PROPENSITY TO USE DIGITAL INNOVATION: CASE OF CONTACTLESS PAYMENTS IN THE CZECH REPUBLIC

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While credit and debit cards have been used since mid-20th century, the first contactless credit card was available only since late 2007. Major supermarket chains in the Czech Republic were equipped for contactless payment since around 2015. Nowadays, also smartphones, smartwatches, and similar wearables facilitate contactless payments. The aim of the research was to analyze the impact of gender, age, education, and wealth on propensity to conduct a contactless payment when the context allows for it. The somewhat surprising finding was that the education level increases contactless payment propensity.

1   Introduction

In recent years, there has been a significant shift towards digital innovation in the financial industry, with contactless payments emerging as one of the prominent trends. The other frontiers for digital innovation in this space include the integration of biometric authentication on mobile phones, perhaps the use of blockchain technology to enhance security and streamline the payment process, among others. (Türkmen & Değerli, 2015) However, as the digital landscape continues to evolve, contactless payments are poised to play an even larger role in shaping the future of finance and commerce. An interesting question remains - how the propensity to adopt digital innovation reflects on the velocity and comprehensiveness of innovation spread within the financial sector.

Propensity to use digital innovations

Muhammet Demirbilek (2014) in his article 'Digital Natives' Debate: An Investigation of the Digital Propensities of University Students assess the digital inclinations of 409 post-secondary Turkish students. He investigates whether gender, chosen academic program, socioeconomic status, type of education, the number of family members, and the quantity of computers per household exert influence on the utilization of Information and Communication Technologies (ICT). He comes to conclusion, that male students exhibit a higher propensity for using Information and Communication Technologies in comparison to their female counterparts. Furthermore, the results indicate that factors such as the attended faculty, type of education program, family income, the quantity of computers available, and the number of children in the household are significant contributors to a higher digital propensity index.

Liviu et al. (2021) also studied academics and their propensity towards utilization of digital resources in the post-pandemic era. They identified that this unique transformation gave rise to a situation of "compelled innovation," characterized by a thorough reconsideration and reconstruction of educational approaches. Their findings indicate that university members exhibit a moderate level of digital propensity, displaying a genuine interest in and taking initiatives to embrace. This study can serve as an initial step in the development of a digital propensity index that can be applied within the academic domain.

Cetindamar et al. (2021) looks into propensity to use digital innovation, particularly whether digital technologies play a significant role in business transformation. They develop Theory of Planned Behavior (TPB) to analyze empirical data of Australian employees regarding their intentions and behaviors related to technology usage, finding a positive correlation between employees' digital literacy and the adoption of cloud technology within companies. Additionally, it extends the TPB framework by introducing digital literacy as a perceived behavior control factor that sheds light on employees' roles in digital transformation.

Contactless payments

Contactless payments have revolutionized the way people make transactions, offering a convenient and secure alternative to traditional payment methods. (Camara, 2021) With the widespread adoption of mobile devices and the development of digital wallets, consumers now have the ability to make purchases with a simple tap or wave of their smartphone or contactless card.

Furthermore, the COVID-19 pandemic has accelerated the adoption of contactless payments (CVV, 2020), as it offers a hygienic way to pay without physical contact. Merchants and businesses are also adapting to this trend by embracing contactless payment terminals to provide a safer and more seamless experience for their customers.

While contactless payments have certainly gained popularity and offer convenience, there are some valid concerns and opposing arguments about their widespread adoption (Cyber Security Intelligence, 2020) (Security Risks of Contactless Payments - Security Intelligence, 2018). One of the primary concerns is the potential for increased vulnerability to fraud and security breaches. With the reliance on digital technology and wireless communication, there is an inherent risk of unauthorized access and fraudulent activities. (Traynor et al., 2017).

Additionally, there are concerns about the exclusion of individuals who may not have access to the necessary technology or prefer to use traditional payment methods (Johnson et al., 2018). As contactless payments become more prevalent, there is a risk of marginalizing a portion of the population who are not equipped to participate in this digital financial ecosystem (Akana & Ke, 2020).

Furthermore, the convenience of contactless payments may lead to overspending and a lack of conscious decision-making when it comes to financial transactions. The ease of tapping a card or waving a smartphone to make a purchase could potentially contribute to impulsive spending behaviors and a disconnect from the tangible aspect of money (Yang et al., 2015).

As we consider the broader implications of contactless payments, it's important to address these concerns and strike a balance between embracing technological advancements and ensuring inclusivity and security for all members of society.

An extensive study conducted by Mastercard (MasterCard, 2020) https://www.mastercard.com/news/press/press-releases/2020/april/mastercard-study-shows-consumers-globally-make-the-move-to-contactless-payments-for-everyday-purchases-seeking-touch-free-payment-experiences/ examines the evolving consumer behaviors across 19 countries worldwide, shedding light on the widespread adoption of contactless payments for everyday purchases. In a 2020 survey involving 17,000 participants, a significant 79 percent of respondents reported their use of contactless payments, primarily motivated by safety and hygiene concerns. The research highlights a notable shift in consumer preferences, with 46 percent globally and 52 percent among those under 35 years old, replacing their traditional wallet cards with contactless options.

