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## A comparative analysis of the ergonomic anthropometry and usability of locally designed and foreign designed smartphones.

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### Abstract

Nowadays, mobile phones have become an essential tool for people's everyday lives. In designing smartphones, various factors are to be considered. People usually prefer smartphones which are user friendly and is a good tradeoff between price and functionality. One of the traits that Filipinos have in this generation is their patronage to foreign designed and manufactured gadgets and smartphones. Since those devices are designed abroad, it is possible that they are only manufactured for the optimal usability of the users of the country where they are manufactured from. Hence, there is a possibility that the physical design and dimensions do not conform to the Filipino users due to the differences in the anthropometric measurements between races, specifically in the measurement of the hands and fingers resulting to awkward positioning of the hands or being unable to grip the smartphone properly when using the smartphones. In this study, the proponents conducted a comparative analysis of ergonomic anthropometry and usability of locally designed and foreign designed smartphones. The researchers gathered the most commonly used locally designed and foreign designed smartphones that Filipino use and their corresponding dimensions and physical design. The results showed that the top 2 most frequently used foreign designed brands are Apple and Samsung and locally designed brands are Myphone and Cherry Mobile. For the uniqueness of model, the latest LG smartphone was also considered. The researchers gathered the dimensions and the distances from the bottom left corner left and the bottom right corner of the smartphone to the physical buttons such as the power, volume, home, multitask, back, silent buttons, and the status bar.

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## 1. Introduction

People nowadays, especially those who are living in the middle to the higher socioeconomic classes, own a smartphone, either made locally or abroad. Phones that have more computing capability and connectivity that can run thousands of different applications require more controls from the users. There has been a global increase in smartphone ownership and a trend in the increase of its sizes has caused a necessity to provide designs that can be easily used by everyone. However, due to the different anthropometric measurements of people belonging to different nationalities, one design cannot accommodate every individual.

## 2. Problem Statement

One of the traits that Filipinos have in this generation is their patronage to foreign designed and manufactured products, specifically gadgets and smartphones. Since they are designed abroad, it is possible that they are only manufactured for the optimal usability of the users of the country where they are manufactured from. Hence, there is a possibility that the physical design and dimensions do not conform to the Filipino users due to the differences in the anthropometric measurements between races, specifically in the measurement of the hands and fingers resulting to awkward positioning of the hands or being unable to grip the smartphone properly when using the smartphones.

## 3. Methodology

### 3.1 Determination Smartphone Statistics

The researchers gathered data as to what is the most commonly used locally designed and foreign designed smartphones that Filipino use and their corresponding dimensions and physical user interface. The results showed that in terms of sales, price, and quality, Myphone, Cherry Mobile, Samsung and Apple are the top 4 brands in the list in that order. Coincidentally, two are foreign designed, namely Samsung and Apple while two are locally designed, namely Myphone and Cherry Mobile. Hence, the researchers would focus on these brands. Apart from that, a research conducted by Gartner shows that the top 2 brands in terms of worldwide smartphone sales to end users by vendor in 2013 are Samsung and Apple [1].

In another survey conducted by JANA, a Boston based mobile technology company, the top five smartphones in the Philippines in terms of sales are Nokia, Samsung, Cherry Mobile, Sony and Myphone. Among the top five, Cherry Mobile and Myphone are locally designed. For this reason, these brands will also be used for the study [2].

### 3.2 Gathering of Anthropometric Measurements.

Setting the confidence level at 95% and a limit of 10 in a population of approximately 3000 College of Engineering students, the researchers collected a sample of 100 students which measured the necessary anthropometric measurements for the both hands. Referring to Figure 4, point P is where the bottom of the smartphone is placed when used. The researchers measured the length P-1, P-2, P-3, P-4, and P-5 to be used for reach evaluation and lengths P-6, P-7, P-8, and P-9, the hand width, and length of segment 10 for grip level evaluation. The age and the gender of the student were also asked to prevent bias.

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