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DIGITAL PAYMENT ADOPTION AND SUSTAINABLE CONSUMER PRACTICES: EXAMINING THE ENVIRONMENTAL AND ECONOMIC IMPACT OF CASHLESS TRANSACTIONS

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Abstract

Cashless financial systems increase rapidly in India, consumer transaction habits have changed in many developing countries, particularly in developing countries where digital technologies are becoming available. This research examines the sustainability implications of using plastic cash. Specifically, it looks at the relationships among green transaction behaviours, ethical consumption orientation, and sustainable cashless consumption, for customers in Tamil Nadu. To accomplish this, primary data were collected from 480 customers who reside in Tamil Nadu using a structured questionnaire. These data were subjected to Exploratory Factor Analysis (EFA), Confirmatory Factor Analysis (CFA) and Structural Equation Modelling (SEM) analyses. The results show that green transaction behaviours are strongly influenced by perceived usefulness, convenience, security, awareness of environmental issues, and digital financial literacy; as well, ethical consumption orientation is similarly determined by environmental awareness and digital financial literacy. Furthermore, both green transaction behaviours and ethical consumption orientation positively influence sustainable consumption behaviours and responsible purchasing behaviours. However, convenience and security perceptions do not appear to be important determinants of ethical consumption orientation, indicating that technological efficiency alone is not sufficient to support sustainable consumer values. The contribution of this research is both theoretical and practical. Theoretically, the research integrates the sustainability dimensions into digital payments research. Practically, the research has also established the necessity of incorporating environmental responsibility into the design of fintech ecosystems that support and enable consumers to act consciously and sustainably.

Keywords: Cashless Consumption, Plastic Money, Green Transaction Behavior, Sustainable Consumption Behavior, Ethical Consumption Orientation, Digital Financial Literacy, Environmental Awareness, Fintech Ecosystem, and Responsible Spending Behavior.

Introduction

In the recent past, there has been significant transformation of the world financial eco-system due to the evolution of cashless transactional systems. This is mainly attributed to the quick transformation of consumer payment behavior in developed and developing countries resulting from rapid technological advancements, extensive digital banking facilities, and introduction of new fintech models [1]. In India, the cashless economy model made significant strides with the implementation of policies such as demonetization, 'Digital India' initiatives, and widespread adoption of UPI-enabled payment transactions [2]. Consequently, plastic money forms including debit cards, credit cards, prepaid cards, smart cards, and contactless technology have become common in everyday consumer transactions. Most consumers believe that digital payment methods are convenient, fast, and modern compared to paper money [3]. The widespread adoption of plastic money has not only improved transactional efficiency but also led to the change in purchase behaviors, financial behaviors, and consumer behaviors. Digital payment systems eliminate transaction barriers which are physical and psychological making it easy to pay

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instantly and easily [4]. According to experts, practices involving cashless consumption have been adopted significantly by various categories of consumers through mobile banking platforms, contactless payment technology, and reward systems [5]. In India, one of the states worth considering for the development of cashless consumption behavior among consumers is Tamil Nadu because of its fast-developing digital infrastructure, market size, and large economic disparity between rural and urban areas. Due to high industrialization and connectivity with technology, there is an unprecedented level of electronic transactions, fintech adoption, and dependence on cashless payment solutions [6]. Nevertheless, this is compounded by financial literacy, connectivity, and socioeconomic differences between urban and rural populations.

As more countries switch to cashless economies, global conversations about sustainable consumption and eco-friendly economic practices are becoming much more visible in universities, government agencies and business organizations [7]. Sustainable consumption refers to responsible buying behavior, efficient resource use, care for the environment through a minimal level of environmental destruction while utilizing the economic framework on a daily basis [8]. Cashless transactions are thought by many to be beneficial to the environment as they reduce the amount of paper cash that needs to be printed, the transportation costs of moving that cash around, and large-scale concretely based transactions. Additionally, new research is showing that frictionless digital payment systems can lead individuals to be less responsible in their purchases, thus promoting overconsumption, being detached from the purchasing experience cognitively, and developing poor consumption patterns [9].

Thus, the theoretical and research relationship between using plastic money versus sustainability remains unclear, and not enough research has been conducted. While there is an increasing body of literature on the topic of plastic money and digital payment systems, the majority of research to date is focused on one or more of the following: intention to use the system, perceived usefulness of the system, technology acceptance of the system, customer satisfaction with the system, system security issues, and ease of use of the system [10]. Although these previous studies give good knowledge about digital payment adoption, these studies do not explain well the ecological effects of cashless consumption, behavioral sustainability, and the new idea of "green transaction behavior" [11].

Experts claim that very little attention has been given to analyzing if frictionless digital payment systems cause overconsumption when these systems decrease the awareness of actual spending among consumers. A major gap in the current studies is that sustainable consumer behavior, Behavioral Finance, and digital payment ecosystems are not combined well. Existing data does not show if plastic money usage helps conscious spending, supports paperless sustainability, or if plastic money usage increases carbon-heavy and unplanned purchasing actions [12].

Regarding the actions of cashless financial behavior, the balancing effect of environmental awareness, digital financial literacy, and ethical consumption orientation is not well studied by researchers. Experts claim that current academic literature does not show clear evidence from South India, especially the state of Tamil Nadu, even though Tamil Nadu has a unique socio-economic diversity and experiences a very fast digital transformation. Because this localized empirical investigation is absent in the region, the usefulness of current findings is restricted and theoretical advancement in emerging market economies is limited. Indeed, the advancement of theory is hindered when regional realities are ignored by researchers.

