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Power Mount: A Proposed Design for Motorcycle Phone Holders to Ensure Style, Safety, Security, and Sustainability

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ABSTRACT

In a no touch economy brought about by the COVID 19 pandemic, courier services became one of the robust businesses (Dones & Young, 2020) wherein delivery companies offer package pick up, delivery and monitoring services. This business is powered by the heavy reliance of the people in online shopping during the quarantine period. On a survey conducted in the Philippines with 120 participants, it was found that 93.3% of the participants are now using courier services from an initial record of 76.6% before the pandemic. It was also revealed that Lalamove and Grab express were among the preferred courier service providers which utilizes their mobile phones to receive transactions, receive order details, communicate with their customers and navigate efficiently. Phone mounts provide a variety of benefits, including navigation, message tracking, and overall convenience by allowing you to use your phone while driving. Furthermore, this is especially relevant for delivery and courier riders, who may need to change routes, navigate detours, or simply know where they are going. The use of a phone mount enables for convenient, hands-free route monitoring. The majority of phone mounts allow users to connect their phones to the side mirror's handle bar or the motorcycle's dashboard. The Power Mount addresses the problems identified by the motorcycle riders in Region IV-A CALABARZON and NCR. Furthermore, this study is solely focused on the development of Power Mount which addresses the problems in security, convenience, durability, design, and sustainability. However, additional concerns about the motorbike, other motorcycle equipment, the technicalities of the proposed added feature (power bank), and the rider itself will not be addressed in this research.

Keywords: Product design, Phone mount, Phone holder, Motorcycle riders

INTRODUCTION

Background of the Study

Phone mounts provide a variety of benefits, including navigation, message tracking, and overall convenience by allowing you to use your phone while driving. Furthermore, this is especially relevant for delivery and courier riders, who may need to change routes, navigate detours, or simply know where

Figure 1: (a) The roam mount, (b) CAW.CAR, (c) RAM® mounts.

they are going. The use of a phone mount enables for convenient, hands-free route monitoring. The majority of phone mounts allow users to connect their phones to the side mirror's handle bar or the motorcycle's dashboard. It also enables you to switch from portrait to landscape orientation which can be utilized depending on the situation.

One example of motorcycle phone mount is The Roam mount as seen in Figure 1A. It has a ball-joint design that allows you to see your phone's navigation vertically, horizontally, or at any angle in between while riding ('Top 5 Motorcycle Phone Mounts,' 2019). Not only is your phone kept in place by a clamp, but also by a silicone net that wraps around the edges of smartphones of various sizes (up to 3-5/8 inches broad) to provide a solid grip. It may also be attached on the handlebar for various diameters in order to accommodate varied motorbike handlebar sizes. On the other hand, given the amount of vibration transmitted via the handlebars, the CAW.CAR's, in Figure 1B, mounting method includes a shock-absorbing clip. This also provides convenience with its characteristic of quick installation with no tools required (simply tighten the claw on), but also stability and security to your phone while placed on the phone mount. However, this has resulted in the emergence of a new problem: the phone's battery life. Constant usage of a mobile phone, particularly while utilizing GPS and mobile data, will deplete its battery rapidly (Eastham et al., 2015). As a result, the necessity to charge occurs in the event that the battery runs out. In an attempt to address this problem, several phone mounts included a wireless charging capability. This is what RAM® Mounts, as presented in Figure 1C, takes pride in introducing, the world's first patented, universal waterproof wireless charging phone mounts (National Products Inc, 2020).

Moreover, this phone holder's arms stretch and contract to secure almost any phone while providing Qi wireless charging, owing to spring-loaded RAM® X-Grip® technology. Rubber-coated covers are included on each arm, and the open design allows you to use your phone, buttons, and switches normally. Lastly, the RAM® Tough-Charge with X-Grip Technology is also totally waterproof, making it suitable for use in wet environments and safeguarding your wireless charging phone holder from spills. In addition, a silicone cover is supplied to keep the USB connection watertight. The power used by the phone mount's wireless charging feature, on the other hand, depletes the motorcycle's battery. Therefore, in order to address the issue of phone sustainability while in use, the phone mount's design must incorporate a charging capability without compromising other components by integrating an independent power bank in the phone mount.

