

A Market Study in Implementing Mobile Power Bank Services in Budapest

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Abstract: Due to the continuous development of technology nowadays, it generates many electronic services that facilitate human life. The majority of the population uses mobile phones on daily basis and generally encounter the issue of running out of the phone's battery while they are on the move. Mobile power bank service is an emerging consumer electronics that one could borrow from one store and return it in another store and have to pay for this, like for shared bikes or scooters. This kind of service is popular in Asian countries, especially in China, but it is not accessible in Hungary, Budapest, at present. The research on the entry of mobile power bank service in Budapest is being conducted with the purpose to investigate the needs of this service, the target customers as well as the possible profitability. The quantitative research utilizes a questionnaire as a tool. The results show that there is a positive attitude toward the introduction of mobile power bank service in Budapest, however the customers are price sensitive, but would use the service at the places like clubs, restaurants, schools or at public transportation stops. Students and females would rather use the service while regardless of the possession of a power bank, the service could be attractive to people.

Keywords: Mobile power bank service, sharing economy, market entry, Budapest

1 Introduction

The information society brought flexibility, changing working hours, changing in work-life balance as well as the need for information, interactivity and multitasking. The smart boom strengthened the trend of being on the move and study and work any time, anywhere and via smart devices. People use their mobile devices in the streets, on trains, at schools, practically everywhere. These devices need charging regularly, since depending on their heavy use, the batteries go flat. The traditional way of charging mobile devices means that these devices are plugged in at home or at the workplace until they are charged. However, mobility requires mobile charging possibilities like power banks that people carry and use when the device needs charging. However, should someone leave the power bank at home a rental service could help them to solve the charging problem. Such

services, namely mobile power bank service has already been introduced in some countries. It is already popular in Asia, but at the same time, not popular in Europe and does not exist in Hungary. Many researchers have been involved in market study, including Felson [1], Koehn [2] and Sundararajan [3] for example. The benefits of using joint power banks have been studied by such researchers as Li et al. [4], Zhang [5], Xing et al. [6] and Zhen et al. [7]. They study mobile power bank service in China, explain the reasons for its popularity, and forecast how this service will develop in the future. These research studies argue about the types of economy that promotes sharing power bank services and it helps to understand why it does not exist in Hungary yet.

However, research on the service of providing power bank services in shopping centers, airports, train stations and analyses on the need for this service is scarce in Europe and in the USA. Therefore, it is important to study the reasons for this discrepancy, to study how the market in Europe works and understand that it is different from the Asian market. It needs to be analyzed why the service is getting more and more popular why it is commonplace in one market but it practically is not offered in another.

This paper will consider the increasingly popular rental service of power banks in shopping centers, train stations, airports, in the streets for a small fee and the convenient return of this power bank at the nearest available point. The mobile power bank service offers convenience for people, they are able to charge their phones in several participating venues forming a network. It will analyse, through a quantitative survey, the possibility of introducing this kind of mobile power bank rental service in the Hungarian market. The scope of research will be in Budapest, Hungary. A questionnaire will be used as a survey tool.

The paper is structured as follows. After some literature review, in which the concept of the sharing economy is clarified and the popularity of mobile power bank rental service is introduced, the research methodology and the sampling structure is outlined together with the research tools. The Results section presents the survey results and the Conclusion section discusses the attitude of the inhabitants in Budapest toward such a service and gives some recommendations how 4Ps of Marketing could be utilized to introduce the mobile power bank rental service successfully in Budapest.

2 Literature Review

With the support of information and network, sharing economy has been the trend in the 21st century. The concept of the “sharing economy” was first proposed by American sociology professors Felson and Spence [1]. Koehn, a business historian at Harvard Business School, defined the sharing economy as a system of direct exchange of goods and services among individuals — without an intermediary directly facilitating every transaction, which is accepted worldwide [2]. Sundararajan reified this concept by investigating four main platforms of sharing

economy: repurposing owned assets as ‘rental’ services, such as Airbnb; professional service provision like Uber; general-purpose freelance labor provision, for example, oDesk; and peer-to-peer asset sales like eBay [3]. Mobile power bank services, as a relatively new product existing in sharing economy, can be borrowed from the fixed rental cabins when needed and returned in the same or different cabins. Customers pay a relatively low price for the service and the deposit can be withdrawn after returning the mobile power bank.