Many people believe that specific elements like the convenience of plastic money, perceived usefulness, digital financial literacy, security perception, and environmental awareness will guide green transaction behavior and ethical consumption orientation. When these elements guide green transaction behavior, sustainable consumption behavior and responsible spending patterns are eventually shaped. To understand consumer heterogeneity in a better way, age, income, education level, and urban-rural differences are included in this research as moderating variables. Under these existing conditions, the main goal of this scientific work is to study consumer perception toward plastic money and cashless consumption in Tamil Nadu while investigating how digital financial behavior is connected to sustainability results. It has been observed that plastic money usage has a direct relationship with green transaction behavior, and this investigation wants to analyze this path carefully. In the same manner, this work evaluates the way digital financial literacy and environmental consciousness influence sustainable consumption practices, while checking if frictionless payment systems make consumers behave in a responsible or impulsive way. Through these efforts, a strong contribution is made by this research to the growing discussion about sustainable digital finance and environmentally responsible consumer behavior in cashless economies.

Review of Literature

One of the biggest shifts in modern financial systems comes from the growth of plastic money. While plastic money began as a way to replace physical cash, plastic money transformed from basic credit cards into many digital payment instruments like debit cards, contactless smart cards, and mobile-linked systems [13]. The global shift to economies without cash was made faster because digital banking foundations and fintech creations improved. Experts claim that plastic money changed the way wealth is handled because digital payment instruments provide new ways for individuals with low income and wealthy people to manage funds. Plastic money was initially seen as a simple tool, but plastic money is now used by everyone. A transition toward cashless societies is being driven by the expansion of banking networks which allow people to avoid using paper bills. Inside the nation of India, the use of digital payment tools grew a lot because of financial reforms, the demonetization period, and government projects like Digital India [14,15]. The movement of individuals who buy things from paper bills to electronic payment ecosystems happened when UPI platforms, fintech programs, and banking digital changes grew quickly. It has been observed that individuals who buy things like cashless payment systems because of the ease of use, the quickness of movement, the way people can reach them, and gifts given for using them [7,15].

Consumer perception toward the financial institutions sector and the monetary matters have thoroughly examined how the general population views plastic money. In these specific academic fields, plastic money is investigated to understand the thoughts of the public regarding new ways of spending their wealth. Most academic works concentrate on the specific influencing factors that lead people to taking up and using plastic money repeated usage because plastic money changes daily routines significantly. It has been observed that elements like the utility, the simplicity of operation, the comfort of usage, and the feeling of protection are often named as primary reasons why people choose plastic money [2,16]. Experts claim that the Technology Acceptance Model and Theory of Planned Behavior provide the logical reasons for why individuals have specific plans for action toward plastic money in their lives. Because plastic money is seen as productive and fitting for daily living choices, many people choose to utilize plastic money frequently instead of using traditional cash [1,9].

Plastic money is adopted when the technology matches the emotional and physical needs of the individual. Electronic confidence and the feeling that a transaction is protected change how much a

person wants to perform electronic monetary actions while they are shopping or sending funds. Within recent reports, the influence of financial technology networks is highlighted because these networks offer money return bonuses, reward schemes, and specialized help for those who use plastic money [17].

Digital payment systems lead toward pleasure-seeking buying while money management discipline becomes weak in the mind of the user. Arrival of single-tap paying, automatic bank deductions, and phone wallet tools has made this situation stronger for every person using these tools. Experts claim that triggers like ease of use, fast moving of money, and bonus point systems change the inner mind feelings of individuals within digital payment systems [18]. Final results of spending are influenced by digital payment systems because the technology creates a path for spending without deep thinking. Digital financial literacy grew to be a vital factor that affects how individuals with purchasing power behave with their money. Experts claim that financial literacy includes the understanding, the expertise, and the capacity of individuals with purchasing power to handle their wealth well and judge their monetary choices [19]. When the world moves online, financial literacy reaches into the way individuals with purchasing power understand internet-based money transfers, safety hazards on the web, handling of exchanges, and ways to plan money usage digitally. These safety hazards on the web are considered by financial literacy when people use internet-based money transfers. Digital financial literacy remains necessary because digital financial literacy helps individuals with purchasing power to avoid losing their money while they participate in the modern economy.

Sustainable consumption is recognized as a primary focus in modern studies of buyers because human beings feel great worry for the world and the changing weather [20]. Specifically, green consumer behavior usually means that individuals make buying choices which protect the natural world and help economic methods that last long. Individuals who buy things give more attention to the moral origins of goods, the effect on nature, and how much carbon is used. It has been observed that many individuals choose items based on sustainability attributes. In the middle of financial networks, the idea of green transaction behavior is not yet fully understood even though electronic payment methods are growing very fast. Definitions of green transaction behavior describe the way that buyers do money activities in a manner that protects the environment, which includes banking without paper and using less physical money [21].

Many people believe that green transaction behavior involves optimizing digital movements of wealth. Frequently, digital payment methods are supported by leaders because these methods reduce the making of paper and lower the cost of moving money through streets. Digital transaction records and paperless banking initiatives are observed by many people to provide a helpful choice that protects the environment more than the old ways of handling wealth [3,8]. Academic experts believe that negative outcomes for nature often come from digital consumption environments even when people do not expect them. Because electronic payments offer a high level of ease and quickness, many individuals choose to engage in the excessive buying of items which causes harm to the planet [22]. Cashless transactions are linked to behavior where people desire many physical objects because the process of buying happens so fast. The main objectives of the present study are to critically analyse the impact of plastic money usage on sustainability in the state of Tamil Nadu and to find out the perception of consumers, green transaction behaviour, responsible consumption behaviour and environmentally conscious financial behaviour in the digitized economic landscape.