Scope and Limitations

The Power Mount addresses the problems identified by the motorcycle riders in Region IV-A CALABARZON and NCR. Furthermore, this study is solely focused on the development of Power Mount which addresses the problems in security, convenience, durability, design, and sustainability. However, additional concerns about the motorbike, other motorcycle equipment, the technicalities of the proposed added feature (power bank), and the rider itself will not be addressed in this research.

NEEDS ANALYSIS

Empathy Map

In practice, understanding the users is the first step in a product development process. To come up with a comprehensive and reliable empathy map, the researchers used both brainstorming methods and interviews with some motorcycle riders. Results from the two steps were then used to develop the empathy map and identify the pains and gains of the users. Gleaning from these, it was identified that the target customers' pain includes their phone's safety when driving, concerns about their phone battery, the weather or even in completing their task. With these identified pains, the researchers claimed that the users may benefit from the product due to the quality, security, and the sustainability that it promises. The results will then be further confirmed and elaborated through a survey to check whether these answers represent the answer of the whole population considered. This is to ensure that the claims were not biased and that the product has the potential to address the concerns and problems of the motorcycle riders.

Sampling

The chosen population for the survey is the registered motorcycle riders of Region 4A (CALABARZON) and National Capital Region (NCR) from 2018-2020. According to the published annual reports of the Land Transportation Office (LTO), the number of registered motorcycles from Region 4A are 771,461, 771,461 and 771,461, respectively. While the number of registered motorcycles from NCR are 1,295,792, 1,295,792, and 1,295,792, respectively. This gives a total of 2,314,383 for CALABARZON and 3,887,376 for NCR. Therefore, the size of the population N considered in this study is 6,201,759.

With the constraints brought by the pandemic, the researchers opt to use a sample size of 100. The confidence level is 95% which has a z-value of approximately 1.645 while the proportion of population was assumed to be 50%. The margin of error for the study is 6.4128%.

Deployment of Survey

The researchers opted to use a convenience sampling method to select the participants for the survey due to limited time and specificity of the population. The survey was deployed online, through postings in Facebook which calls

for registered motorcycle riders from Region 4A and NCR, and private messaging to friends and acquaintances of the researchers. In addition to this, the researchers also did an in-person survey wherein motorcycle riders were given printed survey forms. In addition, as a motivation for answering the survey, the group gave out Php 100 worth of GCash each to the six respondents that will be randomly selected.

Survey Results

Demographics

Survey revealed that 85.1% of the respondents were male while 14.9% were female. On the other hand, 50.5% of them belong to the age group of 25-44 while 43.6% came from the age group of 18-24. Fifty-eight percent of the participants came from Laguna while 26.7% came from Cavite. Majority of the respondents came from the location where the researchers are residing brought by the pandemic. Lastly, 53.5% have an average monthly income below Php 15,000. This information reveals that there is still a possibility that the propose product has a good quality but with a lower price.

Phone Use

It has been revealed that 73% of the respondents use their phone for messaging while 58% of them said that they use it for navigation. In addition, 29% said that they can use their phones for 4-7 hours before having a low battery. Survey showed that 69% of them often worry of their phone being wet when they are driving, particularly during rainy seasons.

Power Bank Use

Despite the phone battery being one of the concerns, results revealed that among the 100 participants, only 70% of them are using power banks. In this number, 87.1% are using their power banks while driving. Survey also revealed that motorcycle riders prefer storing their phones in their bags instead of using a phone mount. Furthermore, it has been found that the relevant features of a power bank are shockproof, waterproof, and solar-powered, respectively.

