the manufactured mobiles. There are many people even in today's world who neither know how to operate a smartphone nor do willing to learn. Aged people fall under this category mainly. Therefore, though they give more preference to feature phones while buying a new one but just because of the scarcity of options, functionality,

accountability, and design they end up buying a conventional smartphone. Which for the sole reason of misuse gets damaged at an early stage. Here a good design new feature phone can come to play. Which would be a more sustainable option for people who are subsumed into that very group. Which in the long run will contribute to the overall sustainability of the manufacturing company.



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## Summary

To sum it up the thing that we should first and foremost acknowledge is there is indeed a lack of sustainability measures in the mobile industry and it can be improved substantially. To cope with the accretive demand of advanced mobile phones we not only are extracting natural resources at our own will but also not even trying to make cellphones more sustainable and eco-friendlier (Except only a few). Just to make the new product more aggressive in terms of pricing so that it can penetrate the market and generate good revenue we are indeed overlooking the long-term adverse impact that it might have on the environment. Whereas on the other hand if we explore the rooms for sustainable development of the product it might not only contribute to nature but the product itself as well. Sustainably developed product and technology is the future. Therefore, the sooner we acknowledge the fact the better for the environment and the future generation as well.

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