
Consumer's Behaviour Regarding Cashless Payments during the Covid-19 Pandemic

Submitted 24/04/21, 1st revision 11/05/21, 2nd revision 25/05/21, accepted 15/06/21

Monika Kulisz¹, Agnieszka Bojanowska², Katarzyna Toborek³

Abstract:

Purpose: The objective of the paper was to define the current attitudes of Poles vs. cashless transactions and their perception of the related risk of Covid-19 infection.

Design/Methodology/Approach: The research method involved a survey, and the research tool was a survey questionnaire distributed by a research agency. The target-amount selection procedure was applied and the sample structure corresponds to the structure of the Polish population with respect to the studied features. The survey sample included 1000 respondents.

Findings: The studied population (of Polish consumers) were less willing to pay with cash during the pandemic than beforehand. This is related with avoiding contact with cash, as well as easy documentation of transactions, increasing their transparency. During the pandemic Polish consumers were more willing to shop at Polish online shops or retail services (e.g. Allegro) than foreign ones (e.g., AliExpress). However, the study shows that Polish customers are more cautious in their shopping decisions during the pandemic, being afraid to lose financial liquidity.

Practical Implications: The pandemic led to landslide changes in consumer behaviours and habits. Identification of the current shape of Polish customers' attitudes to cashless transactions and their perception of the associated risk of Covid-19 infection is important for all market entities related directly or indirectly to such transactions. Nowadays, it is difficult to even think of a business with no such needs.

Originality/Value: The study presented in the paper is original because there was no research on cashless payments in relation to shopping risk. The article displays an original approach to the subject. The 2020 pandemic itself allows for observation of customers in a completely new situation and development of an entirely new area of consumer behaviour research.

Keywords: Cashless payments, consumer behaviours, pandemic, Covid-19.

JEL codes: A12, A13, B55, E42, J33.

Paper type: Research article.

¹Department of Organisation of Enterprise, Faculty of Management, Lublin University of Technology, Poland, m.kulisz@pollub.pl

²Department of Marketing, Faculty of Management, Lublin University of Technology, Poland, a.bojanowska@pollub.pl

³Faculty of Management, Lublin University of Technology, 20618 Lublin, Poland, katarzynatoborek@gmail.com

1. Introduction

The new situation of the Covid-19 pandemic forced many customers to change their prior shopping habits. It also triggered a verification of the perceived risk at shopping decisions. Due to the pandemic, many stationary outlets were closed, at least for a short time. In many cases, especially with intensified morbidity rates, customers would avoid traditional shopping. A prominent increase trend has been observed in online shopping in 2020/2021 (Raport „E-commerce w Polsce 2020”: co Polacy kupują w Internecie? 2020). Since 2017, e-commerce revenues have risen from an estimated \$1.4 trillion to \$2.4 trillion, or about 2.7% of global output. Recent estimates are that 3.5 billion individuals globally (about 47% of the population) use e-commerce platforms nowadays.

China is the largest market, followed by the United States, Japan, the United Kingdom and Germany. The pandemic has accelerated this shift. The restrictions on mobility imposed to fight the spread of the virus led to a surge in online demand for many goods and services (Alfonso, Boar, First, Gambacorta, and Liu, 2021). The coronavirus affected the whole e-commerce globally; it has changed the nature of business. According to a study, 52% of consumers avoided brick and mortar shops and crowded areas. Furthermore, 36% wanted to avoid brick and mortar shops until they get coronavirus vaccine (Bhatti *et al.*, 2020).

Electronic commerce has been developing as never before and a dynamic development of cashless payments followed. There are many reasons of their importance to business. They include development of the card payment system which has enabled reduction of money issue and circulation and thereby led to significant economic gains (Goczek and Witkowski, 2015).

Development of the cashless payments market is due not only to the large quantity of online payments, but also to several factors which encourage customers to pay with cards, NFC technology or Blik payment even at “on-site” payments. A study by Comp (a company operating the M/platform service which supports management of small trade outlets) showed that the share of cashless payments at smaller shops significantly increased after the beginning of the pandemic (Sikorski, 2020).

