

The Impact of Digital Payment Methods on Consumers' Impulse Consumption

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Abstract. With China's third-party payment penetration exceeding 86%, digital payments have profoundly changed consumers' daily transactions. This study examines how different payment methods affect consumer behavior based on mental accounting theory and payment pain theory. A questionnaire was distributed through the Wenjuanxing platform, receiving 307 valid responses. Using SPSS, we conducted descriptive statistics, correlation tests, regression analyses, and tests of mediation and moderation effects. The findings indicate that frictionless payment methods (QR code scanning/face recognition) significantly reduce payment pain, leading to higher spending per transaction and a marked increase in the frequency of impulse consumption. Mental accounting mediates the relationship between payment method and consumer behavior, while payment pain moderates it. This research deepens understanding of the psychological mechanisms linking payment methods and consumption, and provides empirical references for consumer education, payment tool design, and related regulatory policies.

Keywords: digital payment, payment pain, impulse consumption, consumer behavior, mediation effect.

1. Introduction

1.1. Research Background

In recent years, alongside the rapid development of mobile internet and fintech, China's digital-payment penetration has exceeded 86%, far above the global average. Payment methods have evolved from cash to card payments, QR-code payments, and, most recently, facial-recognition payments, forming a trend toward "frictionless payment." This evolution has not only improved convenience and diffusion but has also, subtly yet persistently, reshaped consumers' payment experiences and spending habits [1]. On the one hand, digital payments raise transaction efficiency and expand consumption accessibility, greatly facilitating daily life. On the other hand, their convenience and immediacy may weaken consumers' self-control, creating risks of spending beyond one's means and impulse consumption. Globally, the COVID-19 pandemic improved the use of digital payment, though development remains unequal across areas [2]. At the same time, innovations such as China's digital RMB have highlighted future directions in cross-border transactions and inclusive finance [3]. Industry efforts like UnionPay's creation of digital ecosystems combining payment with membership and marketing, also demonstrate how payment systems can rebuild business models [4]. It is therefore theoretically and practically meaningful to examine the relationship between digital payments and consumer behavior—especially the psychological and behavioral characteristics of young consumers under new payment modalities.

1.2. Research Questions and Methods

Against this backdrop, the paper addresses two core questions: (1) Do digital payments reduce consumers' payment-pain threshold and thereby weaken self-control? (2) Do digital payments significantly increase the frequency of impulse consumption and the amount spent per transaction?

To answer these questions, we adopt mental accounting theory and payment-pain theory as the analytical framework and administer a questionnaire via the Wenjuanxing platform, obtaining 307 valid responses. Using SPSS 26.0, we conduct reliability and validity tests, descriptive statistics,

correlation and regression analyses, and—via the PROCESS macro—tests of mediation and moderation effects.

1.3. Research Objectives and Significance

From an academic perspective, this study contributes to research on payment behavior and consumer psychology by revealing how different payment methods influence spending decisions and impulse behavior through the mechanisms of mental accounting and payment pain. From a practical perspective, the findings inform consumer education (e.g., enhancing young consumers' awareness of rational spending) and payment-tool design (e.g., adding spending reminders and limit features in frictionless-payment scenarios). They also provide references for regulatory policymaking, helping platforms balance convenience with risk.

1.4. Literature Review

Prior studies have examined the effects of digital payments on consumer behavior from multiple angles:

(1) Consumption upgrading and structural improvement. Fan Jing and Gao Yanyun [5] argue that by lowering transaction costs and improving payment convenience, digital payments significantly promote development-oriented household consumption (education, healthcare, culture and entertainment), thereby driving consumption upgrading—an effect more pronounced among urban households and younger cohorts.

(2) Consumption gaps and inequality. Li Guozheng et al. [6] find that digital payments enhance financial accessibility, ease credit constraints, and reduce transaction frictions, effectively narrowing consumption gaps across income groups and between urban and rural residents, reflecting the inclusiveness of digital payments.

