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# Intention to Adopt the Cash on Delivery (COD) Payment Model for e-Commerce Transactions: An Empirical Study

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**Abstract.** The cash on delivery (COD) model has been increasingly used in the last few years as a method of payment for e-commerce transactions. However, little research has empirically investigated the factors that influence customers' intention to adopt this method as opposed to traditional electronic payment methods. As a result, this paper aims to predict and test the factors that influence the customer's intention to adopt the cash on delivery (COD) model for e-commerce transaction payments. A research model of key influencing factors and three hypotheses was developed based on previous conceptual research. To test these hypotheses, a questionnaire was designed to collect the data, which were analysed using the partial least squares (PLS) method in SmartPLS software. The results of this study supported the hypothesis that perceived security, privacy and trust exerted significant influence on the customers' intention to adopt a COD payment system. The interpretation of the results and implications for practise and future research are also discussed.

**Keywords:** E-commerce, Online Payment Methods, Cash on Delivery (COD), Adoption

## 1 Introduction

Since the appearance of the first e-commerce website in 1995, various methods of online payment for e-commerce purchases have been used, including credit cards, debit cards, smart cards, e-cash, e-checks, e-wallet, and micropayment. However, during the past few years, a new method of payment called cash on delivery (COD) has been increasingly used. COD is different from all other methods of payment in terms of its processing, the time and place that the payment is made, the parties involved, and many other issues, including its security and privacy assurance (Reference removed). COD enables customers to make a payment in cash at the time a product is delivered to any location the customers choose. The use of this method is increasing in some countries. For example, in Vietnam, COD is accepted by 24 out of

the 33 (73%) surveyed e-commerce companies [19]. In India, COD accounts for 50–80% of online transaction payments [9], while in the United Arab Emirates, this number is about 60% [13]. However, although it has gained more popularity in the last few years, little empirical research has investigated the reasons that influence customers' intention to adopt this method of payment or what factors make customers favour COD over other methods. This research aims to fill this gap by developing a model of factors that might influence the customers' intention to use this method. It is worth mentioning that no previous empirical research study exists, which makes it impossible to compare these results with previous research. However, the predicted factors were revealed in a prior literature review but in a different context, which was used in this study to predict whether these factors are the reasons that motivate customers to accept it as an alternative to existing e-payment methods. In other words, this research suggested that the concerns that make customers reluctant to adopt e-payment methods are predicted to be the motivating factors for adopting COD for e-commerce transaction payments.

The remainder of the paper is organized as follows: Section two provides a literature review on e-commerce payment methods and related concerns, which led to developing the current research model and hypothesis. Section three describes the employed research method. Section four presents the research results. Section five provides a discussion and the practical implications followed by the research conclusion.

## **2 Literature review**

An electronic payment (e-payment) is a payment that is initiated, processed and received electronically over the Internet. Multiple methods of e-payment are used for e-commerce transactions, such as credit cards, prepaid cards or smart cards, e-cash (digital cash) and e-checks (digital checks). Among these, the credit card method is considered the most common e-payment method [21]. According to much previous research, perceived privacy, security and trust were the main critical factors or reasons that make customers reluctant to adopt existing e-commerce and e-payment methods [1, 2, 7, 14, 20, 22, 23, 27].

E-payments generate information that can be used to analyse customer purchasing behavior or to conduct other investigations, which can be used for purposes that violate customers' privacy. Chellappa [3] defined perceived privacy as the 'the subjective probability with which consumers believe that the collection and subsequent access, use, and disclosure of their private and personal information is consistent with their expectations' (pp. 12). Dinev, Xu, Smith, and Hart [8] defined it as 'an individual's self-assessed state in which external agents have limited access to information about him or her' (p. 299). Customers might have more control of their privacy when they use COD as a payment method because they do not have to release too much information about themselves and their purchases. Banks and e-commerce websites are unable to track the history of their cash transactions. The customers simply need to provide their mobile phone numbers to receive the product at any location (e.g., at work, at home or in any public place) to protect their privacy and avoid tracking. In

contrast, when a customer uses a credit card, every single transaction is recorded; banks, merchants or third parties can obtain this information and compile data about consumer purchasing behaviours, interests or preferences, which is an invasion of customer privacy for (Reference removed).

