External Factors and Socioeconomic Influence on Users Acceptance of Online Payments

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Abstract. Information technology acceptance (ITA) has been studied for several years with contradictory results. This study analyzed the increase in the use of an electronic online payment service and its relationship with external factor (specific confinement by the Covid-19 pandemic) and users' socioeconomic level based on the ITA concept. Specifically, we applied this study to an Internet Service Provider (ISP). The results indicate that external factors have a statistically significant influence on an increase in online payments. Regarding the influence of socioeconomic status, no statistically significant evidence indicates that this aspect does not influence the increase in online payments. This study shows that once customers adopt the Internet, their use of electronic online payment services is not influenced by their socioeconomic status. This study suggests that organizations are constrained in implementing incentives for customers to use e-services.

Keywords: User acceptance · Information technology · Socioecononomics · Online payments · External influence · Covid-19

1 Introduction

The scientific literature on technological user acceptance indicates that when users are presented with a software package, several factors can influence their decision on how and when they will use it [1]. In [2], the authors studied several determinants for using a payment system, where attitude, perceived behavioral control, and external influence are considered significant factors in using a payment system. Likewise, in [3], it is indicated that there are internal factors such as performance expectation, ease conditions, and external factors such as social influence that are determinants in user acceptance of e-services. In this study, we will focus on the influence of the external factor.

Several studies have reported contradictory results regarding the socioeconomic aspect and its influence on the use of e-services, several studies have

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been found with contradictory results. For example, in [4], the authors indicated that socioeconomic factors influence the use of Digital Multimedia Broadcasting technology. On the other hand, in [5], the characteristics of online shopping were studied, and it was found that individual socioeconomic characteristics do not influence Internet use and perceptions of e-commerce.

The study described in this article followed the outbreak of pneumonia caused by a new coronavirus in Wuhan, Hubei Province, in December 2019, which spread rapidly across China [6] and the world. Expressly in Ecuador, where this study was conducted, the first cases were confirmed on March 17 [7], and countrywide containment began. The ISP where this online payment study is conducted has approximately 70,000 customers, and only 20% of Internet service customers use online payments to pay for Internet services provided by the ISP. In January 2020, prior to the start of the pandemic, the number of online payments for Internet services was 15.014 on February 13.178, and March 13,828. However, when the pandemic started in April, it reached 18,052, and in May, 21.005 online payments were made, clearly showing an increase in online payments from the start of the pandemic. However, during confinement, Internet service cuts were suspended for non-payment purposes and the number of monthly payments increased. We believe that the significant increase in online payments in April and May 2020 is related to an external effect due to the start of the pandemic and we want to understand its relationship with socioeconomic factors.

There are several studies in the scientific literature on the use of Information Technology (IT) during the Covid-19 pandemic. As described in [8–13], the authors examined the increased use of the Internet, access to high-quality information, use of technology to improve children's well-being, and digital exclusion of older adults, among others. However, the studies described above did not address the increase in user acceptance of Internet services considering socioeconomic factors. This study analyzed the influence of socioeconomic factors on the use of Internet payment services to generate knowledge to strengthen the use of these services.

The remainder of this paper is organized as follows. Section 2 reviews state-of-the-art and motivates the conduct of this study. Section 3 explains the procedure used in this study. Section 4 presents the results of the study. Sections 5 and 6 present a discussion, conclusions, and future work.

2 Background

2.1 Information Technology Acceptance

The scientific literature on user acceptance of IT indicates that certain factors influence the decision to use software packages or e-services [1,14]. Several models have been developed in this respect, including external and internal factors that influence technology acceptance [15,16]. In this study, we investigate the factors external to the individual that affect the decision to use online payment methods.

In this context, extrinsic or external motivation is defined as the perception that users will want to perform an activity because it is perceived as an

instrument to achieve valuable outcomes distinct from the activity itself, such as improved job performance [17].

Among the models of acceptance and adoption of technology indicated in scientific literature, the Theory of Reasoned Action (TRA) model emphasizes activities, social norms and intentions [18] are mentioned. Theory of Planned Behavior (TPB) is similar to the previous model [19]. Technology Acceptance Model (TAM) explains the motivation of users by three factors: perceived usefulness, ease of use, and attitude, ruling out external factors [20]. In [21], the authors stated that extrinsic and intrinsic motivators affect acceptance or rejection of technology. Social Cognitive Theory (SCT) focuses on three factors: behavior, personnel, and environment [22,23].

The authors in [24] reviewed acceptance models, among other things, and indicated that several models focus on internal antecedents of behavior such as attitudes, values, and intentions, whereas others focus on external aspects such as norms, incentives, and institutional constraints. Most models indicate that external factors influence acceptance of IT (except [19]). The models do not provide guidelines for the operationalization of the variables. In this study, we analyzed the influence of external factors determined by the Covid-19 pandemic.

2.2 Socioeconomic Status

Socioeconomic status is defined in [25] as a measure of social status that typically includes income, education, and occupation. Socioeconomic status is linked to a wide range of life outcomes, ranging from cognitive abilities and educational attainment to physical and mental health.

