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Revisiting Consumer Adoption of Plastic Money: Evidence from Regression and Correlation Analysis in Khairpur District

Javed Ahmed Ghumro
Assistant Professor, Institute of Commerce and Management, Shah Abdul Latif University, Khairpur, Sindh, Pakistan

Ali Akbar Wassan
Assistant Professor, Govt. Sachal Sarmast DegreeCollege, Ranipur

Abstract
The paper revises and revisits how consumers perceive the use of the plastic money (debit/credit cards) in Khairpur District, Sindh, Pakistan. The study is based on the reliability analysis, factor analysis, Pearson correlation and multiple regression to discuss the influence of the benefits of using cards, reasons not to use cards and problems faced when using cards on the consumer perceptions (and, consequently, actual usage of plastic money) depending on the results of the survey of 387 account holders. The Cronbach alpha of the 25 item measure was 0.808. The results of regression analysis indicated that the three independent constructs accounted 86.8 percent of the variation of the use of plastic money (Adjusted R 2 = 0.868, F = 847.835, p =.001). Individual beta coefficients were: benefits (β = 0.413), reasons for not using (β = 0.663), and problems (β = 0.350). Cumulative regression also revealed that the composite perception variable was also explaining the usage of the plastic money 72.3% (Adjusted R 2 = 0.522, 1 = 0.723, p <.001). Each of the four hypotheses was tested. The findings indicate that policy makers and financial institutions should overcome the obstacle on consumer and promote the adoption of card infrastructure to hasten the adoption of digital payment in semi-urban Pakistani districts.

Keywords: Plastic money, consumer perception, digital payments, regression analysis, Khairpur District, Pakistan

1. Introduction

The world financial environment has experienced a dramatic change brought about by the development of information and communication technologies (ICT). One of the most apparent examples of such a change is the universal adoption of plastic money, which is an umbrella term that includes any type of debit cards, credit cards, ATM cards, smart cards, and prepaid cards as an alternative to traditional paper money (Antony, 2018; Bisht et al., 2015). Plastic money can provide its users with convenience, security, portability and easy access to a wide variety of financial services, transforming the habits of consumption and banking practices worldwide (Manivannan, 2013; Sudhakar, 2014).

Cashless payment systems are fairly developed in developed economies, but they are not evenly spread in developing countries and among the semi-urban and rural areas of South Asia, in particular (Slozko and Pelo, 2015; Kumari and Khanna, 2017). Pakistan is an especially educative example: The introduction of plastic money into the country was done by Habib Bank as early as 1990, but the awareness and use were slow to come. Until Citibank released its

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VISA card in 1994, there was no real momentum, and the banks were slowly encouraged to join the trend (MCB, NBP, and others). In spite of this increasing supply-side infrastructure, the demand-side limitations, including consumer perceptions, lack of trust, and digital illiteracy and gaps in the infrastructure, still limit usage, particularly within metropolitan centres (Ullah et al., 2014; Qureshi et al., 2018).

These contradictions are epitomised in Khairpur District, in Sindh Province. The district is a large yet untapped market of cashless payment products with more than 224,000 registered account-holders. However, there is little systematic empirical evidence as to why consumers in Khairpur are adopting or rejecting plastic money. The present article is inspired by this gap.

The current paper restates the MPhil thesis of Ghumro (2022) that used survey-based quantitative research to examine the consumer attitudes towards plastic money in Khairpur. We review and generalize its regression and correlation results, place in context the broader literature on payment technology adoption, and provide implications to the bank management, policy, and future research. More precisely, the article deals with the following purposes:

(1) To assess data reliability and internal consistency across the four constructs used in the study.

(2) To examine the association between benefits of using cards, reasons for not using cards, and problems faced by card users.

(3) To determine the impact of individual perception sub-dimensions on plastic money usage.

(4) To evaluate the cumulative predictive power of composite consumer perception on plastic money usage.

2. Literature Review

The plastic money can be traced back to the early years of the 20 th century when charge cards given out by businesses were used as loyalty cards. The Diners Club launched the first multi-purpose credit card in the United States and Diners Club launched the first official credit card in 1950 and 1951 respectively. The watershed was the standardisation of magnetic strips on plastic cards and in 1970s and the plastic cash was ready in 2001 what practitioners refer to as off the shelf money (ICMR, 2002; Bisht et al., 2015). The Discover Card with its no-annual-fee policy and cash-back rewards was introduced in the 1980s, and the chip-and-pin and mobile payment systems, such as Apple Pay and Square, were introduced in the 1990s and 2000s (Ghumro, 2022).