The keyword “sharing economy”, “mobile power bank”, “market”, “consumer”, “implement” and “module” were searched on searching engines, for instance, Google Scholar, Connected Papers and Cnkipedia. The Chinese websites, Baidu Scholar and Cnkipedia have more relevant literature, given the fact that the mobile power bank service has blossomed from 2014 there.

Following the idea of Li et al. [4], the high frequency of charging and the need for the mobile phone have increased the demand for mobile power bank services. From a similar standpoint, the authors assume that there is a large potential market for mobile power bank services in Budapest. Drawing on the concept of Zhang [5], places with large crowds such as airports, railway stations, or small places such as restaurants and bars would be favorable for mobile power bank services in the future, however, the mentioned airports, railway stations, nowadays are already installed with the charging equipment. And unlike in China, the phenomenon that much less video surveillance is in operation could not be ignored since the equipment can be destroyed deliberately. Over the past years, there has been an increasing amount of research on the target customers. According to the survey conducted by Xing et al. [6], the proportion of females who carry power banks instead of borrowing was 84.95%, which is higher than that of males (78.82%). The difference might be due to the fact that women use phones more frequently or they are inclined to buy smaller-sized phones, whose battery has a smaller capacity. Similarly, Zhang [5] pointed out that mobile power banks are more favored by men, young people, and those with at least a college education. The jobs, in particular, door-to-door salesman, business owners and managers, who spend a lot of time on the way, are in need of mobile power bank services. Another research has concluded 4 factors that influence the willingness to use mobile power bank services in China: price perception, service perception, content perception, and personal income, which also offers new insight into the questionnaire design [7]. In addition, the market entry in Europe is interconnected with regulatory requirements, pricing, reimbursement, prescribing, and dispensing [8]. These reasonable outcomes provide both ideas for our following questionnaire design and comparison materials for a future result.

While extensive research has been conducted in China, much less is known about the market in Budapest. Therefore, the purpose of this paper is to examine the internal and external environment of mobile power bank service and investigate its market feasibility.

3 Research design

The research aims to explore whether there would be some interest in mobile power bank services in the capital of Hungary. The following research assumptions and research activities are posted: (1) Exploring the possibility of entering the market of mobile power bank services in Budapest; (2) At the moment it is known that this service is very popular in Asian countries, but it is practically not provided in Europe, it is necessary to find out why and whether it would be popular in the future; (3) Available resources can help to study how the market works, to study why shared power bank services are popular in other countries. The research aim is to explore the possibility of entering the market of mobile power bank services in Budapest. Moreover, it is to identify the importance and profitability of a Mobile Power Bank service providing business in Budapest. In order to find out how much the mobile power bank service will be in demand in Budapest, the Asian and other markets are studied, where this service is popular. The research then focuses on the Hungarian market and through a survey, it strives to find out whether there is a market for such a service.

Following the assumptions the following research questions were formed:

RQ1. Will Hungarian and international people in Budapest, Hungary be interested in mobile power bank rental services for a small fee?

RQ2. How can this service be introduced into the Budapest market regarding age, costs, places for rent?

RQ3. Why is this service not popular in Hungary now and why is it popular in Asia? How is the potential product value created in the future?

RQ4. What factors can influence the demand of customers to use this service and rent a power bank, rather than buy it?

3.1 Methodology

The methodological framework of the work will be self-administrated questionnaire survey, and then the analysis of the data obtained. Non-probabilistic, convenient type sampling is used; therefore, sampling is not representative but gives some suggestions whether the introduction of mobile power bank services would be of any interest in Budapest, Hungary. Counter type quantitative research will be conducted, as well as a comparative analysis will reveal the differences between the Asian and the European markets. Finally, conclusions will be drawn that will help to understand whether this service is needed in Hungary.