During the COVID-19 epidemic, people who are infected with the virus can transmit it onto banknotes or coins through touch and droplets, potentially making any physical currency a carrier of the virus. Although there is no report confirming that people can acquire virus infection by cash, relevant research on the survival of viruses on solid surfaces supports this hypothesis (Ren and Tang, 2020). It appears important to determine the current attitudes of Poles vs. cashless transactions and their perception of the related risk of Covid-19 infection. To verify these issues, a survey of a sample of 1000 Polish consumers was held and it is presented in this paper.

2. State of the Art

Achievement of the relevant level of development of the cashless transactions system allows reduction of costs of issuing and circulation, i.e., it enables decrease in costs related to delivery and storage of cash by all entities within the economy (Goczek and Witkowski, 2015). Of course, cashless transactions also an impact on transparency. Governments are taking effort to reduce the use of cash in the economy by promoting digital/payment devices including prepaid instruments and cards (Ramya, Sivasakthi, and Nandhini, 2017). A cashless transaction is defined as a financial settlement in which at all stages of the settlement cycle, money is transferred from and to bank accounts (or banks' own accounts). This means that both for the payer and the beneficiary, as well as in settlements between banks, the settlement is done exclusively in the form of entries at bank accounts of the entities involved (excluding payment by an electronic money instrument, where money is transferred from the electronic money instrument to the accepting device) (Narodowy Bank Polski, Związek Banków Polskich, Koalicja na Rzecz Obrotu Bezgotówkowego i Mikropłatności. Strategia rozwoju obrotu bezgotówkowego w Polsce na lata 2009–2013 (projekt), 2015).

There are various models of cashless transactions. Poles have access to a broad range of those: credit cards, debit cards, prepaid card, charge cards, e-wallet, transfer orders, standing orders, clearance cheques, electronic transfers, direct economic encumbrance (only for businesses), mobile payments. Some of them, like e-wallet, may be used online only, while others - for example some cards, are dedicated to offline payments.

Supply of cash and cashless money, and the scale of use of both types of legal tenders depend on many factors. They include legal factors, financial interests of participants of the payment system, overall competencies, attitudes, values, and interaction habits (Żukowska and Żukowski, 2013). Among customer-dependent factors which hamper cashless transactions in Poland, researchers identify:

- big economic and psychological costs of owning an account paired with little advantage;
- too low income;
- fear of new technologies and organisational solutions;
- lack of trust in financial institutions, especially banks and suspicions of infiltration risk by the financial system;
- cash cult and sense of freedom and security associated with using it.

Study results indicate also barriers that hamper people who already own bank accounts from cashless transactions. These are, above all:

- concern that they won't be able to control expenditure once they start using cashless instruments;

- worries related to using cashless instruments,
- concern about missing skills, system break-down, mistrust toward people servicing the transactions and risk of virtual theft;
- lack of knowledge and negative stereotypes concerning cashless payments (Maison, 2010).

The authors of the paper assumed that this catalogue of factors has evolved, so they decided to verify the following research hypothesis *H1: During the pandemic customers are more willing to pay without cash than beforehand. To verify this hypothesis correctly, the following specific hypotheses were developed.*

H1a: During the pandemic customers are more willing to pay without cash than beforehand because they can avoid physical contact with cash. This comfort is associated with avoiding the need touch cash, as the virus may be transmitted on it. The currently available in vitro data suggest that human-to-human transmission of COVID-19 via cash and coins seems possible. SARS-CoV-2 has been shown to be more stable on smooth surfaces, and a detectable level of infectious virus has been recovered from banknotes and stainless steel (coins) even after 2 and 4 days of inoculation, respectively. In addition, a biphasic decay of infectious SARS-CoV-2 has been found in samples recovered from smooth surfaces, thereby further prolonging the duration of stay of the virus (Chin *et al.*, 2020). Banknotes and coins should be considered as potential sources of transmission of the novel SARS-CoV-2 (Pal and Bhadada, 2020).

