



Supply Chain Finance: A Study on the Use of E-Money

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Abstract

Supply Chain Finance (SCF) is the process of managing the necessary financing for the execution of procurement, production, storage and distribution processes. Cash flows have become a crucial element in Supply Chain Management (SCM) for companies. SCF is a topic that companies should focus more on, especially during times of high interest rates and stagnant markets. With the advancement of technologies, new payment services offered to consumers support SCF processes. E-Money is one of the significant examples of this. It has been frequently used in retail recently. E-Money is monetary value issued in exchange for accepted funds, stored electronically, and used for payments. E-Money can be used via virtual and physical cards. E-Money is also known as prepaid cards. In the retail sector, A-101's Hadi and Şok Market's Win application are notable examples in this field. Companies' E-Money applications are crucial for SCF. The ability for consumers to shop using cash loaded onto virtual E-Money cards (accounts) allows companies to utilize the money during the period between the cash being loaded and the expenditure being made. This situation provides a significant advantage in companies' cash flows. The current research examined how consumers perceive this process. The Technology Acceptance Model (TAM), which is frequently used in the acceptance of new technologies, was employed in the research. Due to the examination of multiple variables and their relationships in the research, the Structural Equation Model (SEM) was used. The Smart-PLS 4 package program was used during the analysis process. According to the results obtained, it can be said that consumers are considering completing their shopping using retailers' e-money. The positive impact of PU on AT and AT on intention are among the significant outcomes of the research. Since consumers have actively used many digital payment methods, especially after COVID-19, it is likely that they will adapt to the use of E-Money and digital payment applications in the future.

Keywords: Logistics, Supply Chain Management, Supply Chain Finance, Finance, E-Money



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I. Introduction

Digitalization continues to develop with the changing individual and institutional needs every passing day. Especially in the early 2000s, the development of the internet facilitated communication and interaction over long distances. Concurrently, the advancement in smartphone technology has shown a linear increase in e-commerce volume. The rise in e-commerce has enabled the transition of retail trade to digital platforms. Although e-commerce activities hold a significant place today, when examined specifically in Turkey, its share in retailing is around 20% (Ministry of Trade, 2024).

Ultimately, the volume of in-store retail in trade activities remains quite significant. However, the retail sector has started to utilize digitalized activities. Particularly with the COVID-19 pandemic, the increase in people's e-commerce activities has digitalized both purchasing processes and payment methods (Toraman & Yüksel, 2022). In this context, contactless payment, Instant and Continuous Transfer of Funds (FAST), e-wallet, Virtual POS, NFC payments, Gift Cards, QR code, Digital Money, Cryptocurrency, e-Money, etc., payment methods have been made available to consumers (Toraman, 2022).

Consumers, although limited, are using various payment methods. Retailers are also benefiting from these payment methods by improving their technological infrastructure. Retailers offer e-Money applications to their consumers, which are the subject of the research. E-Money is a monetary value that can be issued in exchange for funds. E-Money is stored electronically and used in payment methods. Another type of e-Money is prepaid cards. Prepaid cards are virtual or physical cards that can be used for payments in exchange for a specific amount of funds (TODEB, 2024). Currently, it is used by retailers such as A-101, Şok Market, and BİM. Additionally, e-Money can be offered to consumers in the form of prepaid cards like Ininal cards.

The characteristic of e-Money is that it grants the right to use it up to the amount of funds received. Moreover, no interest can be applied to the accepted funds. Retailers load e-Money that can be used via individuals' mobile applications in exchange for the funds they accept. When considered in this context, retailers have the right to use the funds they accept before the consumer's shopping. Ultimately, retailers can use these funds in the payment processes of the supply chain. Supply Chain Financing (SCF) is the use of funds obtained after sales in payments within the supply chain. E-Money can be seen as an additional financing method for retailers, especially

during periods of high-interest rates. The research examines the factors affecting the acceptance of current applications used by A-101 and Şok Market.

II. Supply Chain Finance

Supply Chain Management (SCM) involves the flow of goods and materials from procurement to the final point of consumption, while Supply Chain Finance (SCF) ensures the flow of cash generated from sales within the supply chain starting from the point of final consumption. SCF reduces the financial burden on supply chain stakeholders by providing financing (Gelsin et al., 2021). Additionally, it aims to achieve financial optimization for all parties within the supply chain. SCF methods include Reverse Factoring, Dynamic Discounting, and Confirmation (Zaman et al., 2023). In the Reverse Factoring model, buyers (purchasers) enter into an agreement with a financial institution to finance their suppliers' (sellers') invoices (Medina et al., 2023). In the Dynamic Discounting model, buyers pay suppliers' invoices early in exchange for a discount. In the Confirmation model, another form of supply chain finance, buyers make agreements with a financial institution to finance their suppliers' invoices (Gelsomino et al., 2016).