Phone Mount Use

Among the 100 respondents, 61% of them use a phone mount while 39% of them said that they do not use one. Among those who opt not to use a phone mount revealed that 35.7% of them said that they do not need one, while the two reasons tied with 32.1%. These two reasons are because they do not want it or they do not trust it.

Since many of the respondents have doubts in using a phone mount, the developers must adhere to their customers' requirements to ensure that their needs are met and also, to gain their trust as the product addresses their identified concerns. The materials, design, and other factors considered when buying a phone mount are one of the keys to address the mentioned concerns

Table 1. Important factors in buying a phone mount.

Factor	Average Importance Rating
Design	4.62
Convenience	4.56
Size	4.52
Price	4.27
Durability	4.21
Battery Life	4.01

Table 2. Importance rating of factors that affects in buying behavior of power bank customers.

Factor	Average Importance Rating
Security	4.53
Convenience	4.45
Durability	4.33
Design	3.90

and doubts involving the phone mount. Based on the results, the most favorable material and trusted for a phone mount should be alloy. They also want it to be rotating and tilting. Table 1 shows the important factors when buying a phone mount. The importance factors were based on a Likert scale with 1-least important and 5 as the most important.

To further investigate the satisfaction of the current design of the phone mount that they are using. Table 2 revealed the average satisfaction rating for each identified factor involving a phone mount. According to the surveyed motorcycle riders, the security that their current phone mount had an average satisfaction rating of 4.53. This is considered high which indicates that the security that their current phone mount is giving is highly commendable. According to the survey, one of the major concerns of 36% of the respondents, is snatching or dropping of phones which confirms why security also garnered a relatively high importance rating.

PROTOTYPE DESIGN

The prototype is designed to have a phone holder with a lock-and-lock mechanism. This phone holder can withstand heavy rains without hindering the full and convenient utilization of the phone. Another phone holder with a rotational locking mechanism was attached to the main phone mount attachment to hold the solar power bank. Aside from this, the phone mount can be attached on either the side mirror or the handle bar. Lastly, it features a ball mechanism for the rotational and tilting joints for the phone holder.

Prototype Testing

The prototype was tested by one of the creators based on the features and functions of the product. First, the stability and security of the phone holder, and visibility and accessibility of the phone were tested through a 20-minute motorcycle ride on a highway in Binan. It was observed that the phone was not moving inside the phone holder due to the magnetic attachment placed at the back of the phone. Moreover, it was also observed that phone holders and the attachment are stable even when the road is bumpy. Second, the waterproof capability of the screen cover and power bank were tested by exposing them to the rain. Based on this, it was observed that the phone was kept dry inside the phone holder and the power bank is still functioning even after getting wet in the rain. However, even if the power bank is waterproof, it is not recommended to always expose it to water as its electrical components can get corroded. Third, the solar power bank was tested by charging the phone to it for 20 minutes. It was observed that the phone battery charge was increased by 10% in the 20 mins that it was charged. The solar power bank was also tested by exposing it under the sun, which showed a green light indicator that the power bank is charging. Unfortunately, due to the rainy weather in the past week, the solar power bank was not fully charged under the sun. Lastly, the tilting and rotating mechanism of the product were tested while the product is being mounted on the motorcycle and during the 20-minute motorcycle ride. Due to the ball mechanism of the phone mount, the phone holder can be tilted or rotated with a little effort.

CONCLUSION

Upon investigation of the VOC, it has been found out that to be able to address the identified problems of the motorcycle riders which are phone being snatched away or being dropped, phone being wet from the rain, and insufficient battery life, security, sustainability, design, durability, and convenience of the designed phone mount should be evaluated thoroughly to ensure that the Power Mount addresses the problems indicated by the target demographic. Possible risk to failure of the prototype was evaluated using FMEA which showed that the Solar Power Bank is the product feature that is at most risk of failure and so, one considered recommended action that can prevent failure is by incorporating a solar power bank that offers higher quality such as stronger and durable material used.

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