

Factors determining the acceptance of payment methods by online shops in Poland

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Motivation

- Payment instruments need to be accepted by both customers and merchants. However,
 - most studies focus on the preferences and choices of individual customers;
 - the results concerning the e-commerce supply side have rarely been published.
- In case the availability of payment instruments is limited (e.g. credit cards in Poland), merchants' decisions concerning the accepted methods become very important.
- The Polish e-commerce market records extraordinarily large dynamics of development and requires detailed studies.
- The e-commerce provides much more payment solutions than those used in local Points-of-Sale.

Objective

- The analysis of factors determining the decision of Polish online shop managers to accept particular payment methods.²

Comparison of payment methods used in e-commerce

	Use of cash	Bank's intermediation	Non-bank's intermediation
pay before	<ul style="list-style-type: none"> • online vouchers 	<ul style="list-style-type: none"> • virtual/pre-paid card 	<ul style="list-style-type: none"> • mobile payment (e-wallet) • virtual (e-mail) payment provider • virtual (e-mail) payment + Escrow • online vouchers (online purchase)
pay now	<ul style="list-style-type: none"> • cash on delivery • payment in person • payment in other POS • payment onto banking account (eg. at post office) 	<ul style="list-style-type: none"> • bank transfer (any ordering channel) • pay-by-link • debit card 	<ul style="list-style-type: none"> • mobile payment (current account) • virtual (e-mail) payment provider
pay later		<ul style="list-style-type: none"> • credit/charge card 	<ul style="list-style-type: none"> • mobile payment via SMS • mobile payment (based on credit card) • virtual (e-mail) payment provider (based on credit card)

online payment integrator

Source: Authors' own study.



Considered payment methods (1/2)

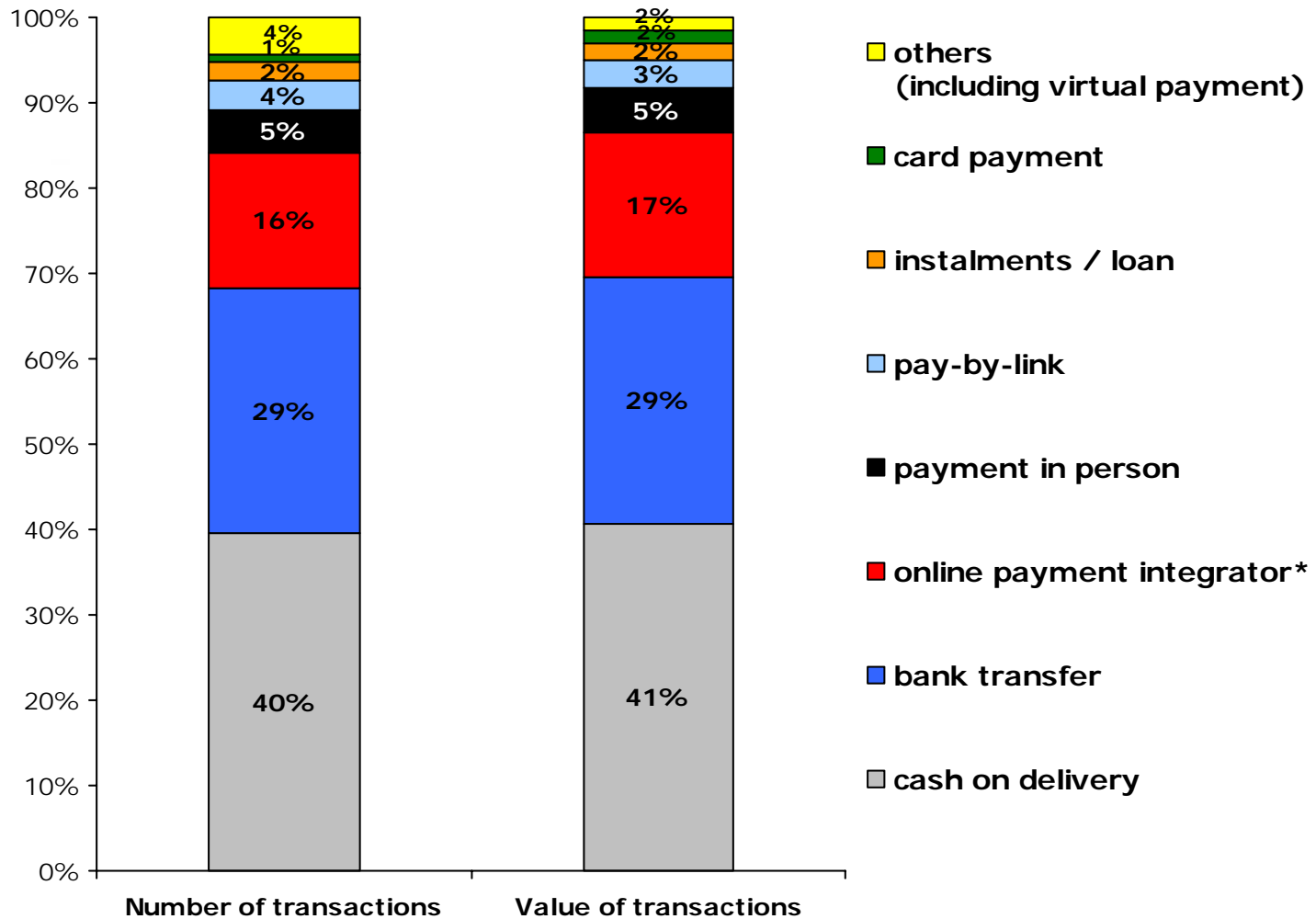
1. **cash on delivery.**
2. **online payment integrator** – a company providing many types of payment for Internet shops. On the basis of a framework agreement, this intermediary automatically services many payment channels, owing to which the shop is not engaged in this process. This activity should be treated as a **form of outsourcing.**
3. **card payment.**
4. **bank transfer.**