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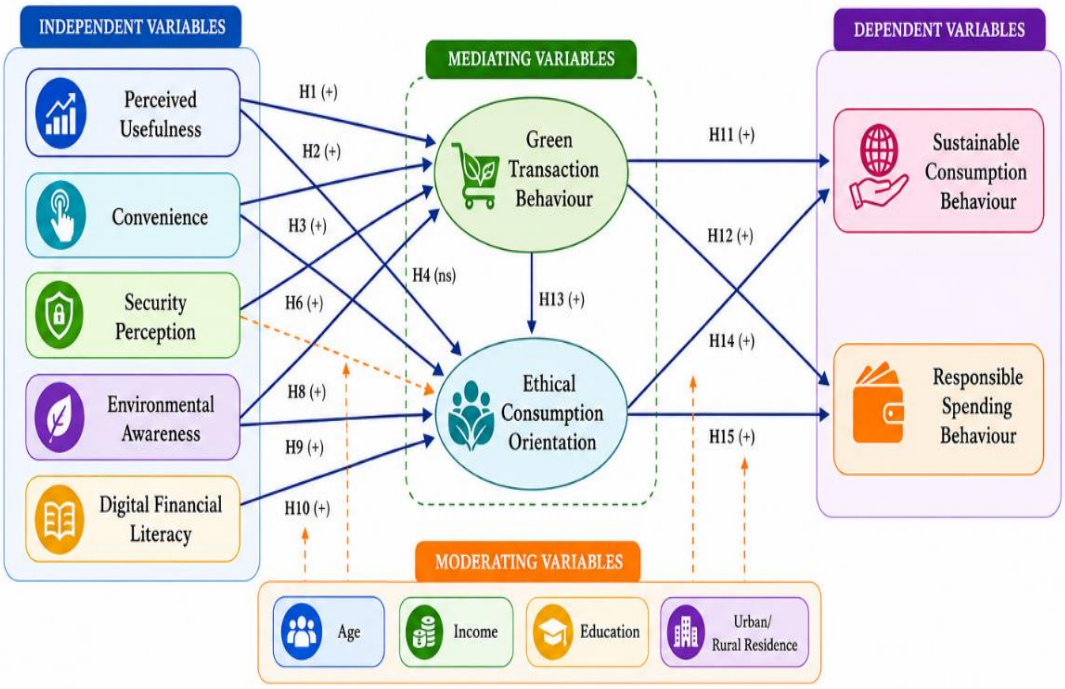

Figure 1. Proposed Hypothesized Model

Methodology

The research seeks to understand the impacts of plastic money usage on sustainability by assessing the relationship that exists among cashless consumption, green transaction behavior, and sustainable consumer practices. The research seeks to validate various relationships between the usage of plastic money, awareness about environmental issues, financial literacy, and sustainable consumer behavior. Thus, it is believed that the positivist paradigm would be ideal for this purpose. Specialists point out that an excellent fit can be gained with quantitative cross-sectional research design in this case because this type of research design will assist in conducting systematic measurements related to consumer perceptions, transaction behaviors, environmental awareness, and sustainable consumption practices through statistical calculations. The consumers, who are known to use plastic money and digital payment systems in the region of Tamil Nadu, represent the target population because the usage of cashless transaction systems has been widely noted among such people. It is also important to note that the stratified random sampling design would be employed by the investigators in order to achieve better results, which means dividing the groups into urban and semi-urban strata before selecting respondents in a purely random manner in each stratum. In total, the number of survey participants will amount to 480, which meets the minimum recommended ratio for respondents and items in a model of latent variables. Primary data collection is achieved through the usage of a structured questionnaire applied directly to the surveyed respondents. The instrument is prepared with the help of scales developed in previous studies. The structural equation modeling of data collected is going to be conducted via SPSS and AMOS because of the opinion that these programs conduct highly reliable scientific analysis.

Result and Discussion

Based on the demographics of the respondents, there is an equal number of respondents who participated in the survey based on gender, age, educational qualifications, occupations, income level, residential area, and frequency of using plastic money for transactions. There were 53.5% male and 46.5% female respondents, showing gender equality among the participants in terms of their digital financial

involvement. This shows the increasing involvement of different demographics in terms of access to cashless finance in Tamil Nadu.

Table 1. Simple Percentage analysis of Demographic Profile (N = 480)

Variables	Category	Frequency	Percentage	Mean	SD
Gender	Male	257	53.5	1.4646	0.49926
	Female	223	46.5		
Age Group	Below 20 Years	32	6.7	2.8104	1.04367
	21–30 Years	181	37.7		
	31–40 Years	151	31.5		
	41–50 Years	78	16.3		
	Above 50 Years	38	7.9		
Educational Qualification	School Level	67	14.0	3.0646	1.19410
	Diploma	73	15.2		
	Undergraduate	155	32.3		
	Postgraduate	132	27.5		
	Doctorate	53	11.0		
Occupation	Student	109	22.7	2.7917	1.24223
	Salaried Employee	63	13.1		
	Business/Self-employed	167	34.8		
	Homemaker	101	21.0		
	Retired	40	8.3		
Monthly Income	Below Rs.20,000	100	20.8	2.5750	1.20308
	Rs.20,001–Rs.40,000	154	32.1		
	Rs.40,001–Rs.60,000	114	23.8		
	Rs.60,001–Rs.80,000	74	15.4		
	Above Rs.80,000	38	7.9		
Residential Area	Rural	89	18.5	2.2958	0.76181
	Semi-Urban	160	33.3		
	Urban	231	48.1		
Usage Frequency of Plastic Money	Daily	202	42.1	1.9563	1.00943
	Weekly	150	31.3		
	Monthly	75	15.6		
	Occasionally	53	11.0		
Frequently Used Payment Methods (* Multiple Response)	Debit Card	380	79.2	—	—
	Credit Card	245	51.0		
	Smart Card	168	35.0		
	Contactless Card	290	60.4		
	Mobile Wallet	420	87.5		
	UPI-linked Card	445	92.7		

