

The use of statistical methods in the analysis of mobile payment market in Poland

Artur Borcuch¹

¹PhD, Jan Kochanowski University in Kielce, Institute of Economics, Poland

Email: artur.borcuch@gmail.com

ABSTRACT

Payments are an inherent element of economic activity (León and Ortega 2018). However, the evolution of payment instruments and the way individuals and businesses make daily payments has undergone enormous change in human history, particularly due to main innovations in payment systems in last decades (Gandhi 2016). The last innovation in payment system concerns mobile payment. The development of mobile payments market can have a positive impact on economic growth (Leon and Rodriguez 2012). Although the Polish market of mobile payments is in the initial phase of development, it is one of the pioneering and leading in Europe and globally. The main purpose of this article is to analyze, which feature (convenience, speed, availability, ease of use, safety) of mobile payments could be the most important for users from Poland.

Keywords: Mobile payment, payment.

1. INTRODUCTION

The advancement of information technology has facilitated innovation in electronic payment (Szpringer and Szpringer 2015) where goods and services are traded without the use of physical cash (Dandapani 2017). A cashless payment eliminates the usage of money as a medium of exchange for goods and services by allowing electronic transfer payments (Tee and Ong 2016) or non-electronic payment via cheques. Adopting cashless payment has numerous advantages. Unlike traditional cash transaction, cashless payments discourage robbery and other cash related crimes (Armeij et al. 2014).

Nowadays, with the growing penetration of the mobile phone (Nemer 2018) the mobile payment is becoming an uncontested mode for paying goods. Almost everyone owns a mobile phone (Mensch 2016) and paying with your smartphone might turn out to be the next natural step in the evolution of payments (Evans 2014).

The main purpose of this article is to analyze, which feature (convenience, speed, availability, ease of use, safety) of mobile payments could be the most important for users from Poland.

2. MOBILE PAYMENT

To properly define mobile payments, we should start the discussion from the electronic payment definition. Hartmann (2006) defines electronic payment (e-payment) as “all payments that are initiated, processed and received electronically”. First electronic payment solutions, e.g., online banking, are strongly inspired by the established account-based bank transfer (Radu and Voicu 2015).

Mobile payment methods may be classified according to the basis of payment. A payment transaction has been identified on the basis of multiple dimensions. A distinction between the different types of payments is made on the basis of location, technology, size and funding mechanism. Mobile payments are typically differentiated by technology, transaction size, location (remote or proximity), and funding mechanism.

On the basis of location payments are classified in two types (Kisiel 2013):

- Remote mobile payments,
- Proximity mobile payments.

On the basis of technology:

- SMS, a mobile browser, or a mobile application,

- Bar codes or a contactless interface to chip-enabled payment technology, such as NFC-enabled mobile phones, contactless stickers, tags.

On the basis of size, the payments are classified into two types:

- Micro payments,
- Macro payments.

The Polish market of mobile payments – own research

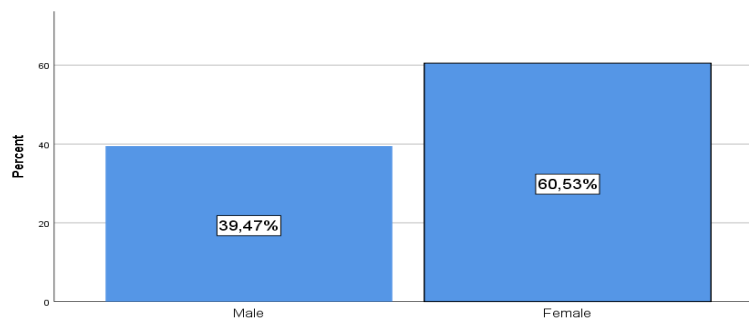
Although the Polish market of mobile payments is in the initial phase of development, it is one of the pioneering and leading in Europe and globally. Poles willingly not only use the Internet on mobile devices, but also, they shop with them more often. It is expected that the number of users of m-payments will continue to grow, which is associated with convenience and ease in making m-payments and popularization of smartphones.

The mobile payment industry in Poland is expected to reach US\$ 26,893.9 million by 2025 (Poland Mobile Wallet 2019).

The empirical data obtained were statistically analysed with the use of cross tables. In order to determine the significance of differentiation between three independent measurement groups, ANOVA univariate analysis test was used (homogeneity of variance was examined by Leven test, used the Bonferroni Post Hoc Test and the Games-Howell Post Hoc Test). The associations between two ordinal variables were analysed with the use of Spearman's rank correlation (r). In all analyses, the level of statistical significance was $p < 0,05$.