Managing working capital becomes crucial during periods of crisis and high interest rates. This necessitates optimizing the SCF process by considering various risks (Guida et al., 2021). SCF was utilized as a tool to ensure financial flow within supply chains after the 2008 financial crisis. In subsequent periods, it has been used as a method of protection against financial risks (Jia et al., 2020). For instance, the Reverse Factoring method allows for the secure collection of receivables. However, during times of high inflation and interest rates, as seen today, both accessing cash and conducting traditional SCF activities can be quite costly (Hofmann, 2011). Companies may consider optimizing their cash flows by going public to secure financing during such periods. Additionally, with the increase in technological innovations and their applications, SCF can be optimized in various ways (Gelsomino et al., 2019). One of these new technologies is e-Money. E-Money represents a monetary value issued in exchange for accepted funds and is stored electronically (Lekkakos & Serrano, 2016). Another type of e-Money is prepaid cards, which are separate forms of e-Money usage. Similarly, they represent a monetary value equivalent to the amount of funds provided (TODEB, 2024; Salameh et al., 2024). Additionally, there are 57 institutions in Turkey authorized to issue e-Money (TCMB, 2024). E-Money applications offered by Turkish retailers include Migros MONEY Pay, A-101 Hadi, Şok Market Win and BİM Market Bimpara.

This research focuses on how retailers can secure financing through the use of e-Money. Consumers load e-Money into mobile applications in exchange for a specified amount of funds. Subsequently, consumers can use the e-Money specific to the retailer's application to make payments for their purchases. According to e-Money regulations, e-Money cannot accrue interest; therefore, retailers offer discounts on purchases made with e-Money. This serves both as a marketing strategy to encourage repeat purchases and as a pre-financing method

for retailers with high transaction volumes in SCF processes. Although e-Money is seen as a new payment method enabled by technological advancements, it also provides retailers with funds before the actual purchase takes place. Retailers can use the funds received from customers prior to their purchases. These funds can be viewed as prepayments for future purchases. Retailers can use the obtained funds to ensure financial flow to suppliers, manufacturers, warehouses, distributors, and service providers within the SCM. Therefore, the focus of this research is to examine the factors influencing the acceptance and usage of e-Money.

III. Theory and Hypothesis

The use and acceptance of new technologies have always been an important issue for academia, domain experts, marketing professionals and industry stakeholders. They have a significant impact on shaping companies' strategies. E-Money is one of the innovations used in the payment field. In this study, identifying the factors influencing consumer usage is important for minimizing the risks in companies' SCF processes. In this context, the acceptance of e-Money, which is considered important in SCF processes, has been examined within the scope of the Technology Acceptance Model (TAM) by users. TAM, commonly used in the acceptance of new technologies, has also been used as the theoretical framework in this study. TAM emphasizes that the factors affecting the use of a technological innovation are Perceived Usefulness (PU), Perceived Ease of Use (PEOU), Attitude Towards Use (AT), and Intention (I). In this study, the Risk variable has been added to the research model in addition to TAM. The research model is shown in Figure 1.

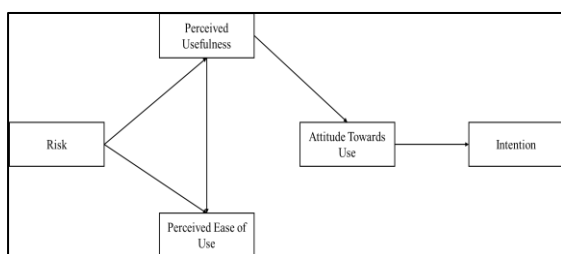


Figure 1. Research Model

Source: Authors' compilation

In addition to TAM, independent variables can be added to the research model based on the subject and content of the research. Therefore, in the current study, the Risk (R) variable has been added because the focus is on e-Money, a payment method used in retail sales. Risk is defined as the perception of whether one will encounter a risk when performing the relevant behavior (Pavlou, 2003; Kamal et. al., 2020). Hypotheses H1 and H2 have been formulated specifically for the risk variable.

H1: R have a positive and significant impact on PU

H2: R have a positive and significant impact on PEOU

According to the original TAM, PU is the degree to which a user believes that using the relevant technology will increase their personal performance. PEOU, on the

other hand, refers to the user's ability to complete tasks with less effort when using the relevant technology. Additionally, AT is defined as positive or negative thoughts towards performing the relevant behavior (Vorm & Combs, 2022). Research conducted within the framework of TAM has found a positive and significant relationship between PEOU and PU. Hypotheses H3 and H4 have been formulated specifically for PU, PEOU, and AT (Singh et. al., 2020).