Considered payment methods (2/2)

5. **pay-by-link** – an online interface, which automatically generates a **bank transfer form** that is authorised by the customer at their bank's online banking service. The transaction is convenient for the customer. The online shop is immediately informed about the payment.
6. **virtual (e-mail) payment provider** – a company (usually non-bank) which facilitates sending the payment at the recipient's e-mail address through virtual accounts (e.g. **PayPal**). Individuals can accept payments in person-to-person transactions.
7. **payment in person** – the goods are ordered via the Internet but the customer receives them and pays at a local Point-of-Sale / warehouse belonging to the online shop.

Percentage of payment transactions for Polish online shopping according to payment method





Survey methodology

The purpose of the survey was to collect source data based on the information from **online shop managers who decide about the accepted forms of payment** for goods and services purchased online.

The study was commissioned by the National Bank of Poland. The survey questionnaire was devised by Polasik and Maciejewski, whereas the MillwardBrown SMG/KRC institute sampled the respondents and collected their replies (December 2007- March 2008).

The obtained sample of 117 online shops managers covers about 3.6% of all 3,257 online shops in Poland.

We received an extensive set of variables, 89 of which were used as explanatory variables in this study.

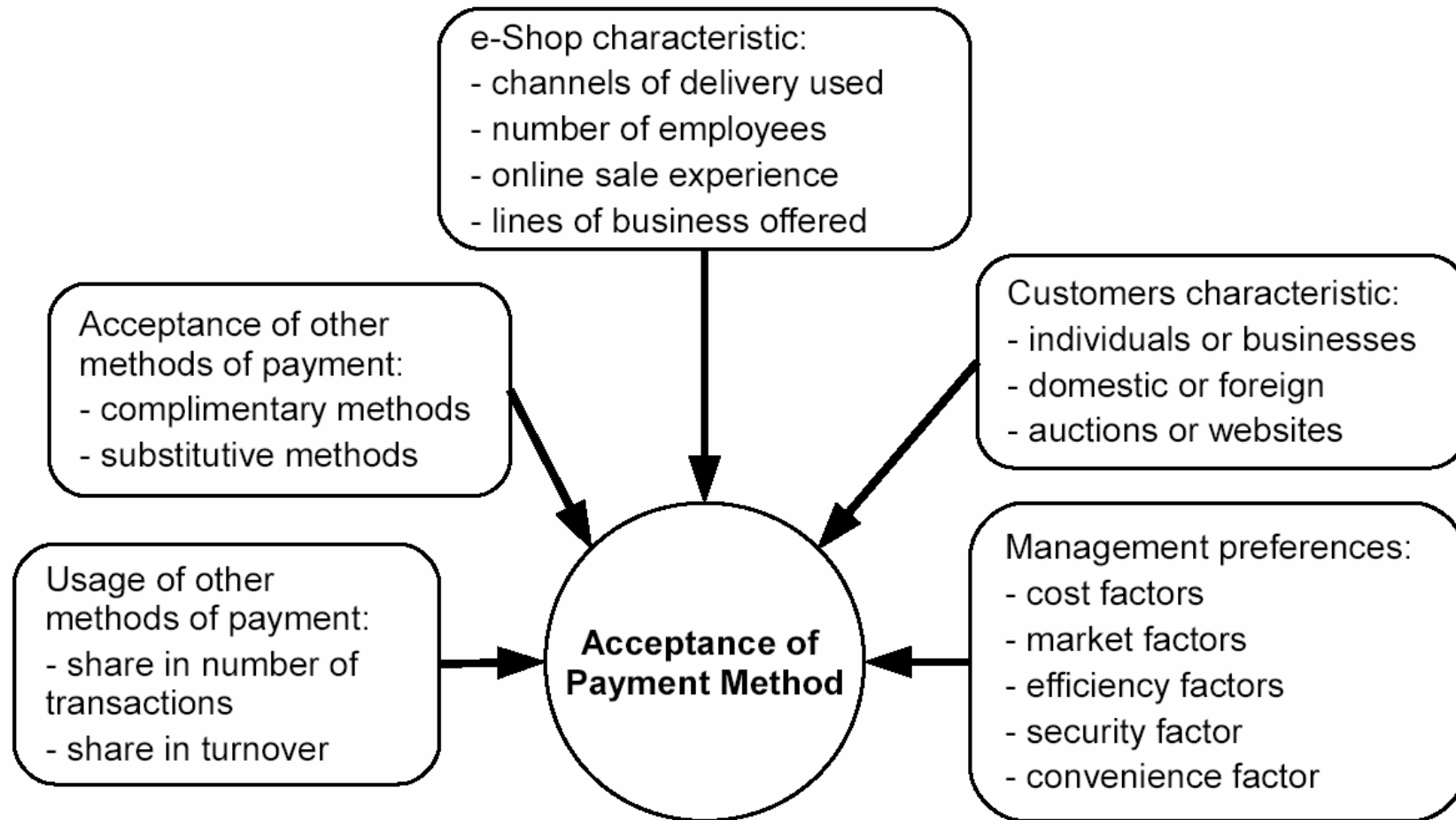


Dependent variables

- **Seven most important methods** of payment were distinguished:
 - (1) cash on delivery,
 - (2) online payment integrator,
 - (3) card payment,
 - (4) bank transfer,
 - (5) pay-by-link,
 - (6) virtual payment provider,
 - (7) payment in person.
- The fact of acceptance of each method was established as dependent variables and analysed in the econometric models.

Conceptual research model