Studies on Internet access in Latin America indicate that socioeconomic factors determine Internet [26,27] subscription. However, we do not know whether this factor influences user uptake of previously accessed online services.

However, contradictory results have been reported in the literature [4,5,28]. In [4], socioeconomic determinants affecting consumption intentions were studied, and the motivational factor was integrated into the TAM model. The results suggest that perceived availability is positively associated with perceived benefits and attitudes towards technology. In [4], the author suggested that socioeconomic factors influence technology use and behavior. In [29], monthly income was found to have a favorable effect on online purchase intention. However, in [5], it was argued that socioeconomic variables do not affect the behavior of experienced e-shoppers.

A wide variety of socioeconomic indicators are operationalized in studies in different areas of knowledge, such as health [30], dentistry [31], dentistry, and telecommunications [32], which have their own socioeconomic indicators. Socioeconomic indicators included household income, housing characteristics, years of schooling, educational level, occupational activity, social class, volume of mobile phone calls and SMS messages.

In [33], the author presented a socioeconomic indicator related to the percentage of customers who dropped out of residential Internet services for economic

reasons over four years. Table 1 describes the four socioeconomic levels or clusters: high, upper-middle, lower-middle, and low.

Table 1. Socioeconomic levels

ID	Level	Description
1	High	The percentage of customers associated with a closet who have churned Internet services for economic reasons in a period of four years is between 0 and 11.11% (number of churned customers for economic reasons/(number of churned due to other reasons + active customers))
2	Medium H	Between 11.12 and 15.28%
3	Medium L	Between 15.29 and 19.12%
4	Low	Between 19.13 and 40%

In telecommunications, a distribution closet provides the network. The network comes from the exchange of the closet and the distribution closet. The network was distributed according to its geographical area of influence with approximately 150 clients per district.

3 Methodology

This study was conducted with Internet home customers at an ISP located in Ecuador. The ISP has approximately 70,000 customers and the Internet penetration rate in Ecuador is approximately 65%.

In the ISP under study, Internet service customers paid for monthly services. Payment methods included physical counters (37%), bank debit (43%), and web portal (20%). The scientific literature indicates that using e-services improves productivity and reduces costs [3,34]. However, in the ISP under study, the uptake of electronic online payment services is low compared with other methods. The ISP under study has a significant group of customers (37%) who continue to use physical services even though electronic service available to make payments. We studied the influence of socioeconomic status on the increased use of electronic online payment services in the context of external event related to the Covid-19 pandemic. The following research questions will be answered:

- Q1. Does confinement influence the monthly increase of customers who use online payments?
- Q2. Does socioeconomic status influence the monthly increase in customers using online payments?

In order to answer the research questions, the analysis will be carried out using data corresponding to payments made in the period from 01 January to

28 May 2020. In total there were 5.436 records of payments were made by 2.152 customers.

To determine the degree of the influence of external factors on the increase in the use of online payment services, a comparison was made between the average monthly increase in customers paying online in a typical month (February, without the pandemic) and the average monthly increase in customers paying online during the confinement month (April, with the pandemic).

In order to determine whether socioeconomic status influences the increase in customers paying online, a hypothesis test was used to determine whether there is a difference between the mean values of the increase in online payments in districts of high, upper-middle, lower-middle, and low socioeconomic levels.

4 Results

Figure 1 shows that from the third month (March) onwards, there has been a growth in the number of online payments for internet services.

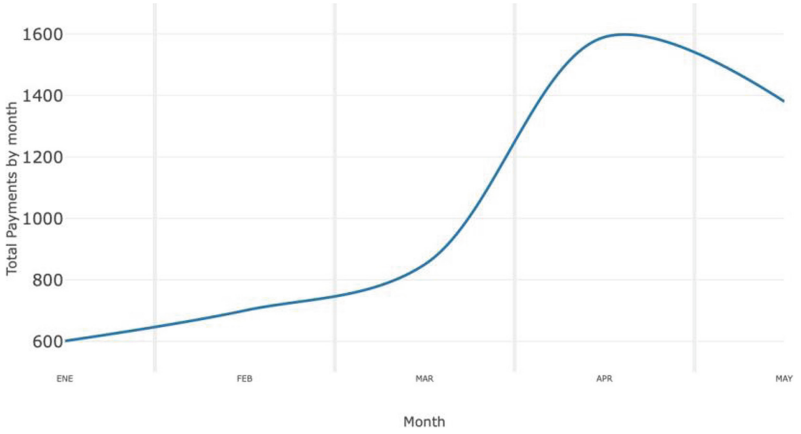

Fig. 1. Number of online payments, January–May

4.1 Influence of External Factors on the Monthly Increase in Online Payments

This section presents a comparison between a typical month (without a pandemic) and a month of confinement (with a pandemic) concerning the monthly increase in online-paying customers per closet. In total, 169 closets were included in the analysis.