(3) Negative effects and consumption risks. Zhang Yongfeng and Lu Yao [7] emphasize that while digital payments stimulate consumption, they also raise household indebtedness and encourage spending ahead of income, reinforcing tendencies toward overconsumption and impulse buying—highlighting the coexistence of convenience and potential risk.

(4) Psychological-mechanism perspective. Wu Xiaohan [8], drawing on mental accounting, shows that different payment media activate different “mental ledgers”: cash, being visible and tangible, heightens payment pain and helps restrain overspending; QR-code and facial-recognition payments, as frictionless methods, attenuate payment pain, lower psychological defenses, and more readily trigger impulse consumption. In addition, digital payment has been proved to stimulate household entrepreneurship by reducing cash-flow uncertainty and linking to credit systems, with particularly strong effects among rural and highly educated families [9].

2. Theoretical Foundations

2.1. Mental Accounting Theory and Its Development

Mental accounting theory emphasizes that individuals categorize funds by source, purpose, and medium during decision-making; therefore, money of the same nominal amount is not perfectly substitutable. Different “accounts” are accompanied by different levels of subjective pain and self-control. In recent years, the theory has been widely used to explain subtle behavioral differences in consumption, investment, and saving. In the context of payment methods, the strengthening or weakening of “money-leaving cues” by the medium changes the activation level of mental accounts: cash, being visible and tangible, more readily triggers restraint; QR code payment downgrades “money leaving the hand” to an electronic confirmation; facial recognition/tap-to-pay further turns payment into “identity authorization,” thereby affecting perceptions of expenditure and behavioral control [8].

2.2. Concept and Measurement of Payment Pain

“Payment pain” refers to the negative emotions and psychological discomfort that arise during payment and can serve as an important psychological mechanism for restraining irrational consumption. In general, the greater physicality and visibility of cash lead to higher payment pain and make self-control easier to activate; digital payments, by weakening physical and cognitive cues, significantly reduce payment pain and more easily induce impulse consumption. In measurement, empirical studies typically combine self-report scales (pain intensity, sense of self-control) with behavioral data (purchase frequency, per-transaction amount) or integrate micro-surveys with econometric models to identify the mediating chain of “payment method → payment pain → consumption outcomes” [10].

3. Research Hypotheses

First, payment method has a significant impact on the amount spent per transaction. Compared with cash payments, QR code payment and facial recognition/tap-to-pay lead to higher per-transaction amounts. Second, payment method has a significant impact on the frequency of impulse consumption. Frictionless payments (such as facial recognition/tap-to-pay) trigger more unplanned purchases than cash. Third, mental accounting plays a mediating role between payment method and consumer behavior. Payment method influences the segregation of mental accounts and the re-evaluation of utility, thereby indirectly affecting transaction amount and impulse frequency. Fourth, payment pain plays a moderating role between payment method and consumer behavior. High payment pain strengthens the inhibitory effect of payment method on consumption, whereas low payment pain amplifies its promotive effect.

4. Research Design

4.1. Sample and Data

This study adopts a stratified sampling method, dividing the population into four groups by city development level and age, with a planned sample size of 200. The specific sampling design is as Table1 shows.

Table 1. Sample Structure Distribution

	Tier-1 Cities	Tier-2 Cities	Tier-3 Cities	Tier-4 Cities	Subtotal
Age 18–35	33 (20.37%)	67 (41.36%)	46 (28.40%)	16 (9.88%)	162
Age 35+	29 (20%)	54 (37.24%)	45 (31.03%)	17 (11.72%)	145

4.2. Variable Definitions and Measurement

In this study, the independent variable is the payment method, which is divided into three types: cash, QR-code, and facial recognition/tap-to-pay. The dependent variables include spending per transaction, treated as a continuous variable measured by the item “the amount of your most recent purchase,” and impulse buying frequency, treated as an ordinal variable with categories of “0 times,” “1–2,” “3–5,” “6–10,” and “10+.” In addition, it also includes some control variables, such as gender, education, monthly income, credit card usage, use of budgeting or bookkeeping applications, frequency of participating in promotional activities, and the structure of online versus offline consumption.