Security is still a consistent concern that prevents customers from engaging in e-commerce. Perceived security can be defined as 'the subjective probability with which consumers believe that their personal information (private and monetary) will not be viewed, stored, and manipulated during transit and storage by inappropriate parties in a manner consistent with their confident expectations[3]. The COD method provides customers with a more convenient way not only to ensure the security of their payment, as they do not have to release their credit cards online, but also to inspect the quality of the product itself at the time of delivery so they can confirm they have received the same product that they ordered, which also helps to build trust between the customer and the e-commerce company. In this situation, as opposed to an online payment transaction, two processes are checked and ensured: receiving the product as expected, which helps to build trust, and payment by cash, which gives the feeling of security and eliminates the Internet's risks/threats. Obviously, this method provides advantages over payments transmitted over the Internet (online payment methods).

Distrust might exist in e-commerce contexts as there is no direct face-to-face interaction between the seller and buyer and uncertainty exists all the time because of both parties' unpredictable actions and opportunistic behaviours [11]. Therefore, the key to removing this type of uncertainty and making successful e-commerce transactions is avoiding opportunistic behaviour [18], a situation that can be enabled through COD because the payment is made after the customer has received and inspected the ordered item. As pointed out by Li, Kim, and Park [24], trust can only exist if the consumer believes that the seller has the ability to provide and deliver goods of expected or better quality, which can be easily verified through COD payment.

Because of all these concerns that exist regarding online payments for e-commerce transactions, COD payment has been increasingly popular in the last few years in some countries, such as India, Gulf Cooperation Council (GCC) countries, Thailand, Vietnam, and Poland (4, 13, 19, 26, 28). The aforementioned e-commerce concerns can be predicted to be the same factors that motivate customers to adopt COD. In other words, a customer feels that he is not vulnerable to any security threats, privacy invasions or opportunistic behaviours when he uses COD payment for e-commerce transactions. Thus, the following hypotheses are expected:

*H1. Perceived security will positively influence the customer's intention to adopt COD for e-commerce payment transactions.*

*H2. Perceived trust will positively influence the customer's intention to adopt COD for e-commerce payment transactions.*

*H3. Perceived privacy will positively influence the customer's intention to adopt COD for e-commerce payment transactions.*

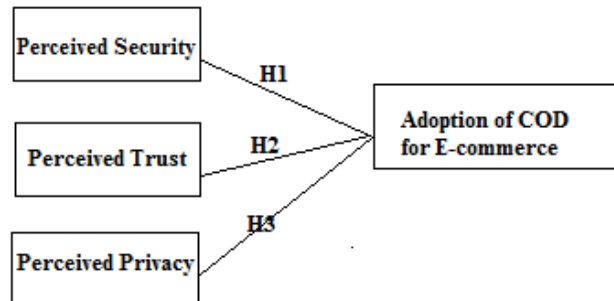


Fig. 1. Proposed Theoretical Model with Hypotheses

### 3 Research Method

The aim of this paper was to predict and test the factors that influence customers' intention to use COD for e-commerce payment transactions. Thus, three hypotheses were formulated, as presented in the previous section. A questionnaire instrument was designed that included the constructs shown in Table 1. All items were assessed using a five-point Likert scale (I strongly agree (5), I agree (4), Neutral (4), I disagree (2) and I strongly disagree (1)). The questionnaire was distributed to 100 participants from UAE. In total, 88 participants filled out and returned the survey, and their responses were deemed appropriate for analysis. The data were analysed using partial least squares (PLS) [a form of structural equation modelling] with SmartPLS software. PLS-SEM has experienced increasing dissemination in recent years in a variety of fields, including Information Systems [17]. PLS is typically recommended in situations in which there are no stable, well-defined theories to be tested in a confirmatory research setting, when the objective is prediction and when the sample size is small [5, 6, 12, 17, 29]. For all these reasons, PLS was an appropriate approach for the purpose of the current research. The model of factors and relationships (depicted in Figure 1) was developed based on conceptual research, yet there is no established theory to explain the factors that influence the customers' intention to adopt COD for e-commerce payment transactions. The model contains constructs that were not previously tested in the context of using COD for e-commerce payment transactions. In addition, the sample size was appropriate for the PLS technique. Furthermore, the condition of minimum sample size was met, as Chin [5] and Hair et al.[17] proposed, in which the minimum sample size should be 10 times the largest number of structural paths directed at a particular latent construct in the structural model. The research model (Figure 1 or 2) has only one dependent (latent) variable, 'adoption of COD', which has three paths directed to it. Thus, the sample size of this study should be a minimum of 30, and this condition has been met (the sample was 88). As shown in the questionnaire and research model (Figure 2), the constructs were measured by a