Table 2 compares the mean values, medians, and standard deviations for the monthly increases. In the month of confinement due to the pandemic, the median

Table 2. Monthly increase of online payments in a district

	Median	Mean	Std. Dev.
Normal month	1	1.34	0.616
Confined month	2	1.94	1.170

and mean values of the monthly increase in customers in a district paying online compared to the normal month.

To answer research question Q1, the following hypothesis is proposed:

Null hypothesis H_0: The monthly increase in online paying customers in a normal month is equal to the monthly increase in online-paying customers in the confined month.

Alternative hypothesis H_1: The monthly increase in online-paying customers in a normal month is greater than the monthly increase in online-paying customers in the confined month.

Alternative hypothesis H_2: The monthly increase in online paying customers in a normal month is less than the monthly increase in online paying customers in a confined month.

The Kolmogorov-Smirnov normality test was performed; the statistical significance value was equal to 0.000; then, the sample did not meet the normality condition. Therefore, the non-parametric Wilcoxon test will be applied for the hypothesis test with repeated measures.

The Wilcoxon test for related samples was applied, indicating sufficient evidence to reject the null hypothesis (p-value = 0.000). Therefore, the alternative hypothesis H_2 is accepted: The monthly increase in new online-paying customers in a normal month is less than the monthly increase in new online-paying customers in the month of confinement.

With this result, it can be stated that the external influence of confinement during the pandemic encouraged the increased use of e-services, such as online payment.

4.2 Influence of Socioeconomic Status on the Monthly Increase in Online Payments

This section presents the results of the comparison between closets belonging to different socioeconomic levels with respect to monthly increase in online payments.

As indicated in Sect. 2.3, geographic districts have been classified according to socioeconomic status. Figure 2 presents the average monthly incremental values of new online paying customers by district for each socioeconomic status.

Table 3 shows the mean, median, and standard deviation values for socioeconomic levels. At a high socioeconomic level, there is higher value for customers paying online than at medium and low levels. However, we tested whether this difference was significant.

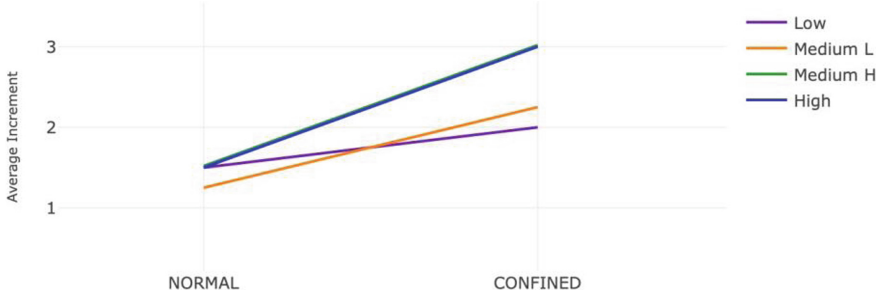

Fig. 2. Increase in customers per district paying online at each socioeconomic level

To answer research question Q2, the following hypothesis is proposed: Null hypothesis H_0: The monthly increase in online-paying customers is equal across all socioeconomic groups.

Table 3. Monthly increase of clients that pay online in socioeconomical levels

Socioeconomical level	Medium	Mean	Std. Dev.
High	1	1.81	1.14
Medium H	2	1.79	1.10
Medium L	1	1.64	0.93
Low	2	1.58	0.94

Alternative hypothesis H_1: There is a difference in the monthly increase in online-paying customers across socioeconomic levels.

The Kolmogorov-Smirnov normality test was performed. The statistical significance value was 0.000 and the sample did not meet the condition of normality. Therefore, the non-parametric Kruskal-Wallis test was applied to the hypothesis test with independent measures.

The Kruskal-Wallis test for independent samples (p-value = 0.439) indicates insufficient evidence to reject the null hypothesis H_0: the monthly increase in new online-paying customers is equal across all socioeconomic groups. Therefore, it can be stated that the socioeconomic factor does not influence the increase of new customers making online payments.

5 Discussion

Although there was no obligation to make payments for Internet services during the pandemic because of the government resolution, customers made a payment online via the company's Web Portal. Confinement during the pandemic has

been an external influence that has positively influenced customers' incentives to make payments over the Internet. Organizations may not have had the capacity to incentivize the use of e-services, although their use improves, among other things, productivity and reduces costs to the organization.

There are indications in the scientific literature that socioeconomic factors limit access to Internet Home services. However, we obtained evidence that socioeconomic factors do not influence the use of electronic services in the context of users who have already adopted Internet Home service. Organizations that effectively incentivize the use of e-services can positively influence users from different socioeconomic backgrounds.

6 Conclusions and Future Work

The external confinement factor during the pandemic significantly influenced the increase in customers paid via electronic services. Concerning socioeconomic status, it was observed that the increase in customers paying online was higher in the highest class than in the middle and lower classes. However, this difference was not statistically significant. Socioeconomic status does not influence the adoption of online e-payment services. Few studies have examined the effects of external motivations and socioeconomic factors on e-service use. In the future, we expect to study the effect of sociodemographic variables, such as income level, gender, and education level, on e-services. External motivation and its effects on e-service use will be studied further.

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