The age demographics show that there were more young respondents involved in the cashless finance process. The largest share of respondents aged between 21-30 years accounted for 37.7%, followed by those aged between 31-40 years accounting for 31.5%. This shows that younger individuals are more technologically savvy to be able to participate in fintech transaction-based operations. Being younger means that individuals are more open-minded towards cashless transactions since more young people

have mobile phones and easy internet access.Further demographic information showed that there were more undergraduate and postgraduate respondents than others. Undergraduates made up 32.3% and postgraduates made up 27.5% of the respondents. Based on this, one can say that educational qualifications are important in contributing to awareness regarding cashless transactions among individuals.According to the occupational distribution, business and self-employed people made up the largest occupational category (34.8%). Students comprised 22.7%, while homemakers comprised 21%. It is evident from these observations that people engaged in business transactions are increasingly resorting to online modes of payments due to the convenience of making such payments and the increased efficiency. Regarding income distribution, middle-income customers made up the biggest share of users of plastic money systems. Customers earning an income ranging between Rs.20,001-Rs.40,000 were the biggest category of customers, which constitutes 32.1% of total customers. Similarly, respondents earning Rs.40,001-Rs.60,000 constitute another sizable portion of respondents, representing 23.8%. The presence of middle-income respondents indicates that plastic money systems have become popular tools among middle-income households. Urban customers were the largest respondents at 48.1%. Meanwhile, semi-urban residents were the second biggest respondent category at 33.3%. In addition, rural respondents made up 18.5% of respondents. It can be observed that a large number of urban residents participated in this survey, indicating the existence of better technological facilities in the urban area.

In terms of frequency of usage, 42.1 percent of individuals responded to use plastic money in their day-to-day transactions, whereas 31.3 percent of individuals use such systems on a weekly basis. Thus, it is clear from the findings that an increasing number of individuals have started relying more on the digital transaction culture. Frequent usage of digitally-integrated systems indicates that individuals have started relying heavily on these systems for everyday transactions. Multiple responses related to the usage of payment methods also show that there is a rise in the domination of digitized payment systems. UPI-based card payment systems turned out to be the most popular payment system (92.7 percent), followed by mobile wallets (87.5 percent) and debit cards (79.2 percent). It can thus be concluded that there has been a rapid growth in the fintech industry in India and individuals tend to opt for more digitized payments now than before.

Table 2. Exploratory Factor Analysis - Rotated Component Matrix

	Component								
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
PU1	-.035	.051	-.022	**.814**	-.008	.031	.078	.061	.092
PU2	-.021	.024	-.003	**.815**	.006	.074	.126	.060	.082
PU3	.004	-.068	.044	**.807**	-.021	.122	.076	.061	.128
PU4	.043	-.051	-.041	**.808**	-.060	.003	.070	.089	.135
PU5	-.006	.031	-.036	**.823**	-.039	.046	.074	.043	.131
CON1	**.859**	-.034	.030	-.023	-.029	.012	.027	.075	.033
CON2	**.842**	-.060	.016	-.014	-.034	.054	.056	.047	.071
CON3	**.852**	.015	-.024	.042	-.062	.073	-.051	.038	.054
CON4	**.813**	-.022	.008	-.020	.052	.012	-.032	.059	.118
CON5	**.842**	-.005	.021	-.002	.000	.045	.056	-.009	.121
SP1	-.008	**.817**	-.002	-.074	.046	.092	.094	.018	.133
SP2	-.021	**.860**	.033	-.005	-.016	.043	.011	.011	.040
SP3	.036	**.827**	-.003	.027	-.020	.066	-.044	.013	.090

SP4	-.055	**.853**	-.015	.042	-.005	.072	.029	.011	.117
SP5	-.062	**.848**	-.041	.000	-.011	-.028	-.023	.040	.097
EA1	.024	-.057	**.840**	-.007	-.025	.046	.137	.047	.066
EA2	.023	.001	**.790**	-.015	.019	.115	.079	.113	.108
EA3	-.006	.008	**.844**	-.003	.001	.031	.124	-.027	.108
EA4	.044	.024	**.834**	-.012	-.006	.055	.068	.023	.061
EA5	-.033	-.005	**.846**	-.021	-.006	.109	.034	.024	.077
DFL1	.022	-.012	.009	.000	**.826**	.043	.122	.117	.018
DFL2	-.038	-.008	-.076	-.001	**.802**	.026	.177	.018	.063
DFL3	-.081	-.058	.049	-.031	**.782**	.118	.139	.061	.056
DFL4	.006	.021	.014	-.037	**.835**	.046	.080	.010	.000
DFL5	.016	.044	-.014	-.051	**.836**	.031	.066	.047	.105
GTB1	.027	.105	.046	.175	.079	.249	.042	.181	**.641**
GTB2	.051	.086	.094	.169	.129	.227	.043	.098	**.669**
GTB3	.185	.129	.141	.110	.053	.093	.105	.191	**.658**
GTB4	.166	.190	.138	.066	.030	.042	.067	.130	**.621**
GTB5	.061	.065	.075	.158	.000	.089	.172	.078	**.709**
ECO1	.000	.037	.123	.114	.138	.147	**.681**	.129	.077
ECO2	.017	-.007	.022	.015	.105	.134	**.752**	.034	.151
ECO3	.021	.015	.130	.070	.122	.184	**.702**	.173	.058
ECO4	-.037	.043	.144	.152	.204	.235	**.613**	.174	.029
ECO5	.050	-.014	.104	.160	.122	.188	**.667**	.126	.088
SCB1	.042	.078	.053	.065	.017	**.727**	.165	-.012	.149
SCB2	.040	.035	-.006	.033	.021	**.722**	.229	.058	.121
SCB3	.107	.058	.088	.069	.018	**.693**	.213	.112	.044
SCB4	.037	.019	.120	.064	.092	**.710**	.090	.157	.100
SCB5	-.016	.055	.102	.040	.114	**.732**	.096	.004	.153
RSB1	.008	.036	.091	.051	.059	.054	.086	**.714**	.133
RSB2	.124	-.006	-.014	.084	.020	-.031	.110	**.716**	.179
RSB3	.028	.008	.001	.009	.016	.085	.109	**.692**	.106
RSB4	.085	.025	-.019	.044	.133	.093	.089	**.679**	.005
RSB5	-.035	.019	.099	.104	.003	.071	.093	**.646**	.104
Kaiser-Meyer-Olkin Measure of Sampling Adequacy 0.881, df. 990, Sig. 0.000									
Eigen Values	**7.576**	**3.868**	**3.796**	**3.530**	**3.414**	**2.161**	**2.031**	**1.518**	**1.171**
Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.									