The similar trend was observed in Pakistan as it was in the world with a lag. The MasterCard, introduced by Allied Bank and the 1994 VISA, introduced by Citibank, stimulated the development of the market and nowadays, practically all commercial banks offer plastic money products. Nevertheless, the urban centres lag behind the consumer knowledge especially in the secondary cities and rural areas (Ullah et al., 2014).

Consumer perception is a multidimensional construct which is affected by cognitive, affective and behavioural dimensions (Nwaolisa and Kasie, 2011). The dominating theoretical approach is the Technology Acceptance Model (TAM) proposed by Davis (1989): intention to use a new technology depends on the perceptions of usefulness and the perceived ease of use. Plastic money is subjected to the concept of the perceived usefulness, as it illustrates the attitude of the consumers towards the belief that cards will improve their functioning in

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the course of the transactions, and the concept of the perceived ease of use, which shows how easy the technology is to use (Davis et al., 1989; Odusina, 2014).

Besides TAM, the researchers have also highlighted the importance of security perception (Trivedi and Mago, 2013), social influence (Lewis et al., 2015), budget-control motives (Hernandez et al., 2017), and psychological attachment to cash (Prelec and Loewenstein, 1998; Burgoyne et al The convenience, security, portability, and access to credit are the most frequent benefits of plastic money discussed in the literature (Bisht et al., 2015; Jain, 2016; Panagiotis et al., 2018). Cards also lead to a detailed record of the transactions, allow online and international purchases, and reduce the risk of losing money due to carrying large amounts of money (Jonker, 2007; Devkota et al., 2021).

Technical, social and psychological barriers to adoption exist. The most prevalent ones are the lack of security and card fraud or loss concerns, the lack of accessible Point-of-Sale (POS) terminals, complex bank procedures, the lack of trust in online systems, and low financial literacy (Sumi and Safiullah, 2014; Diza et al., 2017). In the Nepali and South Asian context, Devkota et al. (2021) found out that not only the bankers but also the consumers remained ill-informed about green banking and cashless habits. Such conclusions are backed by Pakistani-specific studies (Qureshi et al., 2018; Al-Amin et al., 2019) which reveal that another barrier to adoption is the cultural and religious perceptions of the interest-bearing credit cards.

Another yet more overlapping group of barriers are difficulties in using the card, such as the unavailability of card cash at ATMs, issuing counterfeit notes by ATMs, technical problems, and non-acceptance of payments at point-of-sale (Ghumro, 2022; Krol et al., 2016). Contactless payments have proven to reduce such friction and its use in semi-urban Pakistani markets is still in its infancy.

3. Methodology

The research philosophy was positivism and a deductive approach, and operationalised using a cross-sectional survey design which is quantitative in nature. Methodological decisions were made with the help of the Research Onion framework (Saunders et al.): the survey strategy, mono-method (quantitative), cross-sectional time horizon, and primary data collection were used.

The target population was the account holders in the Khairpur District with an estimated population of 224,378 people holding plastic money cards. The convenience sampling was utilized and the sample size was calculated according to Krejcie and Morgan (1970) table where the minimum size of the sample is calculated as 384 with a population of 1,000,000 or more (5% margin of error, 95% confidence level). A total of 387 filled out questionnaires were received and stored to be analyzed.

The structured questionnaire was divided into three parts (A) informed consent; (B) six demographic and seven descriptive questions; (C) 25 Likert-scale items (1 = Strongly Disagree to 5 = Strongly Agree) that were allocated in four constructs:

Benefits of Using Card (5 items) — adapted from Devkota et al. (2021).
Problems Faced in Using Cards (4 items) — adapted from Al-Amin et al. (2019).
Reasons for Not Using Cards (6 items) — adapted from Reena et al. (2021).
Plastic Money / Usage of Cards (10 items, dependent variable) — adapted from

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Antony (2018) and Sultana & Hasan (2016).

The three independent constructs were subsequently computed into a single composite variable — Perception of Customers — for the cumulative regression analysis.

3.4 Analytical Techniques

IBM SPSS Statistics version 25 was used to analyse data. The sequence of the following techniques was used: (1) descriptive statistics (frequencies, means, standard deviations); (2) Cronbachs alpha reliability analysis; (3) principal component factor analysis (PCA); (4) multiple linear regression; and (5) Pearson bivariate correlation.