small number of items (n=2 or 3) where, for example, the intention to adopt COD is measured with one overall reflective item. However, as pointed out by Hair et al. [17], PLS-SEM can easily handle reflective and formative measurement models, as well as single-item constructs, with no identification problems or additional constraints. In addition, it is a good way to shorten the questionnaire.

**Table 1.** Survey Constructs and Measurements

<b>Construct</b>	<b>Code</b>	<b>Item</b>
<b>Security</b>	<b>SE1</b>	I feel that my private information is secure when I use COD for e-commerce payment transactions.
	<b>SE2</b>	When I use COD, I am not vulnerable to any internet security threats.
<b>Privacy</b>	<b>PR1</b>	COD keeps my identity anonymous so that banks and other third parties cannot track me.
	<b>PR2</b>	My sensitive information can be protected when COD is used for e-commerce payment transactions.
	<b>PR3</b>	COD reduces the amount of personal information that I need to share with e-commerce websites.
<b>Trust</b>	<b>TR1</b>	COD gives me the chance to check/test the product before I make the payment.
	<b>TR4</b>	COD ensures the identity of the e-commerce company.
<b>Adoption of COD</b>	<b>AD1</b>	I intend to use COD when I purchase products from e-commerce websites.

## 4 Results Analysis

This section assesses the measurement and structural equation models.

### 4.1 Measurement Assessment

The measurement model was assessed using reliability and convergent and discriminant validity. Reliability was tested using Cronbach's alpha. According to Hair et al. [15, 16], items have high reliability if the Cronbach's alpha value is greater than 0.7. As shown in Table 2 (fourth column), the Cronbach's alpha value of all the constructs was greater than 0.7, so they had high reliability. The convergent validity was assessed by factor loadings, composite reliability and average variance extracted (AVE). The loadings for all items exceeded the recommended value of 0.6 (Table 2 and Figure 2). All of the constructs exceeded the threshold for composite reliability, as they were greater than 0.70 [15, 16] (Table 4), ranging from 0.885–1.000. All values of average variance extracted were higher than 0.5 (Hair et al. [16], with a range from 0.855–1.000.

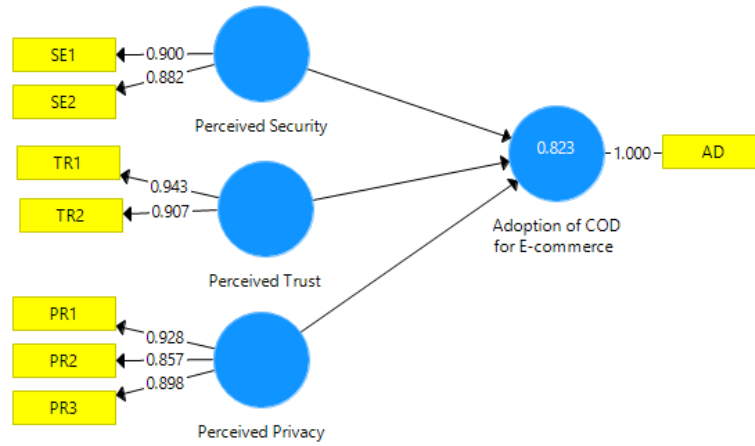
**Table 2.** Summary of Construct and Validity and Item Loading