The study was conducted among people living in Poland. The study was carried out in the period of February 2018 - September 2018. The number of respondents covered by the study is 1358 respondents. According to the information from the survey (1358 respondents), 60,53% (822 respondents) of the respondents are female, and 39,47% (536 respondents) are male.

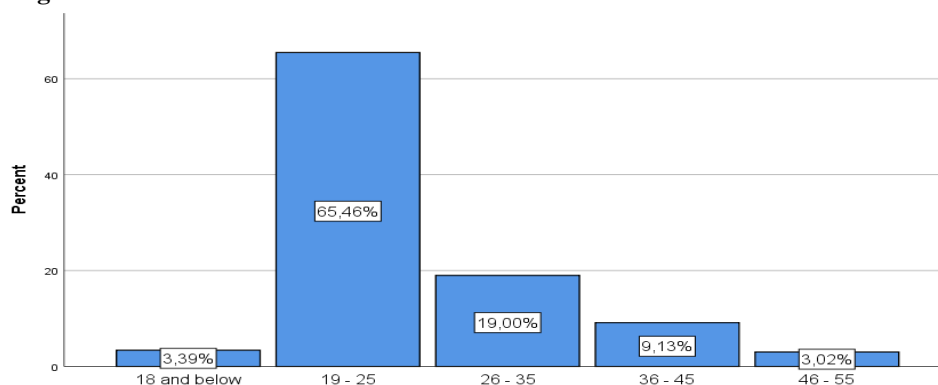
Figure 1. Gender



Source: Own analysis.

In terms of age grouping, 3,39% are 18 years old and below, 65,46% are 19-25 years old, 19% are 26-35 years old, then 9,13% are 36-45 years old, and the remaining 3,02% are 46-55 years old.

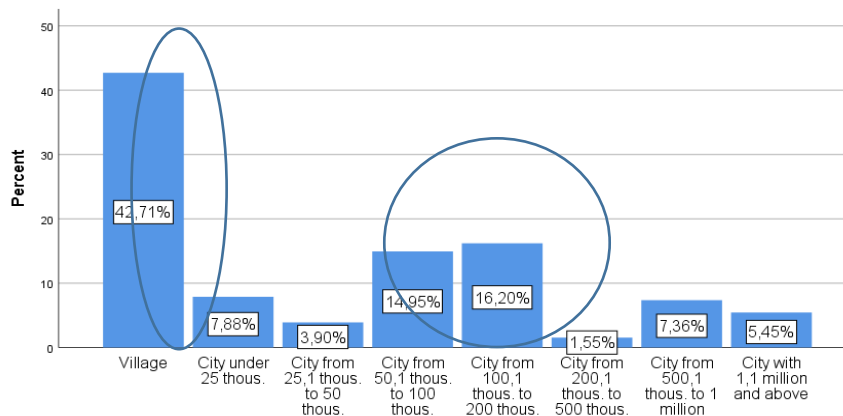
Figure 2. Age



Source: Own analysis.

In terms of place of living, 42,71% of the respondents live in the village, 16,20% live in the city with the number of inhabitants from 200,1 thous. to 500 thous., and 14,95% live in the city from 50,1 thous. to 100 thous. inhabitants. These data demonstrate that the research contains mainly respondents from the village and city with 50-200 thous. inhabitants.

Figure 3. I live in...



Source: Own analysis.

For the type of professional activity, the largest group of respondents, 46,61% are pupils/students. Other larger groups of respondents: 19,81% are employed in public sector and 17,01% are employed in private sector.

Both, male (82,8%) and female (72,7%) respondents, in the vast majority, use mobile payments.

Table 1. Do you use mobile payments? (Male vs. Female) (n=1345).

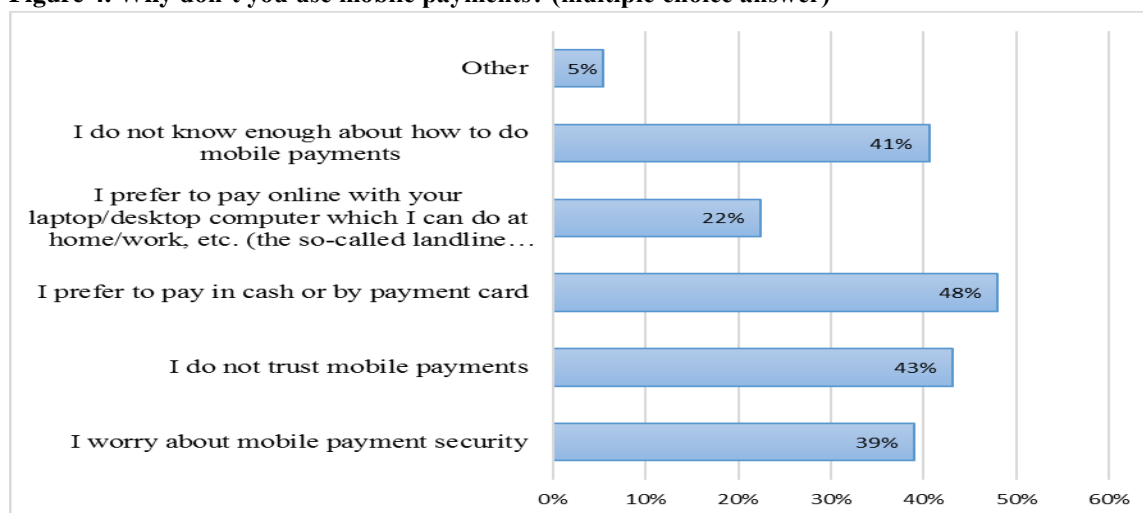
	Male	Female	Total
Yes	443 (82,8%)	589 (72,7%)	1032
No	92 (17,2%)	221 (27,3%)	313
Sum	535 (100%)	810 (100%)	1345