Quantitative analysis will be used for descriptive, contingency as well as correlation and regression analyses, since some characteristics are to be fined that influence the preference of mobile power bank services in the capital. The statistical software SPSS V25 and MS Excel are used for the statistical analyses.

4 Results

4.1 Demographic characteristics of the respondents

A total of 103 responses were gathered during the research period. The majority of the respondents are females accounting for 68.9% of the total respondents, and the proportion of males is 30.1%. The largest proportion of respondents is between 19-25 years old, with the ratio of 68.9%, followed by respondents with the age of between 26 and 45, then the ones between 10 and 18 and finally people from the age group of 46–55 and over 55 years old, with the proportion of 25.2%, 2.9%, 1.9% and 1.9% respectively. When it comes to the nationality, 35% of the respondents are local Hungarians, two thirds are not Hungarians (64.1%). Three quarters of the respondents are students (Table 1).

Demographic profile of respondents

		n=103	Distribution (%)
Gender	Female	71	68.9%
	I do not wish to say	1	1.0%
	Male	31	30.1%
Age	10–18 years old	3	2.9%
	19–25 years old	71	68.9%
	26–45 years old	26	25.2%
	46–55 years old	2	1.9%
	More than 55 years old	1	1.0%
Nationality	Both Hungarian and foreign	1	1.0%
	Hungarian	36	35.0%
	Not Hungarian	66	64.1%
Student	No	25	24.3%
	Yes	78	75.7%

Table 1 Demographic features of the respondents

Considering where the respondents usually stay, it can be said that two quarters of them stay in Budapest, more than half of the respondents work or study indoors, 11.7% work outdoors and one third of them work or study indoors and outdoors. One third of the respondents have postgraduate degree, or undergraduate degree, 31.1% and 36.9% respectively, while 25.3% finished secondary education (Figure 1).

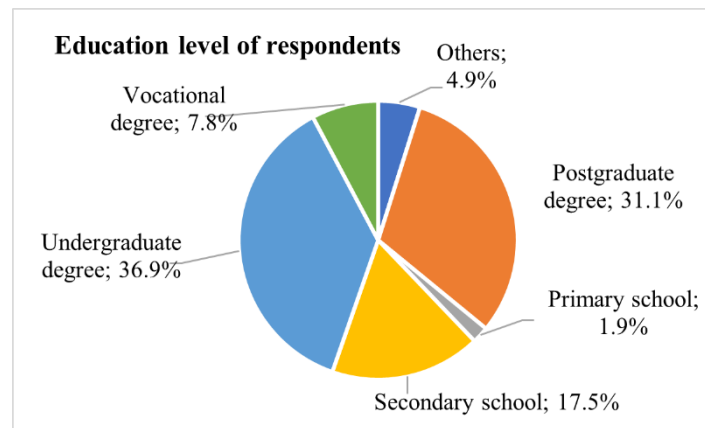


Figure 1 Distribution of respondents by education level

Two thirds of the respondents have a monthly income of less than HUF250,000 while 17.5% earn between HUF250,000 and HUF350,000 (Figure 2).