The Exploratory Factor Analysis (Table 2) was performed in order to identify the dimensionality of the latent constructs. The value of KMO is 0.881, which shows excellent sampling adequacy, whereas Bartlett's Test of Sphericity showed statistically significant results at $p < 0.001$, indicating the adequacy of performing the analysis on the given dataset. Nine components were extracted through the exploratory factor analysis, which had eigenvalues greater than 1.0. The components represented Convenience, Perceived Usefulness, Security Perception, Environmental Awareness, Digital Financial Literacy, Green Transaction Behavior, Ethical Consumption Orientation, Sustainable Consumption

Behavior, and Responsible Spending Behavior. All of the constructs have shown significant factor loadings in the rotated component matrix, with all factor loadings being above the recommended level of 0.60. Exceptionally high levels of factor loadings were identified for the Convenience construct, which ranged from 0.813 to 0.859, and indicated that the transaction process is perceived by consumers as convenient, accessible, and easy to manage, which is why they are engaging in cashless transactions. High levels of factor loading were observed for Perceived Usefulness, with factor loadings ranging from 0.807 to 0.823, indicating consumer perception that digital transactions are useful as financial tools. Similarly, high levels of factor loadings were observed for Security Perception (0.817 to 0.860), which indicates that consumers are engaging in digital transactions due to their confidence in transaction security. The Digital Financial Literacy variables showed very high factor loadings from 0.782 to 0.836, indicating that participants have significant knowledge about digital finance-related concepts and appropriate conduct while engaging in transactions. Moreover, the results revealed that Green Transaction Behaviour and Ethical Consumption Orientation are significant sustainability-focused constructs, implying the importance of environmental practices in transactions in the current age of fintech. In conclusion, the results of EFA show that the proposed construct is valid and empirically supported by data.

Table 3. Convergent Validity, Discriminant Validity and Reliability Assessment

Construct	Items	CR	AVE	√AVE	Result
Convenience	CON1–CON5	0.890	0.618	0.786	Valid & Reliable
Perceived Usefulness	PU1–PU5	0.877	0.590	0.768	Valid & Reliable
Security Perception	SP1–SP5	0.893	0.626	0.791	Valid & Reliable
Environmental Awareness	EA1–EA5	0.891	0.620	0.787	Valid & Reliable
Digital Financial Literacy	DFL1–DFL5	0.882	0.599	0.774	Valid & Reliable
Ethical Consumption Orientation	ECO1–ECO5	0.815	0.468	0.684	Valid & Reliable
Green Transaction Behaviour	GTB1–GTB5	0.796	0.439	0.663	Valid & Reliable
Sustainable Consumption Behaviour	SCB1–SCB5	0.805	0.453	0.673	Valid & Reliable
Responsible Spending Behaviour	RSB1–RSB5	0.763	0.392	0.626	Valid & Reliable

The construct reliability and convergent validity was assessed using Composite Reliability (CR), Average Variance Extracted (AVE) and square root of AVE (√AVE) (Table 3). All CR values were found to be above the accepted threshold value of 0.70, signifying reliable measurement and consistent internal consistency level. Constructs like Security Perception (CR=0.893), Environmental Awareness (CR=0.891) and Convenience (CR=0.890) had high reliability values. Constructs like Security Perception, Environmental Awareness and Convenience had exceptionally high levels of reliability. This confirmed the internal consistency and measurement reliability of constructs relating to technology and sustainability. Most of the AVE values for constructs were at or close to the accepted value of 0.50, showing satisfactory levels of convergent validity. Constructs such as Responsible Spending Behaviour and Green Transaction Behaviour had slightly less than the recommended AVE value but the CR value was greater than 0.70 and therefore fulfilled the criterion set by Structural Equation Modelling literature for acceptable reliability. The value of √AVE exceeded inter-construct correlations and confirmed construct discriminant validity.

The Confirmatory Factor Analysis has been performed in order to test the validity of the measurement model and overall model fitness (Table 4). A number of goodness-of-fit indices have been considered in order to determine the adequacy of the proposed framework. The findings show good fit of the model

with respect to all key indices. The normed chi-square value (CMIN/DF) stands at 1.104, indicating a relatively small discrepancy between the observed covariance matrix and the one estimated by the model, since the suggested threshold is equal to 3.00. In addition, the RMSEA value (0.015) and the RMR value (0.012) indicate that the model fits well and that there is relatively little residual variance. Good incremental fit index values of CFI (0.990), IFI (0.990), and TLI (0.989) substantially exceed the threshold level (0.90), indicating excellent fit. GFI (0.916) and AGFI (0.907) show acceptable model absolute fit.