Source: Own analysis.

In the questionnaire, there were questions, addressed to the respondents who do not use mobile payments. The main reasons of not using m-payments are: “I prefer to pay in cash or by payment card” (48%), “I do not trust mobile payments” (43%), “I do not know enough about how to do mobile payments” (41%) and “I worry about mobile payment security” (39%).

It means that, m-payments should be promoted as trusted and secured, if the operators of m-payments are willing to disseminate them as a new form of payment.

Figure 4. Why don't you use mobile payments? (multiple choice answer)



Source: Own analysis.

The table below presents the list of the means of payment features rated.

Table 2. Rate the features of mobile payments

	N	Mean	Std. Deviation
Mobile payments (e.g. Google pay, Apple pay) : Safety	842	3,7684	0,79821
Mobile payments (e.g. Google pay, Apple pay) : Convenience	842	4,1793	0,86408
Mobile payments (e.g. Google pay, Apple pay) : Speed	842	4,2767	0,81347
Mobile payments (e.g. Google pay, Apple pay) : Availability	842	3,8587	0,94446
Mobile payments (e.g. Google pay, Apple pay) : Ease of use	842	3,9656	0,87099

Source: Own analysis.

Focusing on the issue of the features rated (convenience, speed, availability, ease of use, safety) I calculated the relationship between them with the use of Spearman's rho correlation coefficient. For mobile payment, the strongest positive correlation is between convenience and speed ($r = 0,779$; $p = 0,001$; $N = 842$).

Table 3. The correlation between factors of mobile payment function (Spearman's rho correlation coefficient)

		Mpayment Safety	Mpayment Convenience	Mpayment Speed	Mpayment Availability	Mpayment Ease of use
Mpayment Safety	Correlation Coefficient	1,000	,590**	,505**	,477**	,565**
	Sig. (2-tailed)	.	,000	,000	,000	,000
	N	842	842	842	842	842
Mpayment Convenience	Correlation Coefficient	,590**	1,000	,779**	,494**	,627**
	Sig. (2-tailed)	,000	.	,000	,000	,000
	N	842	842	842	842	842
Mpayment Speed	Correlation Coefficient	,505**	,779**	1,000	,500**	,684**
	Sig. (2-tailed)	,000	,000	.	,000	,000
	N	842	842	842	842	842
Mpayment Availability	Correlation Coefficient	,477**	,494**	,500**	1,000	,452**
	Sig. (2-tailed)	,000	,000	,000	.	,000
	N	842	842	842	842	842
Mpayment Ease of use	Correlation Coefficient	,565**	,627**	,684**	,452**	1,000
	Sig. (2-tailed)	,000	,000	,000	,000	.
	N	842	842	842	842	842