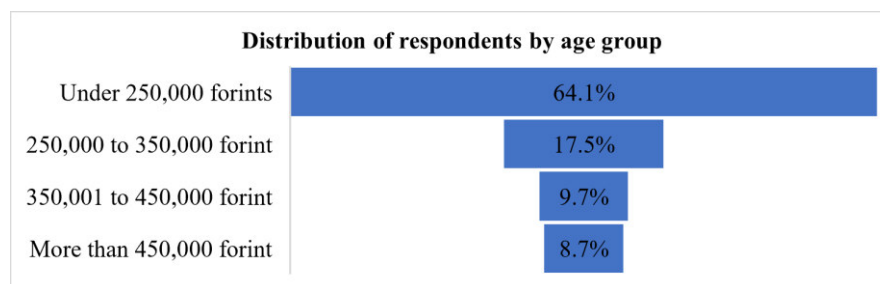


Figure 2 Distribution of respondents by monthly income

4.2 Power bank preferences

People were asked about their mobile charging and mobile power bank preferences. 42.7% of the respondents charge their mobile phone once a day, while 26.2% of them do so twice a day and even there is a 24.3%, who charge their mobile phone three or more times a day, assuming that people either have mobile phones with badly performing batteries or prefer having their mobile phones charged fully most of the time. These results imply that offering mobile power bank services — with a shorter usage time — could be beneficial in Budapest. However, three quarters (73.8%) of the respondents have their own power bank, but only 14.5% of the ones who have power bank carry it with themselves all the time, and 25% of the respondents carry it rarely or sometimes (52.6%) while 7.9% never take it with themselves. It also assumes that people do not pay attention to carry a power bank with themselves all the time, so again providing mobile power bank services can be justifiable.

Out of the 103 respondents 4.7% is familiar with the service while 28.2–28.2% of them do not know it or it is the first time they hear about the service (Figure 3). Half of the respondents would try out such services while 15.5% would never use it and 34% of the respondents are unsure.

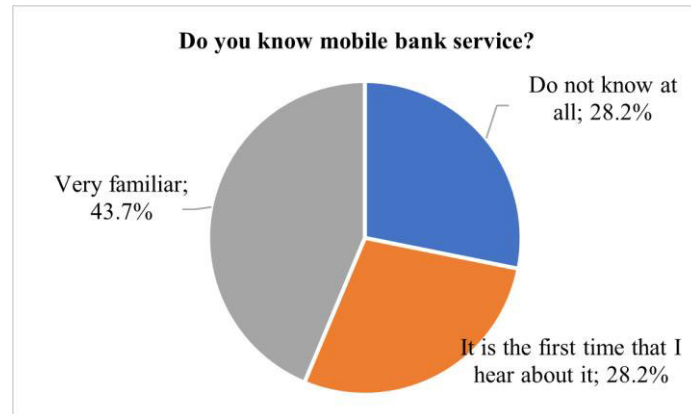


Figure 3 Distribution of familiarity with mobile bank services

A significant relationship was detected between the familiarity with mobile power bank services and the willingness to use it ($\chi^2=20.19$, $p=0.000$, Cramer's $V=0.443$). Table 2 displays that 32% of the respondents are familiar with the services and would definitely use it and 18.5% would try it out as newcomers in using these services. The 34% who are unsure, can be convinced, since the service is new to 23.3% of the respondents and 8.7% would try the service.

<i>Do you know mobile power bank services?</i>	<i>Would you try any mobile power bank services? (%)</i>			
	<i>Definitely yes</i>	<i>Not at all</i>	<i>Not sure</i>	<i>Total</i>
<i>Do not know at all</i>	7.8	8.7	11.7	28.2
<i>It is the first time that I hear about it</i>	10.7	3.9	13.6	28.2
<i>Very familiar</i>	32	2.9	8.7	43.7
<i>Total</i>	50.5	15.5	34.0	100

Table 2 The relationship between familiarity with mobile power bank services and willingness to try out the services

Even if respondents would try out mobile power bank services almost 30% would prefer a free of charge service, and 44.7% would pay less than HUF200 for half an hour. 22.3% would be willing to pay between HUF200 and 300 while only 3.9% would pay over HUF 300. None of the amounts reaches a euro at present. Moreover, no significant relationship was found between the income level of the respondents and the price they would be willing to pay for mobile power bank services ($\chi^2=9.824$, $p=0.132$, Cramer's $V=0.218$).

4.3 Affecting factors of the mobile power bank service usage

Study of correlations between the factors and motivation of the usage of mobile power banks services revealed some significant influencing factors. The overall results illustrate that the factors affecting the potential use of mobile power bank services in Budapest within the framework of this research are gender, monthly income, the status of being a student followed by whether the respondents possess their own power banks. Table 3 summarizes the results and highlights the significant factors.