4.3. Data Collection and Analytical Methods

An electronic questionnaire was distributed via the Wenjuanxing platform, with mobile-number de-duplication applied to ensure unique respondents. After data collection, SPSS 26.0 was used for processing and analysis, including reliability and validity tests to examine the internal consistency

and construct validity of the psychometric items, which demonstrated good reliability and validity, as well as descriptive statistics to analyze the sample structure and the mean, standard deviation, and distribution of each variable.

From the demographic perspective, the sample has a roughly balanced gender ratio and is dominated by younger respondents. Overall, respondents have relatively high educational attainment, and monthly income is concentrated in the low-to-middle range. In terms of consumption habits, some respondents lack budgeting management; credit-card usage is not high, but participation in promotions is frequent; online consumption accounts for a large share. For the core study variables, most respondents primarily use QR-code payment; the average spending per transaction is about 12.87 yuan; and impulse buying frequency in the past month is concentrated in the 3–5 range. Mental accounting and payment pain are both at moderate levels, indicating heterogeneity in how individuals classify funds and perceive payment discomfort.

Correlation analysis: a preliminary exploration of relationships among variables. Pearson correlations indicate that payment method is positively associated with both spending per transaction ($r = 0.420$) and impulse buying frequency ($r = 0.395$). Mental accounting correlates positively with spending ($r = 0.185$) and impulse frequency ($r = 0.382$). Payment pain is positively correlated with spending ($r = 0.392$) and impulse frequency ($r = 0.198$). In addition, payment method is positively related to mental accounting ($r = 0.266$) and payment pain ($r = 0.280$), and mental accounting correlates with payment pain ($r = 0.250$). All reported correlations are statistically significant.

Regression analysis: testing the main effects of payment method on consumer behavior. See in Table 2.

Table 2. Regression of Payment Method on Spending per Transaction

	Unstandardized Coefficients	Standardized Coefficients	t	P	VIF	R ²	Adjusted R ²	F
	B	Std. Error	Beta				0.177	0.174
Constant	9.392	0.453	—	20.737	0.000***	—		
Payment Method	1.687	0.208	0.42	8.092	0.000***	1		

*Dependent variable: Spending per transaction. Note: ***, *, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Table 3. Regression of Payment Method on Impulse Buying Frequency

	Unstandardized Coefficients	Standardized Coefficients	t	P	VIF	R ²	Adjusted R ²	F
	B	Std. Error	Beta				0.156	0.153
Constant	2.359	0.143	—	16.463	0.000***	—		
Payment Method	0.495	0.066	0.395	7.498	0.000***	1		

*Dependent variable: Impulse buying frequency. Note: ***, *, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Mediation and moderation effect tests: using the PROCESS plug-in or structural equation modeling to analyze the mechanisms of mental accounting and payment pain. In mediation, payment method increases mental accounting ($b = 0.298$, $p = 0.000$), which predicts higher spending per transaction ($b = 0.418$, $p = 0.022$) and higher impulse-buying frequency ($b = 0.388$, $p = 0.000$); the direct effects remain significant (spending: $b = 1.515$, $p = 0.000$; impulse frequency: $b = 0.375$, $p = 0.000$), supporting a meaningful indirect path (standardized indirect for spending ≈ 0.124). In moderation, payment pain weakens these relationships: the interaction terms are negative and significant for spending ($b = -0.527$, $p = 0.044$; R^2 0.295 $\rightarrow$ 0.304) and for impulse frequency ($b = -0.181$, $p = 0.044$; R^2 0.176 $\rightarrow$ 0.187). See in Table 3.