Table4. Model Fit Indices of the Structural Equation Model

Fit Index	Recommended Threshold	Obtained Value	Model Fitness
Chi-square (CMIN)	Lower value preferred	1027.403	Acceptable
p-value	> 0.05 desirable	0.015	Acceptable*
CMIN/DF	< 3.00	1.104	Excellent Fit
RMR	< 0.08	0.012	Excellent Fit
GFI	> 0.90	0.916	Good Fit
AGFI	> 0.90	0.907	Good Fit
PGFI	> 0.50	0.824	Good Fit
NFI	> 0.90	0.904	Good Fit
IFI	> 0.90	0.990	Excellent Fit
TLI	> 0.90	0.989	Excellent Fit
CFI	> 0.90	0.990	Excellent Fit
PNFI	> 0.50	0.851	Good Fit
PCFI	> 0.50	0.931	Good Fit
RMSEA	< 0.08	0.015	Excellent Fit
PCLOSE	> 0.05	1.000	Excellent Fit

The hypotheses proposed were tested by Structural Equation Modeling (Table 5). As can be seen from the results, Perceived Usefulness exerted a significant effect on Green Transaction Behaviour ($\beta = 0.397$, $p < 0.001$) and Ethical Consumption Orientation ($\beta = 0.312$, $p < 0.001$). Consequently, customers who perceived digital payment methods as convenient and advantageous tended to have a greener transaction practice and behave ethically. Convenience had a significant effect on Green Transaction Behaviour ($\beta = 0.274$, $p < 0.001$). Therefore, consumers found convenience in transactions could lead to sustainable transaction practices.

Table 5.Maximum Likelihood Estimates-Standardized Regression Weights

Observed Variables		Latent Variables	Estimate	S.E.	C.R.	P
Green_Trans_Behaviour	<	Perceived_Usefulness	.397	.036	7.751	***
Ethical_Consum_Orientation	<	Perceived_Usefulness	.312	.039	6.250	***
Green_Trans_Behaviour	<	Convenience	.274	.031	5.778	***
Ethical_Consum_Orientation	<	Convenience	.066	.033	1.437	.151
Green_Trans_Behaviour	<	Security_Perception	.308	.030	6.400	***
Ethical_Consum_Orientation	<	Security_Perception	.067	.033	1.457	.145
Green_Trans_Behaviour	<	Environmental_Awareness	.279	.031	5.854	***
Ethical_Consum_Orientation	<	Environmental_Awareness	.302	.037	6.127	***
Green_Trans_Behaviour	<	Digital_Finan_Lit	.205	.031	4.410	***
Ethical_Consum_Orientation	<	Digital_Finan_Lit	.391	.040	7.515	***
Sus_Consump_Behaviour	<	Green_Trans_Behaviour	.311	.064	5.472	***

Responsible_Spend_Behav	<	Green_Trans_Behaviour	.358	.064	5.639	***
Sus_Consump_Behaviour	<	Ethical_Consum_Orientation	.454	.061	7.420	***
Responsible_Spend_Behav	<	Ethical_Consum_Orientation	.287	.054	4.728	***
CON5	<	Convenience	.805			
CON4	<	Convenience	.769	.049	18.281	***
CON3	<	Convenience	.816	.050	19.755	***
CON2	<	Convenience	.818	.049	19.808	***
CON1	<	Convenience	.828	.051	20.120	***
PU5	<	Perceived_Usefulness	.796			
PU4	<	Perceived_Usefulness	.778	.056	18.007	***
PU3	<	Perceived_Usefulness	.782	.055	18.138	***
PU2	<	Perceived_Usefulness	.789	.053	18.317	***
PU1	<	Perceived_Usefulness	.769	.056	17.775	***
SP5	<	Security_Perception	.814			
SP4	<	Security_Perception	.836	.050	20.726	***
SP3	<	Security_Perception	.780	.048	18.888	***
SP2	<	Security_Perception	.818	.048	20.132	***
SP1	<	Security_Perception	.789	.049	19.188	***
EA5	<	Environmental_Awareness	.811			
EA4	<	Environmental_Awareness	.792	.048	19.113	***
EA3	<	Environmental_Awareness	.819	.048	19.980	***
EA2	<	Environmental_Awareness	.765	.051	18.268	***
EA1	<	Environmental_Awareness	.820	.049	19.996	***
DFL5	<	Digital_Finan_Lit	.801			
DFL4	<	Digital_Finan_Lit	.781	.055	18.215	***
DFL3	<	Digital_Finan_Lit	.758	.052	17.555	***
DFL2	<	Digital_Finan_Lit	.780	.051	18.175	***
DFL1	<	Digital_Finan_Lit	.796	.054	18.648	***
SCB1	<	Sus_Consump_Behaviour	.698			
SCB2	<	Sus_Consump_Behaviour	.691	.076	12.935	***
SCB3	<	Sus_Consump_Behaviour	.674	.074	12.670	***
SCB4	<	Sus_Consump_Behaviour	.663	.074	12.497	***
SCB5	<	Sus_Consump_Behaviour	.686	.078	12.856	***
RSB1	<	Responsible_Spend_Behav	.667			
RSB2	<	Responsible_Spend_Behav	.671	.087	11.309	***
RSB3	<	Responsible_Spend_Behav	.616	.085	10.648	***
RSB4	<	Responsible_Spend_Behav	.581	.086	10.180	***
RSB5	<	Responsible_Spend_Behav	.575	.079	10.103	***
ECO3	<	Ethical_Consum_Orientation	.699	.077	12.852	***
ECO2	<	Ethical_Consum_Orientation	.645	.075	12.029	***
ECO4	<	Ethical_Consum_Orientation	.694	.074	12.783	***
ECO5	<	Ethical_Consum_Orientation	.679			
ECO1	<	Ethical_Consum_Orientation	.671	.074	12.434	***
GTB2	<	Green_Trans_Behaviour	.673	.083	12.099	***
GTB1	<	Green_Trans_Behaviour	.666			

GTB3	<	Green_Trans_Behaviour	.690	.082	12.340	***
GTB4	<	Green_Trans_Behaviour	.592	.077	10.904	***
GTB5	<	Green_Trans_Behaviour	.638	.083	11.601	***

On the other hand, Convenience had no significant effect on Ethical Consumption Orientation ($\beta = 0.066$, $p > 0.05$). Therefore, even though the customers used cashless payment methods, they were still unable to adopt an ethical consumption orientation. Finally, Security Perception had a significant effect on Green Transaction Behaviour ($\beta = 0.308$, $p < 0.001$). As such, transaction safety and security led to green transaction practices.