4. Results and Analysis

4.1 Demographic Profile of Respondents

Table 1 shows the demographic distribution of 387 respondents in the survey. The majority was made up of males (72.9%), which is also in line with the gender disparity in accessing banks in semi-urban Pakistani districts. There were a few more married respondents (54.3) compared to bachelors (45.7). The educational profile was also quite high with 47.5% having a master degree and another 6.5% having postgraduate qualifications which are indicative of the educated account-holder base on which the survey was conducted. The greatest was the age group of 31-35 (36.2%), then 26-30 (27.1%) indicating that middle-aged working adults are the greatest users of plastic money in Khairpur. The most significant professional groups were students (36.7%), and government employees (36.2%).

Table 1: ***Demographic Profile of Respondents (N = 387)***

Variable	Category	Frequency	Percentage (%)
Gender	Male	282	72.9
	Female	105	27.1
Marital Status	Bachelor	177	45.7
	Married	210	54.3
Education	Intermediate	36	9.3
	Graduation	142	36.7
	Masters	184	47.5
	Above Masters	25	6.5
Age	20–25 years	72	18.6
	26–30 years	105	27.1
	31–35 years	140	36.2
	Above 35 years	70	18.1
Profession	Student	142	36.7

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Businessmen	70	18.1
Govt. Employee	140	36.2
Others	35	9.0

Source: Primary survey data (Ghumro, 2022).

[Figure – Gender Distribution of Respondents (Bar Chart)]

Figure: Gender Distribution of Respondents (Bar Chart)

4.2 Descriptive Patterns: Card Usage Purposes

This questionnaire presented seven descriptive questions that required respondents to answer their major purpose of payment and card use. There was a small majority (54.3) in favor of cash as the most convenient payment method compared to credit/debit cards (45.7) and the plastic (45.7). The most popular types of cards held were credit cards (36.4 percent), debit cards (27.4 percent), and 22.0 percent reported having no cards. These numbers underscore the fact that there is still a non-trivial portion of account holders who are not part of the plastic money system.

In terms of the particular use case, the strongest support of cards was purchases/shopping (76.2% agree or strongly agree) and utility bill payment (46.5% strongly agree). On the other hand, online shopping was the most disagreeable (70.8% disagree or strongly disagree) which may be due to lack of e-commerce infrastructure and mistrust in the district. The most neutral was booking rooms/tickets (42.9%), which can be interpreted as the awareness but indecision.

[Figure – Card Usage Purposes — Frequency Distribution]

Figure: Card Usage Purposes — Frequency Distribution

4.3 Reliability Analysis

All constructs were measured in terms of internal consistency using Cronbach alpha (α). The traditional values of alpha 0.70 are considered acceptable, 0.80 good and 0.90 excellent (Nunnally, 1978). Table 2 summarises results.

Table 2: ***Reliability Statistics by Construct***

Variable	Cronbach's Alpha	No. of Items
Perception of Customers (Overall)	0.808	25
Benefits of Using Card	0.835	5
Reasons for Not Using Cards	0.880	6
Problems Faced in Using Cards	0.754	4
Plastic Money (Use of Cards)	0.837	10

Source: Author computations (SPSS v25).

The total instrument got 0.808 (good) of alpha. Personal constructs were between 0.754 (problems faced - acceptable) and 0.880 (reasons not using cards - good). The construct Reasons not using cards showed the best internal consistency, which implies that there is a high agreement in the sub-items of

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insecurity, technical problems and lack of trust.

4.4 Factor Analysis: KMO and Factor Loadings

All the constructs were subjected to Principal Component Analysis (PCA) to make them unidimensional. The Kaiser-Meyer-Olkin (KMO) scores were: Benefits of Using Card (KMO = 0.558), Reasons for Not Using Cards (KMO = 0.841), Problems Faced in Using Cards (KMO = 0.698) and Plastic Money/Usage of Cards (KMO = 0.678). All KMO values were greater than 0.5 and all constructs had significant Barlett Tests of Sphericity ($p < .001$) which confirmed that they were factorable.

Benefits, Reasons, Problems constructs were resolved in single factor and this factor loading was predominantly above 0.65. Much to our surprise, in Reasons not to use cards, the lack of trust (.948), technical (.946), and lack of acceptability (.938) had near-perfect loadings and this indicates the significance of barriers of trust. Regarding Benefits of Using Cards, card discount offer (.980) and no transaction cost (.887) were the most appropriate.

