

From Dirty Money to “Clean Payment”: Italians behaviour during the COVID-19 pandemic

Elvira Anna Graziano²

Lucia Leonelli³

Gerardo Petroccione⁴

Gian Paolo Stella¹

¹ Correspondence: Gian Paolo Stella, Department of Management and Law
University of Rome “Tor Vergata”
Via Columbia, 20, 0133 Rome, Italy
E-mail: gian.paolo.stella@uniroma2.it

² Link Campus University,
via Nomentana 335, 00162,
Rome, Italy,
E-mail: e.graziano@unilink.it.

³ Department of Management and Law - University of Rome “Tor Vergata”
Via Columbia, 2 00133
Rome, Italy
E-mail: leonelli@uniroma2.it

⁴ Department of Management and Law - University of Rome “Tor Vergata”
Via Columbia, 2 00133
Rome, Italy
E-mail: gerardo.petroccione@uniroma2.it

From Dirty Money to “Clean Payment”: Italians behaviour during the COVID-19 pandemic

With the fear of the transmission mechanism of COVID-19 and the generalised lockdown due to the pandemic scenario, m-payment and contactless payments are taking the place of cash, grabbing more attention thanks as well to the greater coverage of mobile devices and new technologies. The purpose of this paper is to explore the relationships between Italian financial literacy and the adoption of mobile/electronic payments during COVID-19 pandemic in Italy. Data for the study were collected through an online survey of a representative sample of 2,872 users in the Italian context. Structural equation modelling (SEM) was used to verify the validity of the variables and the relationships among them. The results show that fear of COVID-19 and lockdown purchase behaviour are positively and significantly related with the preference for m-payment, while financial literacy and proliferation of mobile devices seem not to be related with the use of m-payment in the lockdown period.

Keywords: Mobile Payment, Payment behavior, Cashless Payment, COVID-19, SEM.

JEL codes: D12, D14, E42, G53

1. Introduction

The retail payments sector is the subject of constant attention, as it is an innovation transmission engine capable of bringing concrete benefits to those who use its services. The recent evolution is also the result of the fruitful relationship between innovation and technology and of the regulatory interventions that have favoured safety and transparency.

The literature has shown the importance of the benefits of a greater diffusion of alternative payment services to cash (Arvidsson, 2014; Dimitriadis et al., 2018; Flavian et al., 2020), which can be appreciated on different levels. On a general level, the advantages can be attributed to the traceability of payment transactions, the emergence of evasion and the containment of criminal behaviour. Furthermore, cash reduction generates resource savings: a survey that examined the social cost of payments in the 2009-2016 period revealed that cash is the most expensive instrument on average per transaction (Bank of Italy, 2020).

In particular, regarding Italy, the spread of alternative payment services to cash has grown over the years but remains rather low when compared with other countries in the Euro area (Bank of Italy, 2020).

Over the past year, following the COVID-19 pandemic and the dramatic events that followed, there has been a sharp change in lifestyles, consumer behaviour and habits in general (Ardizzi et al., 2020). The increase of smartphone and internet users along with constriction within their own homes, opens the opportunity for mobile payment.

Several factors have affected cash payment habits, favouring the increase in the need for remote payments and contactless payments at the point of sale, despite the weak knowledge in financial matters and the scarce digital skills.

Following the circulation of the Coronavirus, many individuals have in fact been afraid of being able contracting the virus through the exchange of banknotes and coins or by handing their card for payment to a person potentially capable of contaminating it. Although the studies on the topic of money as a vehicle for the transmission and spread of the virus are conflicting (Auer et al., 2020; Cevik, 2020; Husain et al., 2020; Kakushadze and Liew, 2020; Panetta, 2020), fear generates a greater propensity towards the use of payment instruments that do not expose the user in situations considered to be dangerous (Ardizzi et al., 2020). Contactless card transactions grew from 35 percent to 55 percent during the lockdown (Perrazzelli, 2021). Furthermore, during the lockdown, the accessibility of cash through withdrawal at the branch was reduced in terms of days and hours. Cash remains the most used tool for transactions in which there is physical presence at the point of sale, but its impact on overall payments is decreasing (Panetta, 2020).

With these premises, the aim of this study is to examine how the fear of contagion changes the payment habits of Italians. How much are the different conditions generated by the fear of contagion and the different relationship with technology able to change the needs and trust of Italians towards mobile payments by increasing the use of apps and contactless payment cards? Furthermore, once the individual decides to give up cash, is he able to choose, based on his degree of financial literacy, the service, the subject of the offer and the contact channel most efficient and comfortable for him to carry out the payment?