Table 6. Hypothesis Testing Results of Structural Equation Modeling

Hypothesized Relationship	Estimate	S.E.	C.R.	p-value	Result
Green Transaction Behaviour ← Perceived Usefulness	0.397	0.036	7.751	***	Supported
Ethical Consumption Orientation ← Perceived Usefulness	0.312	0.039	6.250	***	Supported
Green Transaction Behaviour ← Convenience	0.274	0.031	5.778	***	Supported
Ethical Consumption Orientation ← Convenience	0.066	0.033	1.437	0.151	Not Supported
Green Transaction Behaviour ← Security Perception	0.308	0.030	6.400	***	Supported
Ethical Consumption Orientation ← Security Perception	0.067	0.033	1.457	0.145	Not Supported
Green Transaction Behaviour ← Environmental Awareness	0.279	0.031	5.854	***	Supported
Ethical Consumption Orientation ← Environmental Awareness	0.302	0.037	6.127	***	Supported
Green Transaction Behaviour ← Digital Financial Literacy	0.205	0.031	4.410	***	Supported
Ethical Consumption Orientation ← Digital Financial Literacy	0.391	0.040	7.515	***	Supported
Sustainable Consumption Behaviour ← Green Transaction Behaviour	0.311	0.064	5.472	***	Supported
Responsible Spending Behaviour ← Green Transaction Behaviour	0.358	0.064	5.639	***	Supported
Sustainable Consumption Behaviour ← Ethical Consumption Orientation	0.454	0.061	7.420	***	Supported
Responsible Spending Behaviour ← Ethical Consumption Orientation	0.287	0.054	4.728	***	Supported

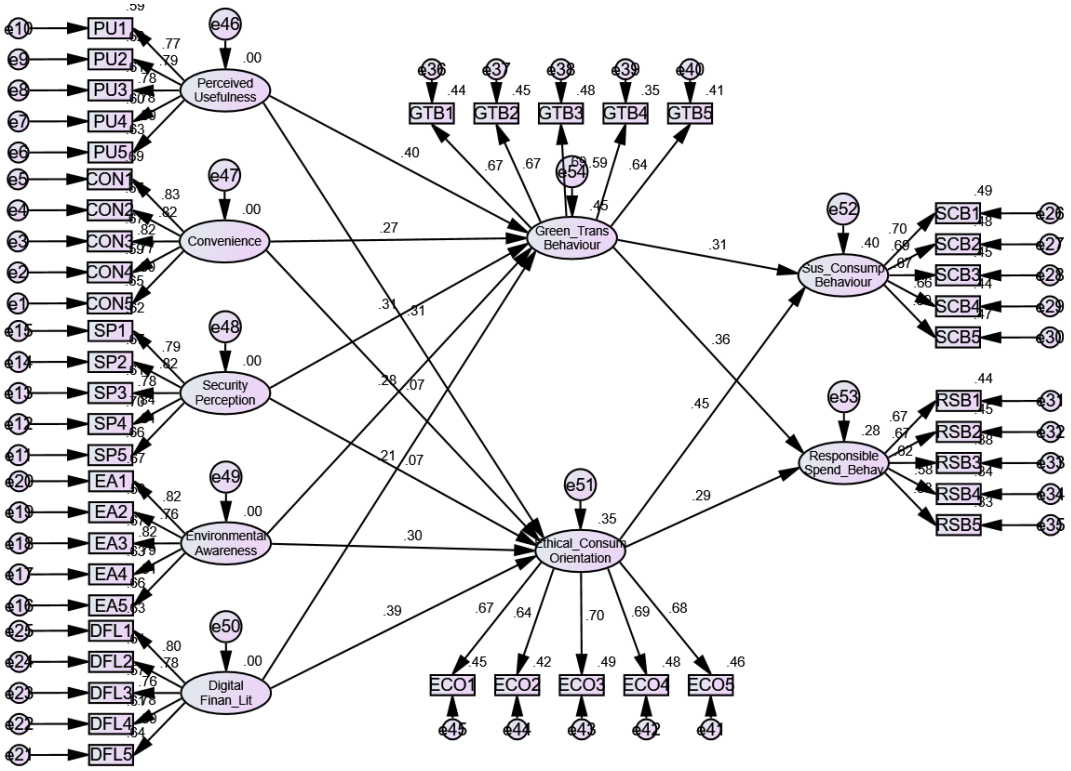

Figure 2. The standardized path coefficients and measurement loadings of the proposed Structural Equation Model

The construct of Environmental Awareness proved to be a powerful predictor of sustainability orientation, significantly impacting Green Transaction Behaviour ($\beta = 0.279$, $p < 0.001$) and Ethical Consumption Orientation ($\beta = 0.302$, $p < 0.001$). These results support the hypothesis that environmentally conscious customers are more prone to engaging in sustainable transactions and making ethically responsible decisions when purchasing products. The Digital Financial Literacy construct revealed strong positive impacts on Green Transaction Behaviour ($\beta = 0.205$, $p < 0.001$) and Ethical Consumption Orientation ($\beta = 0.391$, $p < 0.001$). The close connection between digital financial literacy and ethical consumption orientation emphasizes the importance of financial education in cultivating sustainable behavior related to finances.Green Transaction Behavior had considerable influence on both Sustainable Consumption Behavior ($\beta = 0.311$, $p < 0.001$) and Responsible Spending Behavior ($\beta = 0.358$, $p < 0.001$). Ethical Consumption Orientation had the greatest effect on Sustainable Consumption Behavior ($\beta = 0.454$, $p < 0.001$). All these results confirm that both ethics and environmental responsibility contribute to the formation of sustainable cashless consumer behavior. In general, the findings suggest that sustainable cashless consumer behavior does not depend only on the benefits associated with technology but also on such aspects as environmental consciousness, ethics, and financial knowledge.

