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## Power Exercycle

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### ABSTRACT

Most people usually do indoor fitness activities while using a smartphone. When their smartphone battery is running out, they have to find a charger and a plug that may be far from their exercise equipment and they can no longer use the smartphone in order to charge the smartphone battery. As such, we designed exercise equipment, a stationary exercise bicycle named Power Exercycle with its own uniqueness. This product's specialty is that it can generate electricity to recharge smartphone batteries by converting mechanical energy from pedalling into electrical energy. Hence, people can save electricity and use their smartphones while exercising despite a low smartphone battery. The special features of this product are it has a phone holder and a cable to recharge the smartphone beside a digital display screen. This product can have a high commercial potential as people, especially adults that are busy exercising will enjoy and get benefit from this 2 in 1 product. Therefore, the Power Exercycle can provide a lot of benefits for the users in order to maintain body fitness and at the same time save electricity.

**Keywords:** Power exercycle; smartphone battery; converting energy; generate electricity; save electricity

### INTRODUCTION

In the modern era, people spend most of their time using electronic devices such as computers, television, and smartphones which may increase the usage of electricity. The use of electronic devices has many benefits but at the same time, it also causes many problems such as humans becoming increasingly lazy to do healthy activities such as exercise which is necessary for good health and healthy life [1]. In addition, some people choose to exercise while using electronic devices such as jogging while listening to music. However, long-term use of electronic devices will cause the device to run out of battery. This will affect the exercise activity of the individuals as it is likely that they will stop exercising to find a place to connect their electronic device to charge it which they cannot use the electronic device while exercising.

As for that, we designed a product named Power Exercycle that enables people to engage more in exercise activity indoors whilst charging their smartphone battery. The word Exercycle stands for stationary exercise bicycle which is one of the famous devices used for indoor workout. The main function of this bicycle is can generate electricity by pedalling the bicycle which uses the concept of converting kinetic energy into electrical energy. Thus, the electricity generated from this bicycle can be used to recharge the batteries of electronic devices used during exercise. Furthermore, the Power Exercycle can also give pleasure to those who want to exercise since they can just pedal the bicycle indoors rather than find a suitable place outdoors that can waste their time and energy. Then, their exercise activities will be more

consistent because they can exercise at any time. Moreover, this product is also able to save electricity consumption because of its function which generates electricity through cycling that triggers kinetic energy to be converted into electricity [3].

This bicycle is packed with great features which include a digital display screen that can provide information about time, distance, speed, and calories. Besides, the screen is accompanied by a phone placement and a cable to charge the smartphone. These features are made to make it easy for people to use the smartphone while exercising and at the same time raise the smartphone battery. It is designed with a sturdy steel frame that provides extra stability and can withstand high resistance and a maximum body weight of 180 kg. This bicycle can also generate about 150 W per hour when we ride it which can be different depending on how fast we cycle, but probably not much more [4]. Therefore, this Power Exercycle can save electricity at home and reduce electricity bills.

The product is beneficial for the users as it can keep the smartphone battery rise, at the same time, improve health and physical fitness. In addition, this product can help those who are lazy to exercise outside because they only have to pedal the bike indoors. Thus, a person's exercise activities will be more consistent because they can exercise according to the schedule regardless of the weather conditions or the status of the air pollution outside the house such as haze. To sum up, Power Exercycle is used to encourage people to exercise regularly to maintain their bodies' health. It also can advise people to exercise more using this product because it is made 2 in 1 which can recharge smartphone battery while exercising to improve physical fitness.