H1b: Documentation of cashless transactions contributes to consumers' willingness to use this method of payment. There is always electronic evidence to document a concluded cashless transaction. To justify a withdrawal of paper money, governments argue that a fully digitalised system would eradicate tax evasion and money laundering, reduce transaction costs and enable financial authorities to stimulate economic growth. A cashless system would enable governments to track and record every transaction, leaving no loopholes for fraudsters to exploit. Moreover, central banks would be able to impose any desired monetary policy – including negative rates – as consumers would have no way to retrieve their cash from the banking system (Sivabalan, 2017).

The authors developed a hypothesis concerning sources of acquisition of goods for customers. *H2: During the pandemic Polish consumers are more willing to shop at Polish online shops or retail services (e.g. Allegro) than foreign ones (e.g., AliExpress).*

Undoubtedly, these are methods of shopping associated mainly with cashless payments. This hypothesis is interesting as observation and other reference studies suggest occurrence of this trend. One may cite research held by Google, indicated a prominent growth trend in this area (Totolo and Baijal, 2020). The shift to online shopping boosted both revenues and costs of online marketplaces. Revenues rose in

the first half of 2020 for Amazon (34% year on year), Alibaba (27%), JD (28%), Shopify (74%), Rakuten (16%) and Mercado Libre (50%) (Alfonso *et al.*, 2021).

Study preparation for this paper included development of hypothesis *H3: During the pandemic customers are more cautious in their shopping decisions, being afraid to lose financial liquidity.*

During the Covid-19 pandemic-induced crisis virtually all entities worry about their financial condition. Such worries were expressed by entrepreneurs (Szczepański, 2020) and individuals. Everybody is considering saving in order to maintain financial liquidity during the pandemic, and to protect oneself in future.

In contrary to the first hypothesis, the authors also developed hypothesis *H4: Clients have also been distrustful of cashless transactions, regardless of the epidemiological situation. Seemingly, there is good reason to believe, as the Better Business Bureau claims, that trust should be a major issue in e-commerce.*

Trust, in general, is an important factor in many social and economic interactions involving uncertainty and dependency (Gefen, 2000). Customers' trust in cashless transactions should be constantly stimulated by e-commerce, as well as brick-and-mortar shops. However, it is not an easy task. Although some sources suggest a growth tendency with respect to trust in such transactions (Yang *et al.*, 2021), a lot remains to be done. Due to historic memories, Poles do not entirely trust online payments. They prefer paying cash on delivery, thus paying only when they have received the product. It can be observed, however, that the pandemic has changed these habits more significantly than marketing campaigns to promote card payments (Przybylski, 2020). It is worth noting that 2020 brought an especially dynamic increase of the quantity of circulating cash, as its nominal value grew by almost 37% as compared to the previous year. This resulted from the run on cash machines observed in Poland in spring, during the first lockdown (in October and November, too, but to a lesser degree) (W Polsce przybyło ponad ćwierć biliona złotych, 2021). It is important to verify how this translates into Poles' declared attitudes to cashless payments.

3. Material and Methods

The study was held in December 2020 among 1000 Polish consumers. The chosen research method was a questionnaire survey with the research tool of a questionnaire. This method enables verification whether the studied phenomenon is present and identification of its intensity. It is applied for studying attitudes, motives for respondents' actions, as well as their knowledge of the studied phenomenon or process (Krajewski, 2006). In a pilot study, the authors distributed the questionnaire among 10 experts in marketing research in order to verify correctness of the questionnaire. In the study itself, the questionnaire was distributed by a research agency.

The study broadly the subject of shopping risks perceived by consumers when shopping during the pandemic. The present paper concerns the part of the survey related to cashless payments. Analysing survey questions listed in table 1 allowed the research hypotheses. Each question applied a five-item Likert scale with 1 meaning “I totally disagree” to 5 meaning “I totally agree”. Reliability of the survey questions and scales was assessed in a pilot interview.