The contribution of this research is manifold. Firstly, this paper contributes to the marketing and finance literature advancing the knowledge on the link between emotions, consumers'

behaviour and mobile payment adoption. Secondly, from a managerial point of view, the new payment habits of Italians push banks and financial operators to innovate their payment services. Thirdly, the study is relevant in demonstrating that the growth of the use of non-cash payment services in Italy increases the ability of banks and operators to obtain free information from their customers, allowing them to be better profiled in order to design solutions for financial payment in line with their needs.

2. Literature review

2.1 COVID-19 and payment behaviour

Money is literally dirty. The passing of money from hand to hand makes it a receptacle for body fluids, germs, viruses and bacteria of all kinds and types, such as methicillin-resistant *Staphylococcus aureus*, *Escherichia coli*, *Pseudomonas aeruginosa* and influenza viruses (Abrams and Waterman, 1972; Jenkins, 2001; Maron, 2017; Oyler et al., 1996; Tanglao, 2014; Thomas et al., 2008). A study of Vriesekoop et al. (2016) explores bacterial survival, finding that microbial persistence is greater on banknotes, polymer bills and coins. According to the Pope et al. (2002) study's results, about 94 percent of one-dollar bills are contaminated with pathogenic or potentially pathogenic bacteria, reaching to 100% for currency notes in a particular context, like in Ghana (Tagoe et al., 2009). The literature review conducted by Angelakis et al. (2014) concludes that banknotes retrieved from hospitals may carry antibiotic-resistant MRSA, while those from food outlets may be tainted with *Salmonella* and *Escherichia coli*.

The recent COVID-19 outbreak increases apprehension about handling potentially contaminated cash, putting emphasis on disease transmission through coins and banknotes (Abdillah, 2020; Cevik, 2020; Husain et al., 2020; Kakushadze and Liew, 2020). This virus has temporarily changed the relative cost and benefits of different payment methods: cash has become more costly in terms of health risks, ease of use and likelihood of acceptance, whereas debit card usage has become less costly (Jonker et al., 2020). According to the World Health Organization (WHO), one of the transmission mechanisms of Sars-Cov2 has been coins and paper money passed between a buyer and a seller; it recommends that people wash their hands after coming in contact with banknotes and coins (Pal and Bhadada, 2020). The crucial point is the survival of the Coronavirus on surfaces including cash (Chin et al., 2020; van Doremalen et al., 2020). Taking into consideration the droplets of the virus on banknotes, Chin et al. (2020) find that paper money remains infectious for a period of 4 days. Similarly, Harbourt et al. (2020) analyze the survival of COVID-19 on US banknotes, which are composed of a blend of linen and cotton. Their results show that at a temperature of 40C the virus was detectable for 96 hours on \$1 bills and for 72 hours on \$20 banknotes. According to Riddell et al. (2020), Sars-Cov2 is still detectable on polymer and paper money 28 days after the inoculation. Regarding coins, the survival of the virus may depend on the metal used to mint the coin: according to the results of van Doremalen et al. (2020), this duration appears to range between 8 hours for copper and 48 hours for stainless steel. However, there are still many doubts regarding the transmission of the virus through the hand-to-hand passage of cash. Using two-stage least squares (2SLS), Cevik

(2020) observe that the spread of infectious diseases lowers demand for physical cash, after controlling for macroeconomic, financial, and technological factors.

According with the previous literature hypothesis 1 can be formulated as follows:

H1: The fear of COVID-19 infection changes the payment habits of Italians.

The fear of contracting the virus as well as the lockdown have led to incentive systems related to the use of alternative payment instruments to cash, posing the question of whether these dangers can be avoided by using cashless payments. In order to encourage the use of the latter, during the pandemic the limits and the conditions on contactless payments were increased in many countries (Mastercard, 2020), avoiding the insertion of a pin code for most transactions at the point of sale. Many transactions conducted online or via mobile banking also do not require contact with potentially contaminated surfaces. Consequently, one may argue that changing one's payment behaviours may reduce the risk of infection.

These arguments lead to Hypothesis 1a.

H1a: Fear of COVID-19 contagion pushes Italians to use non-contact payment tools, such as contactless payment cards and apps, increasing the degree of trust in them.