Factors influencing the acceptance of chosen payment methods by the Polish online shops were divided into five major categories.





Empirical results

The acceptance of a selected payment method is a binary choice which can take only two values.

The logit and probit models are used most frequently to explain a binary dependent variable.

We used the logistic model; however, very similar conclusions for most payment methods were obtained also from the probit analysis.

In the logit model, the logistic cumulative distribution function is employed:

$$\text{Prob}(Y = 1) = \frac{\exp(\beta' x)}{1 + \exp(\beta' x)},$$

$$\text{Prob}(Y = 0) = 1 - \text{Prob}(Y = 1).$$



The models can be divided into two groups.

The first one contains models for the following payment methods: cash on delivery, bank transfer and virtual payment.

Frequency of acceptance: $\omega < 0.1$ or $\omega > 0.9$





The second group includes models for online payment integrator, card payment, pay-by-link and payment in person.

Frequency of acceptance: $0.1 \leq \omega \leq 0.9$

Measures of goodness of fit indicate that the first group has a significantly better quality of models.

However, marginal effects are significantly higher for the second group.

I. The logit model for acceptance of cash on delivery

Variable	Coefficient	Std. error	t ratio	p-value	Marginal effect
Constant	4.1549	1.4487	2.87	0.0041	-
 Polish_Post	5.3371	1.9923	2.68	0.0074	4.4543e-9
 Number_shops	2.5425	1.0606	2.40	0.0165	2.1219e-9
 %_transactions_business	-0.0817	0.0246	-3.32	0.0009	-6.8178e-11
 %_transactions_foreigners	-0.1928	0.0631	-3.06	0.0022	-1.6094e-10
Payment_integrator	8.7099	2.7220	3.20	0.0014	7.2692e-9
Factor_customer_convenience	-0.0729	0.0218	-3.34	0.0008	-6.0846e-11
Factor_automation	-0.2646	0.0697	-3.80	0.0001	-2.2083e-10
Statistics					
Log likelihood	-8.5481		McFadden R ²		0.7497
LR statistic (7 df)	51.2154		Mean of Y		0.9151
Percentage of cases correctly predicted	0.966		f($\beta'x$) at mean of independent vars.		0.000