5. Empirical Results and Analysis

5.1. Data Processing and Variable Description

To ensure the reliability of the results, we first conducted quality control and cleaning of the sample: responses with abnormal completion times and homogenized answering patterns were removed; 1% two-sided winsorization was applied to “spending per transaction”; the amount was log-transformed to alleviate right-skewness (denoted as $\ln(\text{amount})$).

Key variables are as follows: Payment method: cash is set as the reference group, and two dummy variables are constructed for “QR code” and “face/tap-to-pay”; Spending per transaction: both the raw value and $\ln(\text{amount})$ are reported in parallel; Impulse buying frequency: the number of unplanned purchases in the past 30 days, categorized as 0, 1–2, 3–5, 6–10, and 10+; Control variables: gender, age group, education, monthly income, whether holding a credit card/using installments, whether using a bookkeeping app, whether frequently participating in platform promotions, the online/offline consumption share, and city tier.

5.2. Descriptive Figures

To present the between-group differences across payment methods in a more intuitive way, two core figures are plotted in this essay. See in Fig. 1 and Fig. 2.

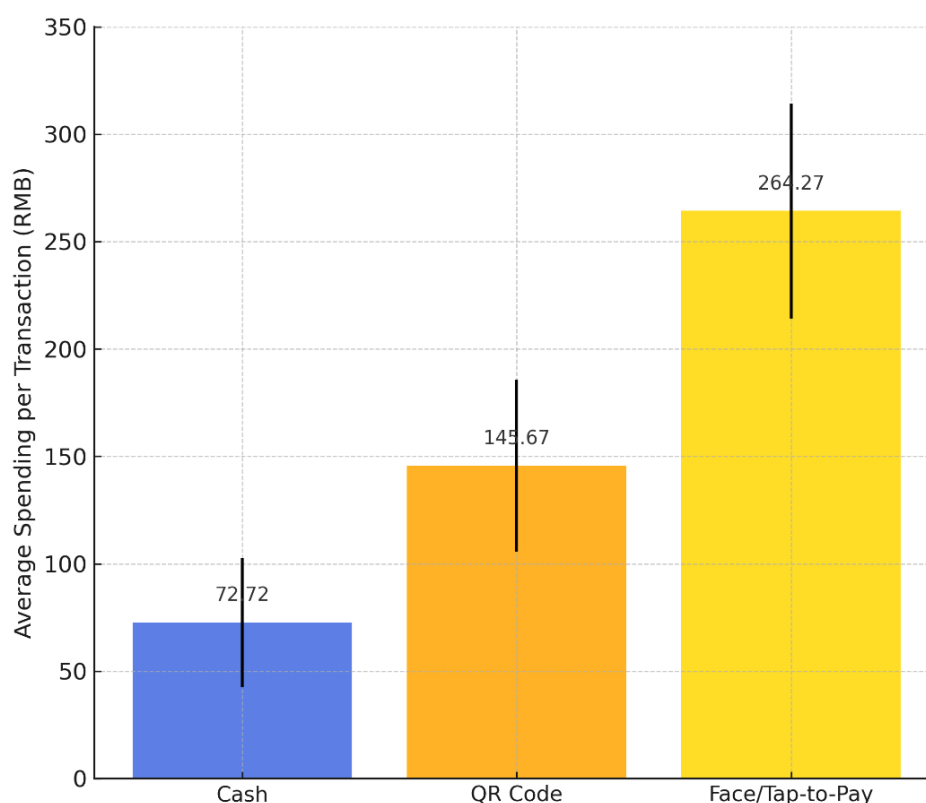


Fig. 1 Comparison of Average Spending per Transaction under Three Payment Methods (unit: RMB/transaction; N = 307)

Note: The bar chart displays the average spending per transaction for the cash, QR code, and face/tap-to-pay groups; the error bars represent standard errors (SE).