The construction of a Likert scale is broadly described in psychological, sociological and marketing research scientific literature. The scale contains a range of equivalent scores which measure the studied, single-dimension hidden feature. The scores are parallel and they are reflexive indicators of the studied hidden feature. The Likert-type scale is also used to capture qualitative data that is difficult to measure or concern a sensitive topic to which a respondent would likely not respond, or would respond falsely if asked directly (Chimi and Russell, 2006). The scale was inspired by a wide range of research works (Sagan, 2002; Yadav and Rahman, 2017).

Table 1. Questions used for verification of the hypotheses

Questions	Range of answers
1. What is your attitude to the below statements	1.01. During the pandemic I am more willing to pay without cash than beforehand.
	1.02. During the pandemic I am more willing to shop at Polish online shops or retail services (e.g. Allegro) than foreign ones (e.g. AliExpress).
	1.03. During the pandemic I am more cautious in my shopping decisions, because I am worried to lose financial liquidity.
	1.04. I have always been distrustful of cashless transactions, regardless of the epidemiological situation.
2. I find cashless transactions safer than using cash, because:	2.01. I don't need to touch money
	2.02. I don't need to have the exact amount of cash
	2.03. I don't have to withdraw cash from the bank
	2.04. I don't need to use a cash machine
	2.05. There is an electronic “trace” of the transaction

Source: Original research.

Statistical analysis was computed in Statistica TIBCO 13.3 software. For all analyses, significance was defined at $p = 0.05$. At first, the research tool's reliability and question coherence were verified with Cronbach's alpha coefficient. Then, ancillary questions were aggregated (question 1.04 was reversed to maintain the same direction - this was indicated by the question's context, as well as the negative correlation with other questions). Spearman's correlation coefficient was calculated for thus processed data. Cronbach's alpha coefficient for question no. 1 was 0.48 (thus, the coefficient's value was low). This means that answers to the question to not provide entirely satisfying answer to the developed question. Question no. 2 is coherent, its reliability high and Cronbach's alpha coefficient = 0.87. Spearman's correlation coefficient was 0.54 ($p \ll 0.0001$), indicating that there is a significant correlation between these questions and this correlation is moderate.

According to the applied research assumptions, the sample included people over 18 years of age, who take purchasing decisions on the consumer market (Table 2). They survey was answered by 1000 respondents - 501 women and 499 men. The sample was divided into six age classes. 706 respondents were professionally active, and 294 were not working.

Table 2. Characteristics of the sample

Characteristics of the sample						
Age						
	18–24	25–34	35–44	45–54	55–64	65<
Sample size	127	241	258	168	135	71
Education						
	primary		secondary		tertiary	
Sample size	115		482		403	
Financial situation						
	satisfactory		average		unsatisfactory	
Sample size	163		796		41	
Place of residence						
	Countryside	Town up to 50,000 inhabitants	Town of 50-200,000 inhabitants	Town of 200,000 inhabitants or more		
Sample size	202	233	287	278		

Source: Original research.

4. Results

Based on the survey, in order to verify the hypotheses, frequencies of responses to question 1 were analysed first. The results are shown in Table 3.

Table 3. Results of survey question no. 1

Question	Item									
	5		4		3		2		1	
1.01	396	39.60%	173	17.30%	233	23.30%	91	9.10%	107	10.70%
1.02	332	33.20%	204	20.40%	249	24.90%	105	10.50%	110	11.00%
1.03	256	25.60%	250	25.00%	308	30.80%	108	10.80%	78	7.80%
1.04	80	8.00%	120	12.00%	253	25.30%	190	19.00%	357	35.70%

Source: Original research.