II. The logit model for acceptance of online payment integrator

Variable	Coefficient	Std. error	t ratio	p-value	Marginal effect
Constant	3.0938	1.2909	2.40	0.0165	-
→ Traditional_sales	-1.4024	0.5073	-2.76	0.0057	-0.3505
→ %_transactions_foreigners	-0.0651	0.0297	-2.19	0.0284	-0.0163
→ Card_payment	1.6913	0.5260	3.22	0.0013	0.4226
%_tran_cash_on_delivery	-0.0467	0.0148	-3.16	0.0016	-0.0117
%_tran_payment_in_other_POS	-0.1358	0.0447	-3.04	0.0024	-0.0339
%_tran_bank_transfer	-0.0368	0.0135	-2.72	0.0065	-0.0092
Factor_foreign_settlement	0.0737	0.0401	1.84	0.0663	0.0184
Factor_popularity_consumer	0.0261	0.0154	1.70	0.0896	0.0065
Statistics					
Log likelihood	-55.9103		McFadden R ²		0.3097
LR statistic (8 df)	50.1622		Mean of Y		0.4792
Percentage of cases correctly predicted	0.769		f(β' x) at mean of independent vars.		0.250





III. The logit model for acceptance of card payment

Variable	Coefficient	Std. error	t ratio	p-value	Marginal effect
Constant	-4.6188	0.9639	-4.79	1.65e-06	-
Number_other_locations_online	0.6892	0.3725	1.85	0.0643	0.1117
Number_shops	0.1328	0.0626	2.12	0.0339	0.0215
→ Years_in_business	0.1189	0.0497	2.39	0.0167	0.0193
→ Sales_abroad	1.4626	0.5663	2.58	0.0098	0.2371
Gardening_tools	1.6691	1.0130	1.65	0.0994	0.2705
→ Payment_integrator	2.1907	0.6786	3.23	0.0012	0.3551
→ Pay-by-link	1.9889	0.6738	2.95	0.0032	0.3224
Credit_or_installment	1.1758	0.5826	2.02	0.0436	0.1906
Factor_customer_convenience	-0.0472	0.0264	-1.79	0.0741	-0.0077
Statistics					
Log likelihood	-40.3477		McFadden R ²		0.3616
LR statistic (9 df)	45.7123		Mean of Y		0.2313
Percentage of cases correctly predicted	0.872		f(β'x) at mean of independent vars.		0.162

IV. The logit model for acceptance of bank transfer

Variable	Coefficient	Std. error	t ratio	p-value	Marginal effect
Constant	2.0094	0.8848	2.27	0.0231	-
Films_music	-3.9327	1.6979	-2.32	0.0205	-4.4522e-3
Office_equipment	-4.2144	1.5172	-2.78	0.0055	-4.7712e-3
 %_transactions_foreigners	-0.1571	0.0514	-3.06	0.0022	-1.7784e-4
 %_ transactions_auctions	0.0435	0.0257	1.69	0.0902	4.9247e-5
Virtual_payment	-3.8882	2.2926	-1.70	0.0899	-4.4018e-3
%_tran_payment_in_person	-0.0790	0.0363	-2.18	0.0294	-8.9441e-5
 Factor_commission	0.0640	0.0371	1.72	0.0847	7.2498e-5
Factor_foreign_settlement	0.9225	0.3228	2.86	0.0043	1.0444e-3
Factor_speed_settlement	0.2060	0.1085	1.90	0.0576	2.3317e-4
Statistics					
Log likelihood	-10.5852		McFadden R ²		0.6901
LR statistic (9 df)	47.1412		Mean of Y		0.9154
Percentage of cases correctly predicted	0.983		F(β' x) at mean of independent vars.		0.001

V. The logit model for acceptance of pay-by-link

Variable	Coefficient	Std. error	t ratio	p-value	Marginal effect
Constant	-1.5130	0.5805	-2.61	0.0092	-
 Foreign_language_website	-2.6942	1.1227	-2.40	0.0164	-0.3820
Books_press	1.8875	0.8539	2.21	0.0271	0.2676
 Internet_service_software	1.9595	1.0023	1.96	0.0506	0.2778
Card_payment	1.6018	0.6297	2.54	0.0110	0.2271
 Virtual_payment	2.0930	1.2102	1.73	0.0837	0.2967
%_tran_bank_transfer	-0.0302	0.0100	-3.01	0.0026	-4.2786e-3
Factor_popularity_consumer	-0.0391	0.0196	-1.99	0.0467	-5.5364e-3
 Factor_customer_convenience	0.0773	0.0252	3.07	0.0021	0.0110
Statistics					
Log likelihood	-45.4651		McFadden R ²		0.3174
LR statistic (8 df)	42.2786		Mean of Y		0.2563
Percentage of cases correctly predicted	0.846		f($\beta'x$) at mean of independent vars.		0.142