H3: PEOU have a positive and significant impact on PU

H4: PU have a positive and significant impact on AT

Since e-Money as a payment method is not used by many people, active usage has been considered as the antecedent in the research, with Intention as the dependent variable. Studies in the literature have found positive and significant relationships between AT and I (Venkatesh & Bala, 2008; Ly & Ly, 2022). Hypothesis H5 has been formulated specifically for AT and I.

H5: AT have a positive and significant impact on I

The aim of the study is to examine the factors affecting the use of e-Money in the retail sector using the research model created. Additionally, since payments made with e-Money represent a financial process, the risk variable has been added to the model. The study attempts to explain intention, considered as the antecedent of active usage, as the dependent variable.

IV. Methodology

Since e-Money as a payment method is a new concept and technology, the study is exploratory in nature. Partial Least Squares-Structural Equation Modeling (PLS-SEM) has been used in the research. PLS-SEM is commonly used in studies that examine multiple variables and relationships. For these reasons, PLS-SEM has been used in the current study. The existing TAM scale has been revised for the content of the research and directed towards experts at the undergraduate level in International Trade, Logistics, Economics, and Finance, focusing on SCF and e-Money. Convenience sampling method was chosen for sample selection. The scale of the research consists of three sections. The first section contains information about retailers' e-Money applications. A 5-point Likert scale was used for the questions in the second section. The third section aimed to collect demographic information from the participants. Subsequently, the scale was tested on a small group for pilot analysis. After it was understood that there were no issues regarding reliability and validity, the data collection process began. The data for the research were collected through online platforms. The scale of the research was sent to 480 people, and a total of 345 responses were received. After cleaning and organizing the data, analysis was performed using 286 usable data. Smart PLS 4, a commonly used analysis program for PLS-SEM, was used for the analysis of the research. The Findings section thoroughly examines the outputs of the research.

V. Findings

The first step involved examining whether the research data were suitable for analysis using Skewness

and Kurtosis values. Since the values were between -1.5 and +1.5, the suitability for analysis was confirmed. Subsequently, reliability and validity analyses were conducted (Tabachnick et. al., 2013). In terms of reliability and validity, Factor Loadings analysis was performed first. This was followed by Cronbach's Alpha, Composite Reliability (CR), and Average Variance Extracted (AVE) analyses.

Table 1: Reliability Analysis

Variables	Variables	Factor Loadings	Cronbach's Alpha	CR	AVE
Risk	R1	0.891	0.791	0.857	0.667
	R2	0.776			
	R3	0.777			
Perceived Ease of Use	PEOU1	0.888	0.906	0.934	0.780
	PEOU2	0.839			
	PEOU3	0.906			
	PEOU4	0.899			
Perceived Usefulness	PU1	0.875	0.892	0.925	0.756
	PU2	0.865			
	PU3	0.923			
	PU4	0.811			
Attitude Towards Use	AT1	0.917	0.918	0.948	0.859
	AT2	0.926			
	AT3	0.938			
Intention	I1	0.927	0.927	0.953	0.872
	I2	0.948			
	I3	0.926			

Source: Smart PLS 4 Software Output

The Factor Loadings, Cronbach's Alpha, CR and AVE values are shown in Table 1. Upon examination of the Factor Loadings, Cronbach's Alpha and CR values, it was found that they were above 0.70. Additionally, the AVE values were found to be above 0.50, indicating that the research data meet the criteria for reliability and validity (Hair et. al., 2011; Hair et. al., 2019; Alnepak & Toraman, 2024).

Table 2: Discriminant Validity-Fornell-Larcker Criterion Analysis

Items	AT	I	PEOU	PU	R
AT	0.927				
I	0.835	0.934			
PEOU	0.629	0.620	0.833		
PU	0.687	0.717	0.783	0.870	
R	0.311	0.210	0.341	0.288	0.816

Source: Smart PLS 4 Software Output

The Discriminant Validity Analysis prepared according to the Fornell-Larcker Criterion is shown in Table 2. Upon examining the correlation table, it can be observed that variables, except for risk, are correlated. It is normal for the risk variable to show low correlation due to its structure. Additionally, the variables meet the requirement of having the highest correlation with themselves and lower correlations with others (Hair et. al., 2011; Hair et. al., 2019; Toraman, 2024).

Table 3: Outputs of Structural Model

Hypothesis	Relation	Path Coefficient	t value	p value	0.05> Supported
H1	R→PU	0.023	0.301	0.763	Not Supported
H2	R→PEOU	0.341	2.470	0.014	Supported
H3	PEOU→PU	0.775	11.637	0.000	Supported
H4	PU→AT	0.687	9.038	0.000	Supported
H5	AT→I	0.835	22.220	0.000	Supported

Source: Smart PLS 4 Software Output

Table 3 presents the results of the hypotheses related to the research model. The lack of a significant relationship between R and PU could be attributed to the perception of the risk factor being usage-oriented rather than performance-oriented. Except for hypothesis H1, the other hypotheses have been accepted. It is observed that there is a high effect between attitude and intention. In this context, supporting a positive perception towards e-Money applications is crucial for encouraging usage.