<i>Would you try any mobile power bank services?</i>	<i>Chi2</i>	<i>df</i>	<i>Asympt.Sign. (2-sided)</i>	<i>Cramer's V</i>
<i>Gender</i>	10.254	2	0.006	0.317
<i>Age</i>	2.590	2	0.274	0.19
<i>Monthly Income</i>	9.841	4	0.043	0.219
<i>Do you have your own power banks?</i>	7.268	2	0.026	0.266
<i>Student</i>	7.172	2	0.028	0.264
<i>Work or study inside or outside</i>	3.389	4	0.495	0.181
<i>Where to stay (Budapest vs not Budapest)</i>	3.846	2	0.146	0.193

Table 3 The relationship between trying out mobile power bank services and different demographic features

Gender significantly determines whether respondents would use the service provided ($p=0.006$). Females would definitely use power bank services (42.2% of the total respondents), while 8.8% of the male respondents would do so. 20.6% and 12.7% of the respondents, who are females and males respectively, are not sure they might also be convinced to use mobile power bank services.

The *monthly income* is also in association with the motivation of using mobile power bank services, with a p value of 0.043, however, the correlation is relatively weak (Cramer's $V=0.219$). Respondents with a monthly income between HUF 250,001 and 350,000 have the highest favorable motivation to use mobile power bank service (66.7% of the respondents in the group), followed by the group with monthly income less than HUF250,000 (51.5% of the respondents in the group). 36.8% of the respondents with monthly income over HUF350,000 would definitely not use the service, however, the unsure and the convinced respondents are of the same percentage (31.6%). Furthermore, 36.4% of the respondents with less than HUF 250,000 monthly income are not sure about using such a service, meaning that together with the 27.8% and the 31.6% of the respondents from the other two groups there is a potential in introducing such a service.

In case of the respondents *having their own power banks*, the relationship is significant with $p=0.026$. Half of the respondents would definitely use such a service regardless of whether they possess a mobile power bank. For those 27 respondents who don't own a traditional power bank, 14 respondents (51.9%) would like to consume the mobile power bank service. On the other hand, 77

respondents have traditional power banks, of which half respondents have a favorable attitude toward mobile power bank services.

The status of being a *student* influences the intention to use the service observed. More than half of the students would definitely use it (55.1%) but there is a group (34.6%) of indecisive, while respondents who are not students, equally share among the 'Definitely Yes', 'No' and 'Not Sure' groups meaning that both students and no students have a group of unsure people, who can also be convinced of such a service if introduced in Budapest. Students, furthermore, prefer such services at low costs or at no costs (Figure 4), since a significant relationship was detected between the status of being a student and the price paid for the service ($\chi^2=8.714$, $p=0.033$, Cramer's $V=0.281$).

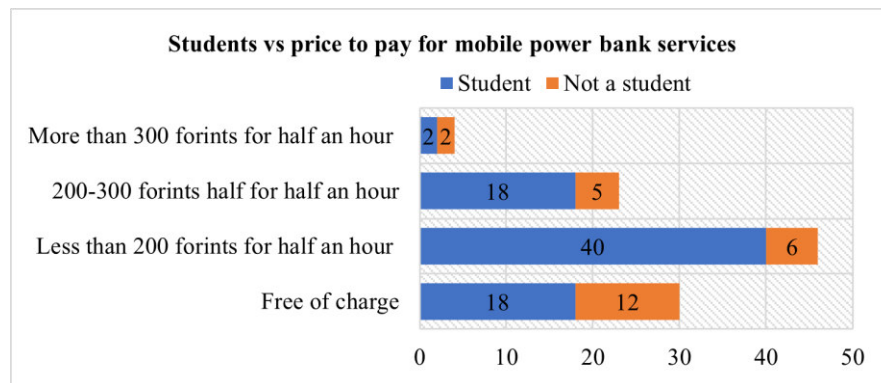


Figure 4 Price tolerance of mobile power bank services among students

The age of the respondents, or whether they work inside or outside, or stay in Budapest or not, did not show a significant relationship with their intention to use mobile bank services.