Research Implications

This study offers significant contributions to the growing body of knowledge and discourse surrounding sustainable digital finance, green transactional behavior, and responsible consumption behaviors in emerging cashless economies. By combining aspects of technological adoption theories with environmental sustainability-related behaviors, the study provides significant insights on how digital finance ecosystems affect environmentally friendly financial transactions. The findings have important

implications for future theory building efforts, consumer behavior studies, fintech policy formulation, and digital financial governance aimed at promoting environmental sustainability. The findings of this study will offer great insights for government agencies, financial institutions, fintech organizations, sustainability advocates, and consumers' financial behavior educators. Specifically, the findings indicate that the emergence of cashless economies needs to be examined from an environmental perspective rather than just focusing on issues of transaction efficiency or even the degree of financial inclusion. For policymakers and governments, the study underscores the importance of integrating environmental sustainability principles into national digital finance policies. India's shift towards a digitally inclusive payment economy through the use ofUPI payment ecosystem has been driven mainly by issues of financial inclusion and transaction efficiency. However, the findings of this study suggest that the same shift to cashless societies might lead to consumer behaviors. Therefore, policymakers ought to ensure that sustainability education forms part of digital literacy initiatives in order to promote sustainable transaction habits and avoid frictionless consumption. These results are especially applicable to the case of Tamil Nadu due to the fact that there is both technological saturation as well as significant socio-economic disparity in the state. Given that most digitally savvy users are younger and urban-educated, sustainability measures aimed at these demographics could prove to be fruitful.

Moreover, it is crucial to draw managerial implications related to financial institutions and fintech companies from the results of the study as well. It is evident from the results that consumers perceive modern digital finance as something convenient, efficient, and environmentally friendly. As a consequence, it becomes possible for banks and fintech organizations to engage customers through their digital payment systems more effectively by promoting a 'green' image. For example, it is possible to provide clients with an opportunity to track their carbon footprint, understand the impact of their purchases from the perspective of sustainability, receive special ecological payments after transactions, or monitor their ethical expenditures. In addition, one should note the importance of financial literacy among consumers who demonstrate a better ethical consumption orientation. Fintech organizations should stop concentrating solely on providing services and start educating their clients. Thus, fintech organizations should consider using digital financial platforms to help customers manage their finances effectively and spend money responsibly. Finally, it is worth discussing the statistical insignificance of the impact of convenience and security perception on ethical consumption orientation. The current focus of fintech organizations on such concepts as speed and security does not necessarily mean that consumers will act ethically or sustainably.

The results can be used to point out an interesting paradox in the case of cashless economies from a sustainable governance standpoint. While electronic payments are likely to lower paper and money usage, the very smoothness and efficiency of digital financial systems may contribute to more impulsive and excessive purchases. As such, there is reason for concern about how the environment is affected by digitally enhanced consumerism. Thus, the sustainable development of fin-tech should consider both technological advancement and behavioral regulation. At the same time, the importance of the research does not lie in demonstrating that the sustainability issues related to cashless economies go beyond finance. Rather, the findings reveal that digitized financial systems have a significant impact on consumer behavior, ethics, and sustainability. In other words, cashless payment systems are far from being behaviorally inert systems that merely process financial transactions. They affect consumer perceptions and decisions in terms of making purchases. This is especially true today as the world rapidly transforms into a digital economy. Should cashless systems make consumers spend more without considering sustainability, all the advantages of digital finances concerning lower paper use would be negated.

Conclusion

The shift towards the cashless economy has brought about radical changes in terms of how consumer behavior is practiced today. In this dynamic context, the current study explored the issue of sustainability from the perspective of plastic money, specifically by establishing the association between digital payment behavior, green transaction behavior, ethical consumption orientation, and sustainable consumption behavior among the consumer population of Tamil Nadu. Rather than focusing on issues relating to the technology itself, the current study adopted a holistic approach to address a significant omission in previous digital payment research by looking at cashless consumption from the perspectives of sustainability and behavioral finance. It was found that the factors that determine sustainable cashless consumption include the usual considerations of effectiveness, efficiency, and convenience, but also other elements such as environmental awareness and digital financial literacy. The data show that usefulness, convenience, perception of security, environmental awareness, and digital financial literacy were important influences on green transaction behavior, while environmental awareness and digital financial literacy played major roles in influencing ethical consumption orientation. The study also found that green transaction behavior and ethical consumption orientation had a considerable impact on sustainable consumption and spending behaviors. Equally significant was the presence of surprising results that would help in theoretical development. Although convenience and security perception played an important role in encouraging green transactions, they were not effective in encouraging ethical consumption orientation among consumers. It means that technological advancements cannot be the sole means of developing a sustainable consumerism perspective among consumers. The promotion of ethical consumption and responsible behaviors requires more than technological integration; it requires increased awareness and knowledge about the environment among individuals. The findings imply that the future of cashless societies should not only focus on the volume of transactions conducted but also responsible financial behaviors.

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