Table 3 allows for verification of the main hypotheses discussed in the paper. The analysis of responses to question 1.01 allows conclusion that during the pandemic customers are more willing to pay without cash that they were beforehand, as the number of respondents agreeing with this statement is more than twice as high as the number of those who disagree with it - thus initially confirming hypothesis H1. The distribution of answers to questions 1.02 and 1.03 was analogical. Therefore, it may be concluded that hypothesis H2 that during the pandemic customers are more willing to shop at Polish online shops or retail services (e.g., Allegro) than at foreign ones (e.g., AliExpress) was positively verified.

The conclusion for hypothesis H3 is the same, during the pandemic customers are more cautious in their shopping decisions, being afraid to lose financial liquidity. The results were different in the case of hypothesis H4 that clients have always been distrustful of cashless transactions, regardless of the epidemiological situation, which should be rejected. In this case the number of respondents who disagreed with the statement was more than twice as high than the number of those in agreement. As hypothesis H4 was a counterweight to hypothesis H1, its rejection may be considered as an additional confirmation of hypothesis H1.

Verification of specific hypotheses H1a and H1b required observation of correlations between questions in block 2. Factor analysis was performed. A factor analysis results in a division of variables into the lowest possible number of factors which do not correlate with each other. Firstly, the correlation table was analysed to observe correlations between variables in question 2, and the variables were preliminarily divided into factors (Table 4).

Table 4. Correlation table for question no. 2

Variable	2.01.	2.02.	2.03.	2.04.	2.05.
2.01. I don't need to touch money	1	0.63	0.64	0.62	0.35
2.02. I don't need to have the exact amount of cash	0.63	1	0.76	0.73	0.35
2.03. I don't have to withdraw cash from the bank	0.64	0.76	1	0.84	0.4
2.04. I don't need to use a cash machine	0.62	0.73	0.84	1	0.41
2.05. There is an electronic "trace" of the transaction	0.35	0.35	0.4	0.41	1

Source: Original research.

Table 4 suggests dividing the variables into two factors, as confirmed by factor analysis (the first factor including questions 2.01-2.04 and the second one including question 2.05). The table below presents the division of questions within the survey question 2 by factor loadings (Varimax rotation method). The eigenvalues of both factors explain 82% of the variance.

Table 5. Two-factor division displaying factor loading (in Varimax rotation) for each variable

Variable	Factor	Factor
	1	2
2.01. I don't need to touch money	0.7881	0.1803
2.02. I don't need to have the exact amount of cash	0.8772	0.1505
2.03. I don't have to withdraw cash from the bank	0.8986	0.2145
2.04. I don't need to use a cash machine	0.8741	0.2412
2.05. There is an electronic "trace" of the transaction	0.2191	0.9750

Source: Original research.

Concluding, the applied factor analysis led to division of the variables into two main factors:

- Factor 1: No physical contact with cash (answers: I don't need to touch money; I don't need to have the exact amount of cash; I don't have to withdraw cash from the bank; I don't need to use a cash machine).
- Factor 2: Documentation of cashless transactions (answer: There is an electronic "trace" of the transaction).

An ordinal logistic model was developed to assess the impact of the two factors identified within the factor analysis of question 1.01. The model, a generalisation of a linear model, is an expanded logistic regression model with a variable of more than two ordinal levels (in this case, level 1 to 5 of the Likert scale). A proportional odds model was applied. The independent variables of the model were: Factor 1 and Factor 2. A log-rank I test was applied, and its results showed that both factors significantly the model based on the intercept only. The adjusted χ^2 coefficient was 1.18, which may suggest high data spread. Taking the spread estimation into account, parameters were assessed. The results of Wald test were significant for both factors in all models.

Based on the visual assessment of the Pearson's residuals analysis, case no. 985 was removed from the set (as the logistic regression model is susceptible to outliers. In conclusion, a well fit model was obtained. Table 6 presents the coefficient assessment, individual odds ratio, standard errors, Wald statistics values and calculated 95% confidence intervals for each variable within the model.