One striking finding is the growing confidence in contactless payments, driven by the global disruptions of 2020. An overwhelming 82 percent of respondents perceive contactless payments as a cleaner and more secure way to transact, contributing to its increasing popularity. Furthermore, contactless payments are reported to be up to 10 times faster than other in-person payment methods, offering added convenience for customers and reducing in-store transaction times.

Mastercard's data analysis revealed a remarkable 40 percent growth in contactless transactions worldwide during the first quarter of 2020. Surprisingly, 80 percent of these contactless transactions involve amounts under $25, traditionally dominated by cash payments.

This Mastercard's comprehensive study was conducted through online interviews with 17,000 consumers across the globe, unfortunately not covering the Czech Republic. This is why we decided to fill this gap by conducting similar research in Prague.

In our paper, we will explore propensity to make contactless payments according to the various aspects and characteristics, such as gender, age or education level in the Czech Republic.

2   Methodology

The survey was conducted using an anonymous online questionnaire. There was no monetary incentive for respondents. There were 146 respondents (of whom seven reported a non-binary gender or decided not to answer; and will be treated as missing values in the full model but will be included in the streamlined model). Age data were collected as intervals, and the middle value of the interval will be used for the analysis. Education was divided into primary school, high school, university, and PhD education (coded as 1, 2, 3, and 4 respectively). In order to avoid non-response in estimating income and/or wealth, a percentage of income one saves was used; it was measured in intervals, and the middle value of the interval will be used for the analysis (eventually, eight decided not to answer). Propensity to make a contactless payment when possible was measured on a 1-5 Likert scale where 5 meant high propensity. A linear regression will be used for the analysis of the impact of gender, age, education, and savings on propensity to make contactless payments. A variance inflation factor (VIF) will be used as a measure of the amount of multicollinearity in the linear regression analysis.

3   Results

Propensity to make contactless payments according to the selected independent variables is provided in the following Tables 1-4.

Table 1: Propensity to make contactless payments according to gender

	Average	Standard Deviation
Male	4.0661	1.32750
Female	4.3889	0.84984

Source: own calculation

Table 2: Propensity to make contactless payments according to age

	Average	Standard Deviation
18-24	4.0172	1.31778
25-39	4.2609	1.19622
40-54	3.6923	1.49358
55-76	3.6667	1.15470
77+	2.0000	0.00000

Source: own calculation

Table 3: Propensity to make contactless payments according to education

	Average	Standard Deviation
Primary	3.0000	1.65831
High school	3.9571	1.37720
University	4.3607	1.01707
PhD	4.5000	1.00000

Source: own calculation

Table 4: Propensity to make contactless payments according to savings

	Average	Standard Deviation
0%	3.2857	1.70434
1-10%	4.1364	1.08213
11-21%	4.3478	1.11227
21-30%	3.8889	1.42325
31-50%	4.5161	1.09151
51-75%	4.2105	1.18223
76%+	3.2222	1.56347

Source: own calculation

The linear regression model with propensity to make contactless payments as a dependent variable and aforementioned four independent variables is provided in Table 5. VIF was lower than 1.1, therefore, collinearity is not a problem.

Table 5: Full linear regression model

	B	Std. Error	Beta	t	Sig.
Constant	3.421	0.545		6.278	0.000
Gender	-0.272	0.325	-0.072	-0.838	0.404
Age	-0.007	0.012	-0.051	-0.573	0.568
Education	0.520	0.170	0.268	3.049	0.003
Savings	-0.003	0.005	-0.056	-0.653	0.515

Source: own calculation

With regards to the explanatory power of the full model, the coefficient of determination is 0.073 and the adjusted coefficient of determination is 0.044, and its significance is 0.044. Logarithm of age instead of age per se was tested as well, significance worsened from 0.568 to 0.734.

The linear regression model with propensity to make contactless payments as a dependent variable and education as an independent variable is provided in Table 6.

Table 6: Streamlined linear regression model

	B	Std. Error	Beta	t	Sig.
Constant	2.895	0.399		7.254	0.000
Education	0.492	0.159	0.251	3.084	0.002

Source: own calculation

With regards to the explanatory power of the streamlined model, the coefficient of determination is 0.063 and the adjusted coefficient of determination is 0.056, and its significance is 0.002. If the coding of education was changed from 1, 2, 3, 4 to 1, 2.9142, 3.7214, 4 (i.e. the optimal coding), then the coefficient of determination would be 0.073 and the adjusted coefficient of determination would be 0.066, and its significance would be 0.001.

Although education was an ordinal variable, it was the only one from the tested independent variables which explained propensity to make contactless payments.

4   Conclusion

The aim of the study was to identify what influences propensity to make contactless payments. Adoption literature suggests that early adopters of a new technology are typically younger people, and men. Our respondents varied in age, but age was not found to be a significant explanatory variable, neither was gender. This could be because contactless payments are not so new anymore, and it is also a widely spread technology. Self-help financial advisors push an idea stemming from mental accounting that it is better to pay cash to have a better understanding of one's own spending habits. In the sample at hand, respondents who are not able to save anything and respondents who can save over three quarters of their income both reported similar propensities to make contactless payments that are lower than propensities of respondents in between the two ends of the scale. This phenomenon should be studied in a more focused future research. The analysis identified a significant relationship between achieved education and propensity to make contactless payments, the higher the education the high the propensity. Further research should aim to explain the mechanism behind this relationship.

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