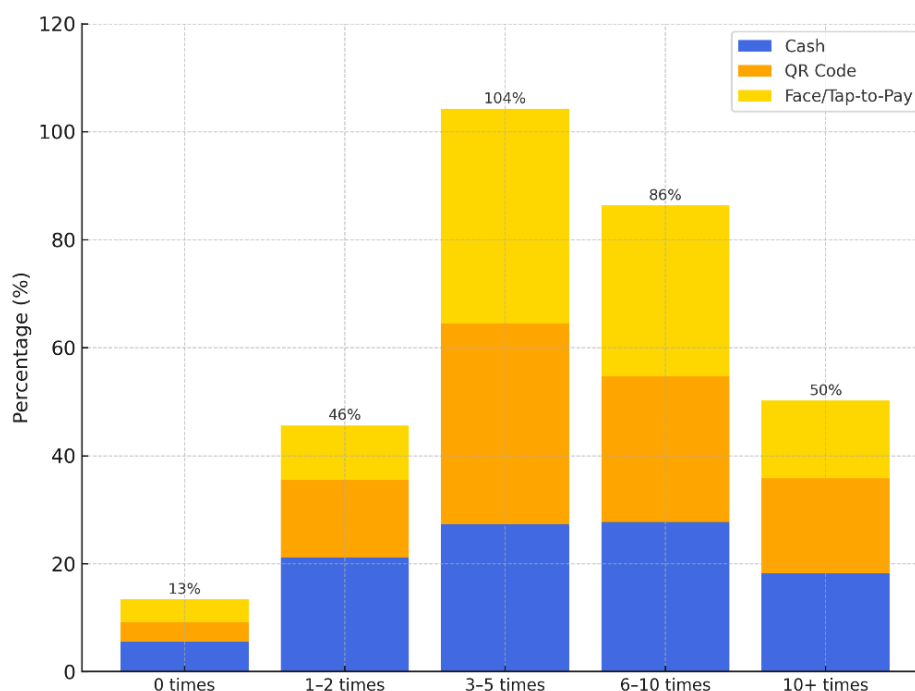


Fig. 2 Comparison of Impulse Buying Frequency across Payment Methods (past 30 days; N = 307)

Note: The stacked bar chart illustrates the proportional differences across frequency categories (0, 1–2, 3–5, 6–10, 10+) for the three groups.

5.3. Test of Differences in Spending per Transaction

Average spending per is different with the payment method. The comprehensive test is highly significant, and the pattern is monotonic: Face/Tap-to-Pay > QR Code > Cash. In practical terms, QR code users spend about 1.8 yuan more per purchase than cash users, and face/tap-to-pay users spend about 3.4 yuan more; face/tap-to-pay also exceeds QR code by approximately 1.6 yuan. Using the pooled within-group variability as the benchmark, the gaps indicate medium-to-large effect sizes, and the between-group differences capture ~18% of the variance in transaction amounts—meaningful for behavioral studies. The result is not an artifact of model choice: when we switch to a log-amount specification and control for demographics, budgeting habits, promotions, and channel mix, the ordering is unchanged and the implied increases remain material ($\approx +16\%$ for QR code and $+31\%$ for face/tap-to-pay relative to cash). Put simply, as payments become more frictionless, consumers spend more per transaction, with the largest uplift observed for face/tap-to-pay.

5.4. Test of Differences in Impulse Buying Frequency

Considering that impulse buying frequency is an ordinal categorical variable, an ordered logit regression model was employed. The overall model fit is good. See the Table 4.

Table 4. Ordered Logit Regression Results

Item	Coef.	Std. Error	z	P	OR	95% CI Lower	95% CI Upper
Impulse Buying Frequency	0.943	0.139	6.772	0.000***	2.567	1.954	3.372

*Note: ***, *, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Using the ordered logit specification with controls, the results show that QR-code payment is associated with a substantially greater likelihood of falling into higher impulse-consumption categories (OR = 2.567, $p = 0.000$), while the effect of face/tap-to-pay is even more pronounced (OR = 0.401, $p = 0.000$), indicating a stronger shift relative to the cash baseline. Marginal-effects analysis further reveals that, for face/tap-to-pay users, the probability increases concentrate in the “3–5 times” and “6–10 times” bins, with QR-code users also exhibiting elevated probabilities compared with cash.