VI. The logit model for acceptance of virtual payment

Variable	Coefficient	Std. error	t ratio	p-value	Marginal effect
Constant	-13.7369	5.1850	-2.65	0.0081	-
Polish_Post	11.0266	4.1682	2.65	0.0082	1.1563e-3
Office_equipment	16.2661	5.4167	3.00	0.0027	1.7057e-3
→ %_turnover_auctions	0.0589	0.0265	2.22	0.0262	6.1777e-6
Pay-by-link	3.4090	1.5942	2.14	0.0325	3.5748e-4
%_tran_cash_on_delivery	-0.0604	0.0264	-2.29	0.0223	-6.3325e-6
→ %_tran_card_payment	0.8351	0.2623	3.18	0.0015	8.7574e-5
%_tran_pay-by-link	-0.2794	0.1019	-2.74	0.0061	-2.9297e-5
→ Factor_popularity_consumer	-0.3325	0.1093	-3.04	0.0023	-3.4863e-5
Factor_within_integrator	0.1818	0.0602	3.02	0.0025	1.9068e-5
Statistics					
Log likelihood	-12.7455		McFadden R ²		0.6268
LR statistic (9 df)	42.8207		Mean of Y		0.0851
Percentage of cases correctly predicted	0.957		f(β'x) at mean of independent vars.		0.000

VII. The logit model for acceptance of payment in person

Variable	Coefficient	Std. error	t ratio	p-value	Marginal effect
Constant	-2.0328	0.7454	-2.73	0.0064	-
Number_shopping_passages	-0.3940	0.2292	-1.72	0.0856	-0.0933
Collection_in_person	2.3603	0.5508	4.29	1.82E-05	0.5589
Years_in_internet	0.4153	0.1454	2.86	0.0043	0.0983
Foreign_language_website	-1.1927	0.6331	-1.88	0.0596	-0.2824
Internet_turnover	-5.8189e-7	2.8784e-7	-2.02	0.0432	-1.3779e-7
%_turnover_auctions	0.0260	0.0122	2.12	0.0339	0.0061
Credit_or_installment	1.9122	0.7108	2.69	0.0071	0.4528
Virtual_payment	1.8934	0.8206	2.31	0.0210	0.4483
%_tran_card_payment	0.4737	0.1715	2.76	0.0057	0.1122
%_tran_pay-by-link	-0.0847	0.0247	-3.43	0.0006	-0.0200
Factor_fixed_costs	-0.0299	0.0165	-1.82	0.0693	-0.0071
Statistics					
Log likelihood	-46.5291		McFadden R ²		0.4174
LR statistic (11 df)	66.6594		Mean of Y		0.5732
Percentage of cases correctly predicted	0.838		f(β' x) at mean of independent vars.		0.237



Conclusions (1/4)

- It has been found that a shop's strategy of using distribution channels has a strong influence on its acceptance of particular payment methods.
 - The shops that decided to use traditional local Points-of-Sale alongside Internet sales tended to choose different payment methods than typically virtual shops
(e.g. traditional delivery channels parallel with the Internet have a significantly positive impact on the acceptance of cash on delivery, card payment, and payment in person).
 - Shops' involvement in online auctions requires them to adapt themselves to their specificity of auctions, including payment.

In the case of Poland, it encourages them to accept bank transfer and to apply innovative methods offered by non-bank providers.



Conclusions (2/4)

- **Implications for business:**
 - Managers attach **more importance** to payment related factors determining the **market competitiveness** of online shops, i.e. customer's convenience and popularity of the method, rather **than** to the amount of **commission** and fixed costs.
 - The security factor does **not have significant influence on managers' decisions** about the selection of payment methods.

It is an indication for payment solution providers of how to increase chances of adoption of their products by online shops.



Conclusions (3/4)

- The study confirmed competition between banks and non-bank intermediaries on the payment market.
- Most payment methods used by Polish online shops and preferred by consumers have a **low usefulness** for **cross-boarder transactions**.
 - It creates a market niche for non-bank virtual payment providers.
- **Pay-by-link** and **virtual payment** are **niche products** on the Polish market.
 - It seems that pay-by-link method has higher chances for popularization, due to strong support of banks and acquirers.



Conclusions (4/4)

- An interesting feature of the Polish e-commerce is that many Internet shops often opt for full or partial **payment outsourcing** through cooperation with online payment integrators.
- The vital reason for **large usage of cash** as a component of payment in the **Polish e-commerce** is a low penetration of banking accounts in the society.
 - It gives additional possibilities for non-bank agents in online payments, especially for the online payment integrator, which can exploit this opportunity.

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