Construct	Items	Factor Loading	Cronbach's Alpha	Composite Reliability	AVE
<b>Adoption of COD for e-commerce</b>	<b>AD1</b>	1.000	1.000	1.000	1.00
<b>Perceived Privacy</b>	<b>PR1</b>	0.928	0.878	0.923	0.801
	<b>PR2</b>	0.857			
	<b>PR3</b>	0.898			
<b>Perceived Security</b>	<b>SE1</b>	0.900	0.741	0.885	0.794
	<b>SE2</b>	0.882			
<b>Perceived Trust</b>	<b>TR1</b>	0.943	0.833	0.922	0.855
	<b>TR2</b>	0.907			

Discriminant validity was assessed by examining whether the square root of the AVE for each construct was higher than the squared correlation between that construct and all other constructs [10]. Table 3 shows that discriminant validity was met. The square root of the AVE for each construct was greater than the correlation between constructs. As a result, the measurement model demonstrated adequate reliability, convergent validity and discriminant validity.

**Table 3.** Correlation between Constructs (the diagonal represents the square roots of average variance extracted)

	<b>Adoption of COD</b>	<b>Perceived Privacy</b>	<b>Perceived Security</b>	<b>Perceived Trust</b>
<b>Adoption of COD</b>	1.000			
<b>Perceived Privacy</b>	-0.667	0.895		
<b>Perceived Security</b>	-0.870	0.894	0.891	
<b>Perceived Trust</b>	0.251	-0.004	-0.108	0.925



**Fig. 2.** PLS Structural Equation Mode (with factor loading values)

#### 4.2 Structure Equation Model

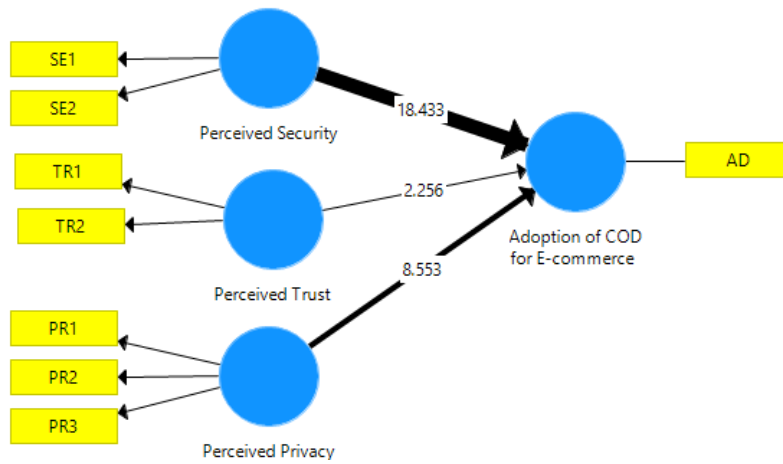
Two measures were used to assess the structural model: the statistical significance (t-tests) of the estimated path coefficients and the ability of the model to explain the variance in the dependent variables (R square). The R square attempts to measure the explained variance of the dependent variable relative to its total variance. Values of approximately 0.670 are considered substantial; values around 0.333 are moderate, while values of approximately 0.190 are weak [5]. As shown in Figure 2, the R square of the research model was 0.823, indicating that 80% of the variance in the adoption of COD for e-commerce was explained by the independent variables, which is a high variance. Figure 2 shows the R square for the dependent variable (adoption of COD for e-commerce). To test the significance of the hypotheses, the rule proposed by Martinez-Ruiz and Aluja-Banet [25] was followed. A t-value >1.65 is significant at the 0.05 level, while a t-value >2 is significant at the 0.01 level. Table 4 and Figure 3 show the t-value for each hypothesis. The research results indicated that perceived security, perceived privacy and perceived trust demonstrated a significant influence on the intention to adopt COD for e-commerce payment transactions. Therefore, H1, H2 and H3 were supported. However, it is obvious that H2 has the lowest significance t-value and this might be interpreted as some of the participants know the e-commerce websites that they deal with so they are adopting COD not mainly because of distrust but for security and privacy reasons.



**Table 4.** Hypothesis Testing Based on t-values

H No.	Hypothesis	t Statistics	Significance
H1	Perceived Security > Adoption of COD	18.433	Supported
H2	Perceived Trust -> Adoption of COD	2.256	Supported
H3	Perceived Privacy -> Adoption of COD	8.553	Supported

Note: A t-value >1.65 is significant at the 0.05\*\* level; a t-value >2 is significant at the 0.01\* level.