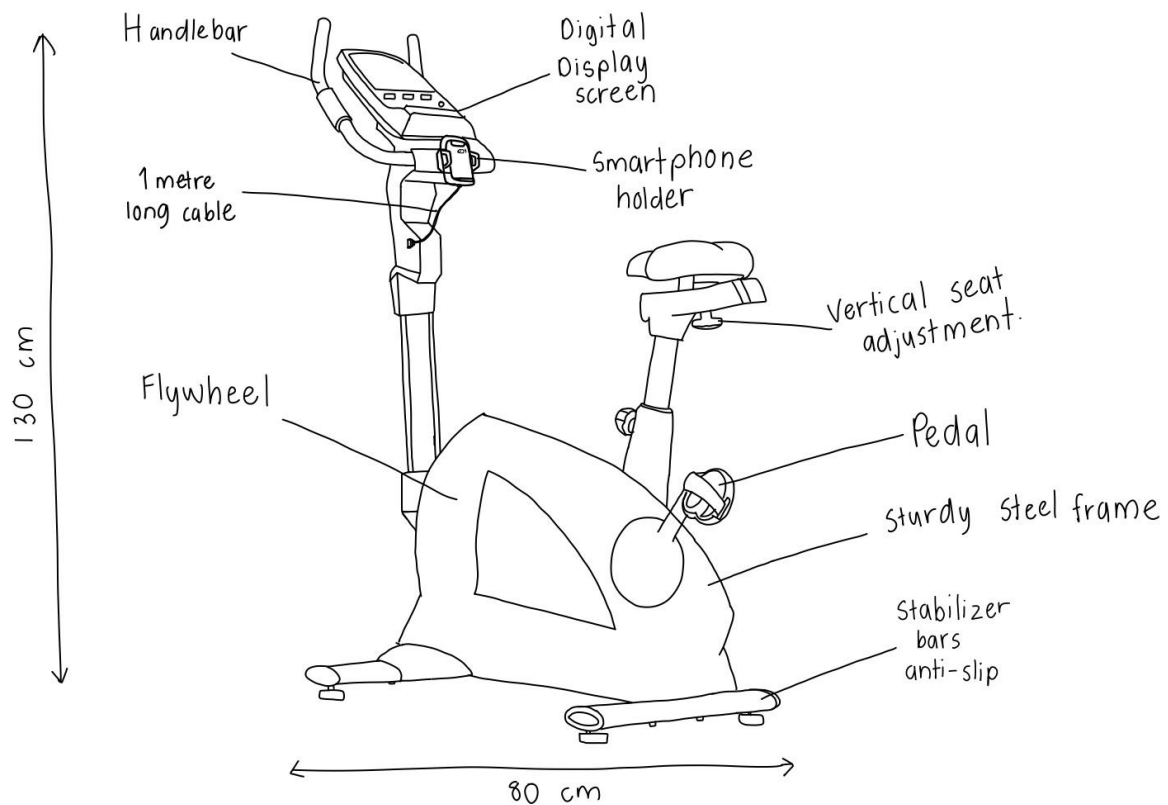
## INNOVATION DEVELOPMENT

An exercise bicycle or stationary bicycle has been introduced to the world since the 90s as indoor fitness equipment. In the hectic lifestyle of the modern era, the time for leisure activities is extremely limited as everyone was busy with their jobs and got less time to go outside, even going to the gym. Therefore, having this exercise bicycle at home might be the best solution for those who want to stay fit during a busy schedule. On the other hand, cycling on an exercise bicycle alone might be boring after some time and users tend to search for their smartphone to listen to music or watch videos when cycling. Moreover, over the year, this bicycle has already gained popularity among consumers and various technologies have been invested in this product for their advantage. This technology development includes a special exercise bicycle that we innovated, "Power Exercycle" which we modified to ease people to charge their smartphone while exercising. The objectives of our product are to maintain the user's smartphone battery during exercise, motivate users to work out regularly and reduce the current usage at home.