4.4 Competitive advantages of the mobile power bank service

By using the multiple response questions, the motivation of the respondents using the power banks service in the external environment was analyzed. Figure 5 shows that individuals would use mobile power bank services mostly when they are long time outdoors (58.25%), or because their cellphone and other commonly used electric device run out of charge (42.72%), or in case of emergent preparation (53.4%), however, there are some who follow the general trend as well (6.8%).

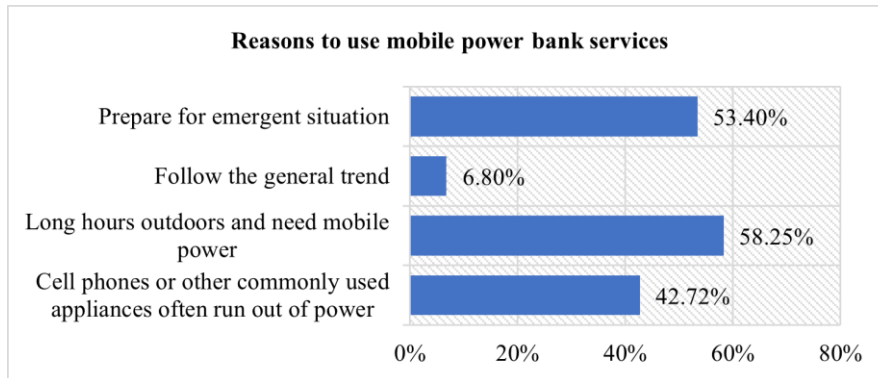


Figure 5 Reasons why respondents would use mobile bank services

Figure 6 presents, on the other hand, the frequency distribution of the respondents' motivation of choosing mobile over traditional power banks. The quick availability has the highest proportion with a ratio of 71.84%. Charging multiple types and charging without carry have similar preferences (34.95% and 35.92%, respectively). Twenty-five respondents chose the option of large electrical capacity, which accounts for 24.3% of the responses. As other reasons, respondents mentioned that '*I have my own (charger)*', or there is '*sometimes emerged using*' or even '*The phone battery is not enough*'.

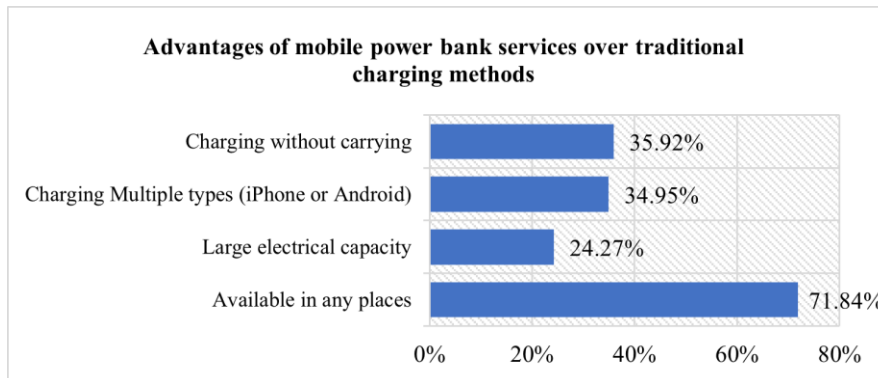


Figure 6 Distribution of preference of mobile power bank services over traditional one

Finally, the researchers were interested where such a service would be preferred by the customers. Over 50% of the respondents would use mobile charging services in shopping malls and restaurants while around 40% of them would use it at schools or in clubs (Figure 7). There was an option for '*Public transport point*' as well.