**Fig. 3.** Factors' Relationship with the Adoption of COD by t-values Using SmartPLS (the level of significance is indicated by bold arrow)

## 5 Research Implications and Conclusion

This paper aimed to predict the factors that influence customers' intention to adopt COD as a method of payment for e-commerce transactions. As expected, the perceived security was a significant factor that motivated customers to adopt COD for e-commerce payment transactions. Since Internet security threats continue to increase and there are no guaranteed solutions, some customers still prefer to pay in cash at the time of delivery instead of taking the risk of using a credit card or other payment method over the Internet. Our results indicated that customers intend to adopt this method of payment and might prefer it to other e-payment methods. Thus, considering the results, e-commerce companies need to provide this service to customers and should also clearly indicate this option on their websites. For example, e-commerce companies could create a special logo that reflects the COD service and display this logo on their homepage to attract customers' attention and encourage them to purchase from the website.

Consistent with our predictions, perceived privacy had an impact on customer intention to adopt COD. Customers do not want to share too much information about themselves and would prefer to keep their identities anonymous when they conduct transactions online. They believe that this privacy can be obtained with a COD payment method. For the last few decades, e-commerce companies have failed to show respect for customer privacy by using their information, by annoying them with calls, texts or emails promoting products or services, or by following their personal life due to the ability to track every single purchase made using a credit card transaction.

As expected, customers perceive e-commerce websites as more trustworthy when COD is used as they can verify whether the item is exactly as they expected before purchasing it. Consumers do not have this advantage when they make a payment using a credit card in advance of receiving the ordered item. Customers might have negative past experiences with e-commerce websites, such as receiving incorrect, fake or unexpected products, so COD offers a solution as it enables them to verify if the e-commerce company is credible and trustworthy.

This paper is considered original because it is the first academic paper to the author's knowledge that empirically investigated the COD payment method for e-commerce transactions from a customer's perspective. COD could continue to grow as an e-commerce payment method because it offers an alternative to other e-payment methods, which have many problems, including security, privacy risk and credibility and other issues. COD could be one of the best options for certain customers in specific situations, but it should be accepted along with other traditional e-payment methods. It is not advisable to rely only on COD as there might also be customers who prefer the convenience of other methods and are concerned about COD for reasons such as cash availability and exchange issues.

For practitioners in the e-commerce industry, this study provides e-commerce companies with statistical data that show a customer preference for paying using COD. It also indicates the reasons that prompt them to adopt this method. E-commerce companies have two options to tackle these reasons: 1) accepting COD besides other methods of e-payment. 2) Providing solutions that address the concerns and problems regarding existing traditional e-payment methods, including security, privacy and trust issues, which are not yet 100% guaranteed. Thus, option 1 could help e-commerce companies increase sales and convince customers to pay online. It also might give e-commerce websites that accept this method of payment an advantage over others that do not.

One limitation of this study is that it tested only three main constructs. There could be other constructs, such as cost, convenience and simplicity, that impact a customer's decision to adopt this method of payment for e-commerce transactions. Thus, future research might consider empirically testing other factors. Second, the data were collected from a context where around 40% of e-commerce transactions involved COD, and the results supported our prediction that three constructs influenced customers' intention to adopt COD. However, if data were collected from other contexts and countries where this method has not been used or is rarely accepted by e-commerce websites, the results might differ. Thus, further investigation of these constructs and

hypotheses in a different context can help to generalize the results. Finally, it is not known whether the questionnaire respondents had prior experience purchasing products and paying online using a credit card, using COD, using both methods, or using none of them.

Therefore, the research findings might be different for consumers who have never purchased online using a credit card, for example.

The current study predicted factors that influenced the adoption of COD from the customers' perspective. Future research will be required to investigate empirically if e-commerce companies are also willing to accept COD payments and what reasons might motivate them to do so. Future research is also needed to identify whether using COD will enable e-commerce companies to gain a competitive advantage and increase sales over other e-commerce companies that do not accept this payment method.

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