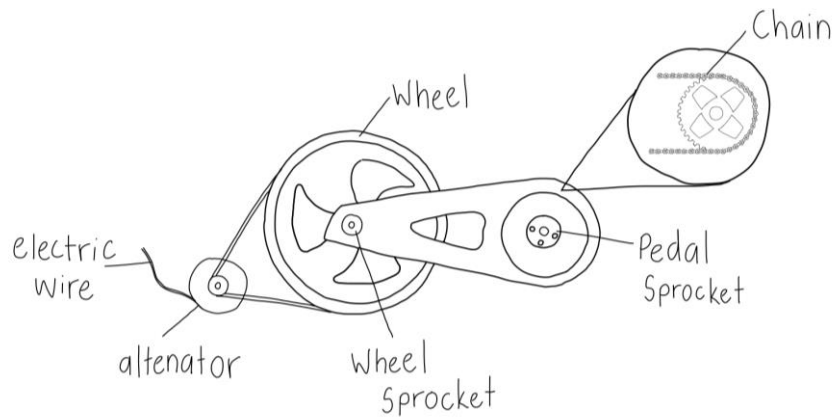
"Power Exercycle" has been modified from a normal exercise bicycle to a smart exercise bicycle that can generate electricity to charge a smartphone. This bicycle was packed with various features that were beneficial for users such as the electrical generator at the body below. This generator is able to generate electricity by converting the kinetic energy generated from pedalling the bike into electrical energy. When pedalling a bicycle, a person may produce about 150 W of power which is able to power a variety of electrical devices [4]. However, the amount of power that a person can generate while pedalling depends on their strength and how long they bike [4]. In our "Power Exercycle," we simply use the alternator that will create an alternating current to charge the smartphone's battery. The alternator has been chosen as it is commonly used in bicycles, produces more power and can be used to power the majority of

electronic devices including smartphones [6]. Thus, the amount of electricity used in homes can be minimised. Other than that, our product includes a digital display screen that will provide the users with information about time, distance, speed, and calories burned during cycling. This digital screen also uses the electrical energy generated from the alternator when pedalling the bike and it can be controlled just by touching the screen for all the information to be displayed.

Furthermore, there is an adjustable smartphone holder, cable port and smartphone cables below the display screen for the user to charge their smartphone conveniently. Due to the wide variety of smartphones available nowadays, various types of smartphone cables have been provided in our product such as type C cable, Micro-USB cable and lightning cable. In addition, the “Power Exercycle” body has been designed with a sturdy steel frame that can provide extra stability, withstand high resistance and can support a maximum body weight of 180 kg. Therefore, the user that has overweight problems or obesity can try this exercise bicycle for fitness.



**Figure 1:** Side view of “Power Exercycle”



**Figure 2:** Flywheel of exercise cycle

## COMMERCIAL POTENTIAL

Power Exercycle is a product to help those who love enjoying music or even scrolling social media while exercising. By introducing this product, we hope to achieve the primary goal of enhancing people's desire to exercise even while they are occupied with their regular routines at home. This product is also symbolizing the perfect combination of physical principles and fitness equipment to maximize the usage of a product whilst still considering the effect on the environment and other aspects.

This newly advanced invention is intended to solve the problems of almost every fitness enthusiast out there by charging their smartphone while exercising without putting them aside. Most of the time, people will need to find a plug or power source to charge their smartphone if it is running out of battery, hence, by introducing this technology we are optimistic that the problem will come to an end. The idea of this stationary bicycle will benefit society in terms of a new applicable concept of physics in gymnasium equipment. Furthermore, this product will also bring a positive impact on the environment. The Principle of Energy Conservation applied in this product will not require power sources to operate the charging mechanism and will reduce the usage of electricity that will lead to environmental degradation resulting from the emission of carbon dioxide produced from the heat [2]. This product will also help the users to reduce their household bills as it will definitely save electricity consumption by converting kinetic energy (pedalling) to electric energy (output) that will be used to charge the smartphone.

Power Exercycle has a lot of market entry prospects and can compete with existing gym equipment, particularly stationary bicycles. People who want to use their smartphone during exercise will be attracted to buy this product, especially fitness enthusiasts that do not want to waste their time while cycling. In addition, we believe that the product will be able to target persons who have socialising issues or social anxiety, requiring them to spend more time alone than in public only to ride a stationary bicycle in the gym. Furthermore, individuals who are still new to exercising will find this product to be a problem solution because they will not have to travel too far to acquire access to gym equipment because they can do it indoors in their own neighbourhood. However, we still believe that Power Exercycle will be able to attract more consumers, including adults and proprietors of gyms.