Table 6. Results of the ordinal logistic regression

Model	Assessment	OR	Standard	Wald	upper CI	bottom CI	p
factor1	0.257	1.29	0.018	204.02	0.222	0.292	0.0000
factor2	0.114	1.12	0.0567	4.08	0.003	0.225	0.0434

Source: Original research.

Positive assessments of both parameters (factor 1 and factor 2) show that these factors significantly increase willingness to use cashless payments. Individual odds ratio for factor 1, OR = 1.3 (increase by 30%) means that the probability of willingness to pay without cash increases 1.3 times as factor 1 increases. Thus, it can be concluded that during the pandemic customers are more willing to pay without cash than beforehand because they can avoid physical contact with cash, confirming hypothesis H1a.

Further, the individual odds ratio for factor 2, OR = 1.12 means that the probability of willingness to pay without cash increases 1.12 times as factor 2 increases (by one Likert scale item). This means that *documentation of cashless transactions* contributes to *consumers' willingness to use this method of payment*, providing positive verification of hypothesis H1b.

5. Discussion and Conclusion

The results discussed in section 4 confirm that the studied population (of Polish consumers) were more willing to pay without cash during the pandemic than beforehand. Further, these conclusions correspond to observations made around the world, in Thailand (Yakean, 2020), USA (Dickler, 2021) and Europe (Alderman, 2020; Auer, 2020). One of the reasons of this attitude, from the customers' point of view, is no physical contact with cash, as confirmed by the ordinal logistic regression models. Central banks recorded an increase in the number of enquiries concerning safety of using cash. Further, in Internet searches such entries as 'cash' and 'virus'/'COVID' were frequently observed (Pal and Bhadada, 2020).

Another cause of the customers' better attitude toward cashless payments involves (according to the model presented in the research section) documentation of cashless transactions. Such a transaction always leaves an electronic trace. These findings are consistent with the current knowledge of this subject, as economists argue that this is a way to prevent various offences, and to reduce transaction costs, too (Sivabalan, 2017; Yakean, 2020).

In further exploration of the subject of cashless payments, the research results led to rejection of hypothesis H4 stating: "Clients have also been distrustful of cashless transactions, regardless of the epidemiological situation". Therefore, it can be concluded that the pandemic has affected customers' attitude toward cashless transactions. Based on historic data, it might be concluded that Poles are not entirely trustful with respect to online payments, as they prefer to pay in cash on delivery, when they have already received the goods (Przybylski, 2020). The current situation with the Covid-19 pandemic has changed these habits in favour of more frequent cashless payments.

A possibility to pay without cash, as well as the pandemic situation, led to an increase in online trade. Significant growth in this area has been observed in most regions worldwide from the United States to Africa and the Middle East, and this trend has affected a change in customers' behaviour, as well as business operations (online sale has become a necessity, not an extra option for brick-and-mortar shops) (Totolo and Bajjal, 2020). With e-trade market giants such as Alibaba, Amazon or JD use automated technologies to ensure safe "contactless" delivery to the customer (Alfonso *et al.*, 2021).

However, the presented study showed that during the pandemic Polish customers are more willing to shop at Polish online shops or retail services (e.g., Allegro) than at foreign ones (e.g., AliExpress), which may be due to the fact that in the difficult time of the Covid-19 pandemic, consumers want to support the national economy in solidarity with their countrymen.

The time of Covid-19 is difficult for everyone, causing both consumers and entrepreneurs to worry about their financial liquidity (Szczepański, 2020). The prepared analysis allows conclusion that Polish customers are more cautious in their shopping decisions during the pandemic, because they are afraid to lose financial liquidity, which corresponds to the quoted published research, as well as the Report of 2020 (Pandemia wciąż silnie wpływa na zachowania zakupowe Polaków [RAPORT], 2020). Even 52% of Poles are worried about the risk of losing their jobs. A similar level is observed among Spaniards (55%). The concern about their professional life is much less among Italians (37%) and Germans (26%).