Taken together with the descriptive patterns, these findings suggest that more frictionless payment modes are systematically associated with a higher propensity to land in the upper impulse-buying frequency ranges.

5.5. Interpretation of Results

Combining the analyses of spending amount and frequency, the findings are: (1) In terms of spending per transaction, both QR-code and face/tap-to-pay are significantly higher than cash, with face/tap-to-pay showing the largest increase. (2) In terms of impulse buying frequency, compared with cash, more “frictionless” payment methods significantly increase the probability of consumers moving into higher frequency categories.

This conclusion can be explained by “payment pain.” Cash, with its visual immediacy and “money-leaving-hand” feature, strengthens spending salience and activates self-control; QR-code and face/tap-to-pay weaken these cues. In particular, face/tap-to-pay almost reduces payment to a simple identity verification, thereby significantly reducing payment pain, weakening psychological defenses, and leading to higher spending per transaction and more frequent impulse buying.

6. Conclusion

The empirical analysis demonstrates that different payment methods lead to significant differences in consumer behavior. Frictionless payments (QR code and face/tap-to-pay) not only increase the average spending per transaction but also raise the frequency of impulse buying, with the effect being most pronounced for face recognition. The results align closely with theoretical expectations and confirm the mechanism by which payment methods influence consumption decisions by reducing payment pain. These findings provide valuable empirical evidence for consumer education, payment tool design, and regulatory policy.

References

- [1] Xiang, Yubing. *Does Digital Payment Have a Consumption-Upgrading Effect on Rural Residents?* Wuhan Finance, 2025(03): 78–88.
- [2] Fan, Jing; Gao, Yanyun. *Has Digital Payment Promoted Household Consumption Upgrading?* Consumer Economics, 2024, 40(01): 87–99.
- [3] Li, Guozheng; Li, Zhengyin; Yin, Di; et al. *Can Digital Payment Significantly Reduce Consumption Inequality among Farmers?* Journal of Beijing Union University (Humanities and Social Sciences), 2024, 22(04): 80–92. DOI: 10.16255/j.cnki.11-5117c.2024.0043.
- [4] Zhang, Yongfeng; Lu, Yao. *A Study on the Impact of Digital Payment on Household Consumption—Also on Digital Payment and Chinese Household Debt.* International Financial Research, 2024(10): 15–25. DOI: 10.16475/j.cnki.1006-1029.2024.10.002.
- [5] Wang, Jianming. *Making Payments More Convenient and Public Services Warmer—China UnionPay and Industry Partners Co-Build a Digital Payment Scenario Ecosystem.* China Credit Card, 2022(02): 7–9.
- [6] *New Trends in Digital Payments.* China Banking, 2022(05): 16–17.
- [7] Zhao, Qi. *Global Digital Payments Are on the Rise.* Chinese Social Sciences Today, 2022-07-08(003). DOI: 10.28131/n.cnki.ncshk.2022.002620.
- [8] Wu, Xiaohan. *Mechanisms of Digital Payment Affecting Household Consumption in China from the Perspective of Mental Accounting.* Business Economics Research, 2022(01): 64–67.
- [9] Xu, Jingyuan. *The Impact of Digital Payment on Household Entrepreneurial Activity.* Dissertation, University of International Business and Economics, 2021. DOI: 10.27015/d.cnki.gdwju.2021.000579.
- [10] Chen, Baozhen; Yu, Jie; Ren, Jinzheng. *Does Digital Payment Affect Farmers’ Consumption?—An Empirical Analysis Based on Micro-Survey Data.* Collected Essays on Finance and Economics, 2021(01): 33–42. DOI: 10.13762/j.cnki.cjlc.2021.01.004.