Cycling was also found to be a more efficient type of exercising rather than running [5]. This fact will surely raise consumer interest in purchasing this product because it is more convenient because customers can access it whenever they want by owning it, as well as the ability of Power Exercycle to recharge smartphones in an environmentally friendly manner.

The features offered by Power Exercycle will also set them apart from other stationary bikes now on the market as they will provide consumers with intriguing mechanisms.

All in all, Power Exercycle is the kind of product to be considered to maximize its usage whilst still minimizing the negative effects on the surroundings. This product also has high market potential due to its pedal-powered charging mechanism and other features that will allow them to compete with current stationary bicycles in the market. Power Exercycle will undoubtedly make indoor exercise more enjoyable and engaging.

## CONCLUSION

People in the modern era rely heavily on electronic devices, which has many benefits but also results in laziness and decreased exercise. Even exercising while using electronics, such as jogging with music, is hindered by the need to charge a device, leading to fewer opportunities for exercise. The Power Exercycle is an indoor stationary exercise bicycle that is designed to enable people to engage more in exercise activities while charging their smartphone battery. It is able to save electricity consumption by converting kinetic energy into electrical energy.

Power Exercycle is a product designed to solve the problem of charging a smartphone while exercising. It combines physical principles with fitness equipment and does not use external power sources to operate the charging mechanism. This helps to reduce electricity consumption and benefits the environment. The product is targeted at fitness enthusiasts and those with socialising issues who need to stay in their own neighbourhood. It has good market prospects and can compete with existing gym equipment. Power Exercycle offers an efficient, convenient, and eco-friendly way to exercise and recharge smartphones. It also provides convenience for users by providing a digital display screen, phone placement and cable to charge the smartphone. It is set apart from other stationary bikes with its intriguing mechanisms and features, making indoor exercise more enjoyable and engaging. This product has high market potential and is the perfect way to maximize usage while minimizing environmental effects.

## IMPROVISATION PLANNING

For future improvisation, we are planning to make three main changes which are as below:

1. Provide a charging platform that will charge other smart gadgets at once.

Gadgets nowadays are significantly important among these generations. They have evolved into personal devices that signify social identity and status and provide multiple gratifications in the form of entertainment, information retrieval, time management, coping mechanisms, and social identity preservation [7,8]. By adding this new feature, it would satisfy people's need to utilise their gadgets while exercising, whether for entertainment purposes such as viewing movies or completing unfinished tasks or projects. It will indirectly improve one's efficiency because one will be able to multitask while exercising.

2. The faster the pedalling movement, the faster the charging mechanism.

Currently, the power generated by the bicycles is capped at 150 W. To acquire the capability of charging other smart gadgets especially when they are charged at the same

time, more power will be required. Thus, we are planning on using a mini-transformer to increase the power based on the formula of Power = Voltage x Current ( $P = IV$ ). The power produced by the generator will be increased as the transformer acts as a voltage stepped-up component. The generated electricity is then stored in the capacitor and utilised when the bicycle is turned on. Electricity will also be used to power the display panel and nearly all of the mechanisms that require electricity, making this device environmentally friendly.

### 3. Bluetooth connection with smartphones.

We are also planning on adding Bluetooth features that will connect the smartphone to the bicycle. Users can easily track their blood pressure condition, pulse rate and others by just on the tip of their fingers. This record can be easily tracked by the users by accessing the apps that will be introduced in the future called "Exercycle " when the Bluetooth are connected. Other than that, the apps will help the users to track their cycling kilometres as the apps will do the calculation of pedalling average speed and do the estimations of the kilometres. Here, users can keep their health and other records when cycling and keep up with their health progress. Furthermore, the display panel will be able to play music and movies when both smartphones and Power Exercycle are connected. This will surely increase the market potential of this product and will attract more people to own it in the future.

Overall, Power Exercycle is projected to meet market expectations and compete with existing stationary bicycles on the market. The improvisations are also to be considered to ensure that this product will bring the users with the best experience when they are exercising with Power Exercycle.

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