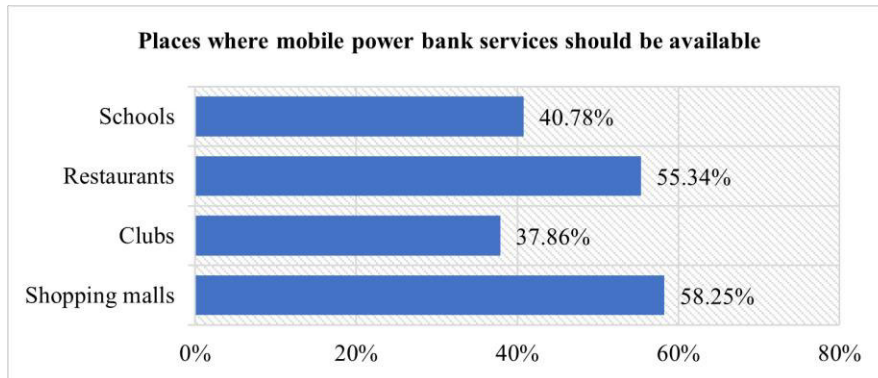


Figure 7 Places where respondents would use mobile power bank services

Conclusions

This result shows that the attitude toward trying mobile power bank services is positive, since more than half of the respondents would try out the service. The reason individuals would use the mobile power bank service is that they spend a long time outdoors, their cellphone and other commonly used electric devices run out of charge or some emergent need crops up. Among the expectations of customers, the quick availability would be highly preferred followed by multiple types charging possibilities, charging without carrying and the large electric capacity seems to count the least.

Interestingly age, location and whether the respondents spend most of their time inside or outside does not have an impact on their preference of trying out mobile power bank services, while females would significantly use the service more often, as well as people with a monthly income between 250 and 350 thousand forints, and surprisingly half of the respondents owing and not owning power banks would try out the service. Students would also prefer such a service and not surprisingly prefer cheap or free of charge services.

According to the findings, over 90% of respondents charge their phone at least once a day, which is consistent with Li et al.'s idea of the high frequency of charging [4]. Besides, the finding that high support for placing mobile power bank in shopping malls, clubs, restaurants, and schools is also mentioned by Zhang [5]. What's more, the finding that outdoor workers are in need of a mobile power bank is noted by Zhang [5] too. However, our findings that age does not impact the motivation of using the mobile power bank service is contrary to that of Zhang [5]. The reason might be that 94.2% of respondents are between 19-45 years old. A rather disappointing result is how much people are willing to pay for such a service, considering that a positive attitude was found towards the introduction of mobile power bank services. Further research is necessary to explore the reasons why people expect services at such a low price, despite the fact, that no relation

was found between the price people are willing to pay for this kind of services and their income level.

However, the current research was mainly limited by the lack of data, especially from those aged less than 18 and more than 45, and the research did not concentrate on cities outside Budapest. Therefore, the sample was not representative. Consequently, more data needs to be collected and representativeness needs to be ensured. One issue emerging from the findings is the effect of respondents' monthly income on the price of the mobile power bank service, which can be improved in future research.

This has been the first research project to explore whether there is a demand for mobile power bank service in Budapest. A positive attitude was found and a significant proportion of the surveyed were not sure whether they would use the service. Combined with the 4Ps of Marketing, the study also suggests a way to develop the market for mobile power bank services in the capital.

From the point of Product, the cool color and warm color of the mobile power bank are more popular than medium color and metallic color; charging multiple types, large electric capacity, and charging without carrying should be taken into consideration when designing the power bank.

When considering mobile power bank spots— the place aspect of 4Ps of Marketing —, mobile power banks should be accessible at places with large crowds such as shopping malls, clubs, restaurants, and schools, because the feature “available in any place” ranks the highest in the advantage list of the mobile power bank services.

According to the Price expected by respondents, around one-third of people hope to use the mobile power bank services for free, while the majority of the respondents prefer the price less than 200 forints for half an hour, and less than a quarter think that 200-300 forints for half an hour is also acceptable.

Finally, Promotion is also significant, because “following the general trend” is also a reason why people are willing to try mobile power bank services. Based on the mentioned price range, the free trial will be a great option to develop the new market.

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