Table 4: R² Values

Items	R ²	Radj ²
AT	0.472	0.466
I	0.697	0.693
PEOU	0.117	0.107
PU	0.614	0.606

Source: Smart PLS 4 Software Output

Table 4 presents the R² values. Upon examining the values, it is important to note that the dependent variable I has an R² value close to 0.7. This indicates a strong percentage of explanation. A strong R² value is an indicator that the variables are added correctly to the research model (Hair et. al., 2011; Hair et. al., 2019).

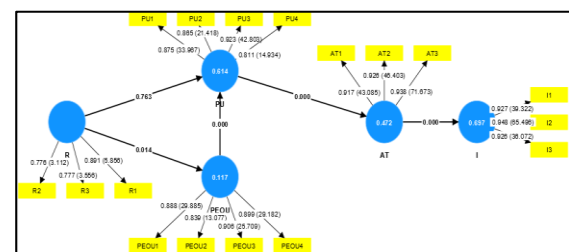


Figure 2. Research Model Outputs of Smart PLS 4

Source: Smart PLS 4 Software Output

Figure 2 displays the analysis results of the research model. It includes the factor loadings of the variables, t-values, Path Coefficients between hypotheses and R² Values. The outputs of the research are consolidated into a single figure.

VI. Discussion and Conclusion

The development of technology has changed past habits in many fields and different sectors. Manufacturers, retailers, customers, service providers and other supply chain members have embraced digitalization throughout the entire process from the supply process to product delivery, aiming to ensure product flow and customer satisfaction. This digitalization process optimizes product flow within the supply chain towards the final consumer point and also optimizes information as well as cash flow back to the origin. The use of e-Money in Supply Chain Finance (SCF) activities, which is the main theme of the research, has been emphasized. While traditional SCF methods such as Reverse Factoring, Dynamic Discounting and Confirmation are typically used in Supply Chain Management (SCM), recently, Buy Now Pay Later (BNPL) and Embedded Finance applications have been introduced. In addition, new technologies have been utilized in payment methods, including Contactless Payment, FAST, e-Wallet, Virtual POS, payment via NFC, Gift Card, QR Code, Digital Currency, Cryptocurrency, e-Money, etc., which have been made available to consumers.

The research specifically examines the role of e-Money and SCF optimization. E-Money can be used for payments from virtual or physical accounts or cards, up to the sum of funds available. However, for it to be used in payments, the monetary value to be used must be loaded onto physical cards or virtual accounts beforehand. This is precisely the point emphasized in the research, as customers must allocate a certain amount of funds to retailers for e-Money before making a purchase. During this period, the use of the allocated funds is under the control of the retailers until the purchase is made at the retail outlets. Retailers can manage the flow of funds obtained before the sale among the supply chain stakeholders. This situation is an important alternative in terms of cash flows.

The research investigates the factors influencing user adaptation of e-Money in payments. Ensuring cash flow within the supply chain is not overly complex. However, accessing cash during periods of high interest rates is both difficult and costly. It is crucial for the funds obtained through the use of e-Money to be used among supply chain stakeholders. In this context, the Technology Acceptance Model (TAM), commonly used in the acceptance of new technologies, has also been employed in the process of accepting e-Money in retail payments. As can be seen in Table 3 and Figure 2, the results of the research are consistent with the literature. Except for hypothesis H1, all other hypotheses were accepted. While there was a significant relationship between E and PEOU, the lack of a significant relationship with PU could be due to the perception of risk being usage-oriented rather than performance-oriented (Davis & Venkatesh, 1996). The significant and positive effect of PU on AT and of AT on I are among the important findings of the study. Additionally, the R² Values being close to 0.70 indicate a strong percentage of explanation.

Finally, with the increasing use of e-Money in the future, the scope of the current research can be expanded and repeated with different models and samples. It is believed that the results obtained will benefit many sectors, especially retail and finance. Particularly during periods of high interest rates and market stagnation, the use of alternative financing methods is important. The challenges faced by companies in their financing processes were addressed in the current research. Although limited, the use of e-Money can have a positive impact on these processes. During periods of high interest rates, companies' marketing and financial activities can be managed from a single point. This can be turned into a positive process by both retailers and consumers. With the use of e-Money, retailers can optimize their SCF activities and offer consumers advantageous prices through discounts and various promotions.

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