** . Correlation is significant at the 0.01 level (2-tailed).

Source: Own analysis

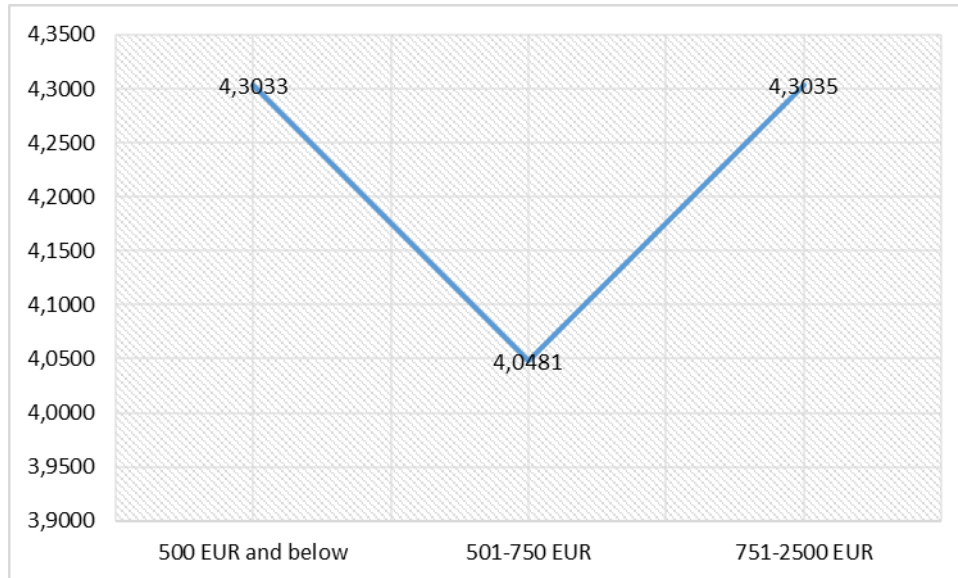
An analysis of variance (ANOVA) revealed that there are differences in the analyzed *monthly income* groups¹ ($F(2, 673) = 6,862$; $p = 0,001$) in the *convenience* feature of mobile payment.

The respondents with monthly income of 501-750 EUR ($M = 4,05$; $SD = 0,77$) rated this feature higher than the respondents with monthly income of 500 EUR and below ($M = 4,30$; $SD = 0,89$) and respondents with monthly income of 751-2500 EUR ($M = 4,30$; $SD = 0,83$).

The Games-Howell Post Hoc Test demonstrated that the differences between the groups were significant ($p < 0,05$), except respondents with monthly income of 500 EUR and below, and monthly income of 751-2500 EUR ($p = 1,000$).

¹ (500 EUR and below, 501-750 EUR and 751-2500 EUR).

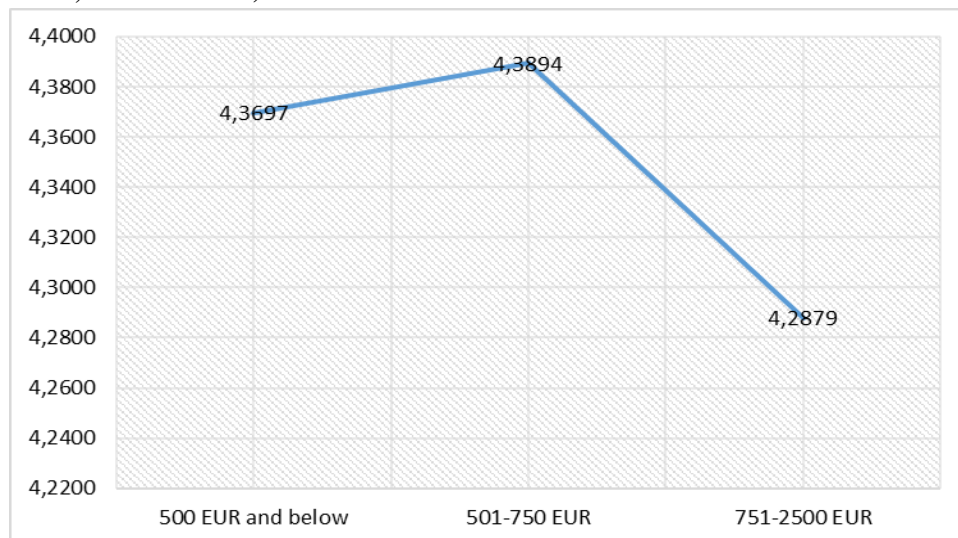
Figure 5. Convenience feature of mobile payment (monthly income: 500 EUR and below, 501-750 EUR, 751-2500 EUR)



Source: Own analysis.

An analysis of variance (ANOVA) revealed that there are no differences in analyzed *monthly income* groups² ($F(2, 673) = 1,030$; $p = 0,357$) in the *speed* feature of mobile payment.

Figure 6. Speed feature of mobile payment (monthly income: 500 EUR and below, 501-750 EUR, 751-2500 EUR)



Source: Own analysis.

3. CONCLUSION

Mobile payments significantly improved consumers' payment experience, and provided a new opportunity to promote the development of online shopping, financial institutions, and third-party payment.

Mobile payment can be the most efficient in integration of logistics, capital flow, and information, and it gradually becomes a mobile value-added service for people in daily life. Additionally, a mobile phone as a device, can support added services such as ticketing, loyalty, scan of QR codes, receipt of seller's information and mobile ordering. Therefore, the mobile payment is still in the golden period of development.

² (500 EUR and below, 501-750 EUR and 751-2500 EUR).

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