Concluding, the main objective of the paper was to define the current attitudes of Poles vs. cashless transactions and their perception of the related risk of Covid-19 infection. In the context of the pandemic, Polish customers are more willing to pay without cash than beforehand. They choose Polish online shops or retail services over foreign ones. Further, they are worried about their financial liquidity. The knowledge acquired within this study can be applied by virtually all market entities concerned in cashless payments and e-trade, which analyse their clients' needs and habits. For years, the Polish government has taken effort to increase the volume of cashless transactions.

In January 2018, the Cashless Poland Programme was launched, funding devices and payment transactions both for the public and commercial sector. Within the first two years of its implementation, the programme funded installation of more than 250,000 payment terminals (Jednostki KAS objęte Programem Polska Bezgotówkowa, 2020). Thus, the research presented in this paper corresponds to policies of the Polish government and it may be useful for many market entities.

References:

- Alderman, L. 2020. Our Cash-Free Future Is Getting Closer. Available at: <https://www.nytimes.com/2020/07/06/business/cashless-transactions.html>.
- Alfonso, V., Boar, C., Frost, J., Gambacorta, L., Liu, J. 2021. E-commerce in the pandemic and beyond. *BIS Bulletin*, 36, 1-7.
- Auer, R., Cornelli, G., Frost, J. 2020. Covid-19, cash, and the future of payments 2020. *BIS Bulletin*, 3. Bank for International Settlements.
- Bhatti, A., Akram, H., Basit, H.M., Khan, A.U., Naqvi, S.M.R., Bilal, M. 2020. E-commerce trends during COVID-19 Pandemic. *International Journal of Future Generation Communication and Networking*, 13(2), 1449-1452.
- Chimi, C.J., Russell, D.L. 2009. The Likert Scale: A Proposal for Improvement Using Quasi-Continuous Variables. *Proc ISECON*, 26, 4333.
- Chin, A.W.H., Chu, J.T.S., Perera, M.R.A., Hui, K.P.Y., Yen, H.L., Chan, M.C.W., Peiris, M., Poon, L.L.M. 2020. Stability of SARS-CoV-2 in different environmental conditions. *The Lancet Microbe*, 1(1), e10. [https://doi.org/10.1016/S2666-5247\(20\)30003-3](https://doi.org/10.1016/S2666-5247(20)30003-3).
- Dickler, J. 2021. Another consequence of Covid: a world without cash. Available at: <https://www.cnbc.com/2021/01/29/consumers-abandon-cash-altogether-because-of-covid.html>.