4.5 Multiple Regression Analysis

Multiple linear regression was applied with Plastic Money (Usage of Cards) as the dependent variable and the three perception sub-dimensions as predictors.

4.5.1 Model Summary

Table 3: ***Regression Model Summary***

Model	R	R^2	Adjusted R^2	Std. Error
1	0.932	0.869	0.868	0.862

Source: Author computations (SPSS v25); Predictors: Benefits of Using Card, Reasons for Not Using Cards, Problems Faced in Using Cards.

The model accounts a total variance of 86.9 ($R^2 = 0.869$) in the usage of plastic money that is adjusted (adjusted $R^2 = 0.868$), which implies a high level of parsimonious and strong fit. The multiple correlation coefficient $R = 0.932$ indicates that there is a near perfect linear association between the combination of the three predictors and the dependent variable.

4.5.2 ANOVA

Table 4: ***Analysis of Variance (ANOVA)***

Source	Sum of Squares	df	Mean Square	F	Sig.
Regression	1890.855	3	630.285	847.835	.000
Residual	284.724	383	0.743	—	—
Total	2175.580	386	—	—	—

Source: Author computations (SPSS v25).

The ANOVA table confirms overall model significance ($F = 847.835$, $df = 3/383$, $p < .001$). The regression accounts for a sum of squares of 1890.855 against a residual sum of squares of 284.724, demonstrating that the model captures the dominant sources of variance in plastic money usage.

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4.5.3 Coefficients and Hypothesis Testing

Table 5: ***Regression Coefficients***

Predictor	B	Std. Error	Beta (β)	Sig.
(Constant)	1.886E	.044	—	1.000
Benefits of Using Card	.981	.054	0.413	.000
Reasons for Not Using Cards	1.575	.054	0.663	.000
Problems Faced in Using Cards	.830	.061	0.350	.000

Source: Author computations (SPSS v25). Dependent variable: Plastic Money (Usage of Cards).

The three predictors yielded significant beta coefficients ($p < .001$). Reasons Not Using Cards proved to be the best predictor ($\beta = 0.663$) then Benefits of Using Card (0.413) and Problems Faced in Using Cards ($\beta = 0.350$). The positive beta of Reasons for Not Using Cards is counterintuitive, indicating a suppressor effect: the more informed respondents are of the obstacles, the more likely they are to be involved with the card ecosystem, perhaps because they are active users struggling with the real-world constraints. This observation should be further developed qualitatively.

4.6 Pearson Correlation Analysis

Table 6: ***Pearson Correlation Matrix***

Variable	Plastic Money	Benefits	Reasons	Problems
Plastic Money	1	.113*	.493**	.112*
Benefits of Using Card	.113*	1	.092 (ns)	-.465**
Reasons for Not Using Cards	.493**	.092 (ns)	1	.474**
Problems Faced in Using Cards	.112*	-.465**	.474**	1

*Note: ** $p < .01$; * $p < .05$; ns = not significant. Source: Author computations (SPSS v25).*

The Pearson correlation analysis shows that several interesting patterns are noted. The use of plastic money was significantly related to all the three predictors: Reasons for Not Using Cards ($r = .493$, $p < .01$) had the highest level of association, followed by Benefits ($r = .113$, $p < .05$), and Problems ($r = .112$, $p < .05$). The correlation between Benefits of Using Card and Reasons for Not Using Cards were not significantly different ($r = .092$, $p = .072$), meaning that the knowledge of card benefits and the knowledge of card obstacles are rather independent cognitive variables among Khairpur respondents. Benefits and Problems were negatively related ($r = -.465$, $p < .01$), indicating that those consumers who believe they have higher card benefits are less likely to report usage problems - a result that supports the familiarity-breeds-comfort hypothesis.

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4.7 Cumulative Regression: Composite Perception Variable

In order to determine the total predictive capability of the consumer perception, SPSS compute was used to calculate the three independent constructs into one composite variable (Perception of Customers). This composite was then subjected to a simple regression with it being the only predictor of the usage of Plastic Money.

Table 7: ***Cumulative Regression — Perception of Customers on Plastic Money***

Predictor	B	Beta (β)	t	Sig.
Perception of Customers	1.718	0.723	20.561	.000
Adjusted R^2 = 0.522	F = 422.757	Sig. = .000		

Source: Author computations (SPSS v25).