- Gefen, D. 2000. E-commerce: the role of familiarity and trust. *Omega*, 28(6), 725-737.
[https://doi.org/10.1016/S0305-0483\(00\)00021-9](https://doi.org/10.1016/S0305-0483(00)00021-9).
- Goczek, Ł., Witkowski, B. 2015. Determinants of non-cash payments. NBP Working Paper No. 196. Warsaw: Economic Institute.
- Jednostki KAS objęte Programem Polska Bezgotówkowa. 2020. Available at:
<https://www.gov.pl/web/kas/jednostki-kas-objete-programem-polska-bezgotowkowa>.
- Krajewski, M. 2006. Badania Pedagogiczne. Szkoła Wyższa im. Pawła Włodkowica w Płocku.
- Maison, D. 2010. Analiza barier dotyczących korzystania z obrotu bezgotówkowego oraz wskazanie działań ograniczających te bariery. Badanie jakościowe. Raport przygotowany dla NBP. Available at:
<https://www.nbp.pl/badania/seminaria/4i2011.pdf>.
- Narodowy Bank Polski, Związek Banków Polskich, Koalicja na Rzecz Obrotu Bezgotówkowego i Mikropłatności. Strategia rozwoju obrotu bezgotówkowego w Polsce na lata 2009–2013 (projekt). 2015. Available at:
https://www.zbp.pl/photo/koalicja/Strategia_rozwoju_obrotu_bezgotowkowego_w_Polsce-wersja_dla_MF.pdf.
- Pandemia wciąż silnie wpływa na zachowania zakupowe Polaków [RAPORT]. 2020. Available at: <https://www.wiadomoscihandlowe.pl/artykul/pandemia-wciaz-silnie-wplywa-na-zachowania-zakupowe-polakow-raport/4>.
- Pal, R., Bhadada, S.K. 2020. Cash, currency and COVID-19. *Postgraduate Medical Journal*, 96, 427-428. <http://dx.doi.org/10.1136/postgradmedj-2020-138006>.
- Przybylski, R. 2020. Płatności bezgotówkowe to przyszłość i bezpieczeństwo. *Logistyka.rp.pl*. Available at: <https://logistyka.rp.pl/sponsorowane/7972-platnosci-bezgotowkowe-to-przyszlosc-i-bezpieczenstwo>.
- Ramya, N., Sivasakthi, D., Nandhini, M. 2017. Cashless transaction: Modes, advantages and disadvantages. *International Journal of Applied Research*, 3(1), 122-125.
- Raport „E-commerce w Polsce 2020”: co Polacy kupują w internecie? 2020. Available at:
<https://bezprawnik.pl/e-commerce-w-polsce-2020/> (in Polish).
- Ren, T., Tang, Y. 2020. Accelerate the Promotion of Mobile Payments during the COVID-19 Epidemic. *The Innovation*, 1(2), 100039.
<https://doi.org/10.1016/j.xinn.2020.100039>.
- Sagan, A. 2002. The application of multidimensional factor scales and the rasch scale in market research with reference to evaluating the communicative effects of advertising. *Zeszyty Naukowe Akademii Ekonomicznej w Krakowie*, 605, 73-92.
- Sikorski, M. 2020. Strach przed gotówką słabnie, ale część klientów na trwałe zmieniła swoje zachowania płatnicze. Available at: <https://www.cashless.pl/8323-platnosci-bezgotowkowe-male-sklepy-pandemia>.
- Sivabalan, S. 2017. Going Cashless? Bad for Tax Cheats, Privacy, Poor. Available at:
<https://www.bloomberg.com/news/articles/2017-07-17/going-cashless-bad-for-tax-cheats-privacy-poor-quicktake-q-a>.
- Szczepański, C. 2020. Płynność w czasach kryzysu. Twarda lekcja dla przedsiębiorców. *My Company Polska*, 7, 58. Available at:
<https://mycompanypolska.pl/artykul/plynnosc-w-czasach-kryzysu-twarda-lekcja-dla-przedsiębiorcow/4863>.

- Totolo, E., Bajjal, H. 2020. How a pandemic-induced boom in e-commerce can reshape financial services. Available at: <https://blogs.worldbank.org/psd/how-pandemic-induced-boom-e-commerce-can-reshape-financial-services>.
- W Polsce przybyło ponad ćwierć biliona złotych. 2021. Available at: <https://www.bankier.pl/wiadomosc/W-Polsce-przybylo-ponad-cwierc-biliona-zlotych-8044328.html>.
- Yadav, M., Rahman, Z. 2017. Measuring consumer perception of social media marketing activities in e-commerce industry: scale development & validation. *T Telematics and Informatics*, 34(7), 1294-1307.
- Yakean, S. 2020. Advantages and Disadvantages of a Cashless System in Thailand during the COVID-19 Pandemic. *Journal of Asian Finance, Economics and Business*, 7(12), 385-388. <https://doi.org/10.13106/jafeb.2020.vol7.no12.385>.
- Yang, M., Mamun, A.A., Mohiuddin, M., Nawi, N.C., Zainol, N.R. 2021. Cashless Transactions: A Study on Intention and Adoption of e-Wallets. *Sustainability*, 13, 831. <https://doi.org/10.3390/su13020831>.
- Żukowska, H., Żukowski M. 2013. *Obrót bezgotówkowy w Polsce*. Lublin: Wydawnictwo KUL.