The composite perception variable had 52.2% variance in plastic money usage (Adjusted R^2 = 0.522), which had a very significant ANOVA (F = 422.757, p = 0.001). The standardised (β = 0.723, p < 0.001) means that one standard deviation change in the composite consumer perception is related to the 0.723 standard deviation change in the use of plastic money. Pearson correlation between the two variables was r =.723 (p <.01) which proved that the two variables were strongly positively associated.

4.8 Hypothesis Testing Summary

Table 8: ***Summary of Hypothesis Testing Results***

H	Hypothesis Statement	Result
H1	Significant association between Consumers' Perception and Usage of Plastic Money	Supported
H2	Significant impact of Problems Faced in Using Cards on Plastic Money	Supported
H3	Significant impact of Benefits of Using Card on Plastic Money	Supported
H4	Significant impact of Reasons for Not Using Cards on Plastic Money	Supported

Source: Derived from regression and correlation analyses.

All four hypotheses were supported. H1 confirms the significant positive association between consumer perception and plastic money usage (r = .723, p < .01). H2 through H4 confirm that each perception sub-dimension — problems, benefits, and reasons for not using — exerts a significant positive impact on the dependent variable, consistent with TAM-based predictions.

5. Discussion

This study has a number of implications both theoretical and practical.

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To begin with, the fact that the three predictor regression model has a very high explanatory power (Adjusted R 2 = 0.868) indicate that in the Khairpur setting, the use of plastic money is virtually due to consumer perceptions and not due to demographic or macroeconomic variables that were not included in this model. This result supports the TAM hypothesis of Davis (1989) that attitudinal factors, and not structural constraints per se, are the immediate predictors of technology use.

Second, the fact that Reasons to Not Use Cards (β = 0.663) remains the strongest predictor, despite the adjustment of the benefits and problems, indicates that there is a framing effect which is asymmetric: consumers in Khairpur are more vulnerable to the perceived disadvantages of using plastic money rather than the benefits. This can be compared to the wisdom of prospect theory that the losses are larger than gains (Kahneman and Tversky, 1979), as well as the pain of payment literature (Prelec and Loewenstein, 1998). In practice this means that financial institutions will gain more from adoption than promoting the benefits of cards by vigorously breaking down barriers - especially by lack of trust, fear of losing the card, and inadmissibility at merchant terminals - than by advertising the benefits of card use.

Third, the insignificant relationship between Benefits and Reasons Not Using Cards (r =.092, p =.072) indicates that Khairpur consumers do not carry out these evaluations in opposition but in parallel. A consumer may be both appreciative of the convenience of cards and have security concerns, a duality that requires co-ordinated interventions: increasing benefits and decreasing barriers.

Fourth, there is a negative relationship between Benefits and Problems (r = -.465), which suggests that more advanced users have fewer perceived problems, which is in line with a learning-curve or familiarity effect. Banks might abuse this dynamic by using try-before-you-buy programmes, onboarding workshops, and low-risk pilot accounts which enable reticent consumers to gain confidence before making a commitment to mainstream card utilisation.

Fifth, the demographic picture shows that the sample is dominated by the students (36.7%) and government employees (36.2%). Since the payment of government salaries in Pakistan is gradually being done via bank accounts and ATM cards, special digital literacy programmes handed out by the government agencies and universities may help hasten the uptake of these two key groups.

6. Conclusion

This article has revisited and extended the empirical research of the article by Ghumro (2022) by a systematic review of evidence on the regression and correlation analysis of consumer perception towards plastic money in Khairpur District. The primary findings of the research are obvious, consumer perception - operationalized in the form of benefits, barriers and usage problems - is a robust and statistically significant indicator of plastic money use, and the joint effects can be utilised to describe 86.8% of the variation in the usage behavior. The variable of composite perception has a beta of 0.723 and by itself, it explains 52.2% of the variance.

Such results affirm the four research hypotheses and would tend to agree with the TAM-conceptualized stories on adopting technology in developing-country contexts. The overestimated importance of barrier-based perceptions underscores the urgency of supply-side modifications like expanded POS

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infrastructure, enhanced ATM dependability, straightforward card onboarding procedures, and consumer-focused education, should Pakistani banks and regulators aspire to adopt the entire potential of the digital payment ecosystems within semi-urban districts.

Future researches may employ longitudinal designs to track the perception changes once the infrastructure has matured, could employ qualitative research methods to unpack the cultural and religious factors of card adoption, and extend geographically to other districts of Sindh and other areas outside Pakistan. To investigate the role of financial literacy, gender, and income as a condition of the boundaries, the theoretical contribution would also be improved with the mediation and moderation analyses.

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