The Italian population has always been characterised by an important use of cash, both because it is a widespread belief that in this way it is possible to control and contain spending, and because they show a lack of confidence in alternative payment tools and channels, such as cards and apps (Ardizzi et al., 2020; The European House – Ambrosetti, 2021). The COVID-19 pandemic has accelerated the way how consumers pay: electronic payment instruments have become more attractive relative to cash (Bijlsma et al., 2020; Graf et al., 2021). Actual spending and the willingness to pay are higher when using payment cards relative to cash (Agarwal et al., 2020; Brown et al., 2020; Runnemark et al., 2015; Prelec and Semester, 2001). Furthermore, the habits they develop during periods of restrictions and lockdowns appear to further diminish their appetite for transacting in cash, influencing declared future intentions to move away from cash after the pandemic is over. Life safety is the motivational and protective factor which initiates the cashless payments to safeguard and resist COVID-19 (Husain et al., 2020). Using System Dynamics approach, the Authors finds that the COVID-19 pandemic has caused severe anxiety about currency and the hygiene of things, triggering fear of contagion and perceived resistance to handling cash payments. The use of QR code m-payment in the retailing industry could reduce unnecessary physical interactions between humans and, therefore, increase social distancing to contain the spread of the COVID-19 pandemic, especially in the absence of vaccines and specific treatment (Anderson et al., 2020; Kasab et al., 2020; Yan et al., 2021). According to Hart (2020), the COVID-19 pandemic has created a “new normal” in which everyone is subjected to a certain degree of constraints in life, delivering many changes to consumer payment preferences, as a response to the need to increase social distancing: with QR code m-payment in place, consumers do not need to remain in a panic buying queue that compromises all of them within the same retail store during the next pandemic (Yan et al., 2021).

2.2 Financial literacy and payment habits

Previous studies support the existence of a relationship between financial literacy and payment behaviour. Higher levels of financial literacy appear to be related to better management of credit cards (Hamid and Loke, 2020; Klapper and Lusardi, 2019; Shefrin and Nicols, 2014; Disney and Gathergood, 2013) and better debt management (Lusardi et al., 2015) also to prudent financial behaviour such as paying bills on time, tracking expenses, and budgeting (Hilgert et al., 2003), wiser investments in the stock market (van Rooj et al., 2011), improved long-term wealth management (Stango and Zinman, 2009), higher retirement saving (Lusardi and Mitchell, 2011).

Several studies observe that financially literate individuals are less likely to exhibit costly credit card behaviour such as revolving credit compared to illiterate persons (Schuh and Stavins, 2011; Mottola, 2013). In particular, consumers more financially literate are less likely to use high-costly borrowing methods (Farias, 2019; Lusardi and de Bassa Scheresberg, 2013), while people with lower financial literacy display costly behaviour when they use credit cards (Mottola, 2013). Besides, individuals with the high level of financial literacy are less willing to be in credit card debt and more willing to repay each month their credit card debt (Lusardi et al., 2015). Constructing an analysis based on a sample of 451 credit card users in Malaysia, Hamid and Loke (2020) show financial literacy and money management skill have a positive effect on credit card- holders' decision making. Specifically, money management skill related to financial statements monitoring, prompt bill payment, spending within budget and handling money matters well influence credit card repayments, supporting previous studies (Gathergood et al., 2019; Haliassos and Reiter, 2005; McHugh and Ranyard, 2016; Toraman et al., 2016). On the other point of view, the consumers with low level of financial literacy that use the payment cards and/or mobile payment are prone to individual overspending and over-indebtedness (Bannier and Gärtner, 2019; Barboza, 2018; Canner and Elliehausen, 2013; Norvilitis et al., 2006).

Another field of studies considers the relationship between financial literacy, adoption of payment instruments and usage of them. Schuh and Stavins (2011) show that factors significantly differ in the adoption and usage stage of payment instruments. According to Marcotty-Dehm and Trütsch (2021), financial literacy exerts no effect on payment instrument choice and financial literacy levels impact on payment instrument adoption more than subsequent usage decisions.

These arguments lead to Hypothesis 2.

H2: During the COVID-19 pandemic, the Italians' use of alternative payment instruments to cash, such as contactless cards and M-Payment, is independent of their level of financial literacy.

Investigating the financial technology (FinTech) impact on the U.S. millennial generation financial behaviour, Lusardi et al. (2018) find that the young users' mobile payments show expensive financial behaviour, such as spending more than they earn through the usage of different alternative payment methods, highlighting lower level of financial literacy. Conducting a survey data of National Financial Capability Study (NFCS), Liao and Chen (2020) find that financial literacy is significantly negatively related to the use of mobile

payment confirming that people more financially literate are less likely to use mobile payments that are considered expensive services.

2.3 ICT and M-payment usage

Innovation and progress are often the subject of studies in relation to the spending and consumption behavior of individuals. As M-payments services are considered new technologies, innovativeness plays a pivotal role in determining user's perceptions and decisions about technology adoption (Liébana-Cabanillas et al., 2020; Dahlberg et al., 2015; Yi et al., 2006).

Several models on the adoption of information technologies, such as the diffusion of innovation, the unified theory of acceptance and use of technology have been utilized with the other factors, such as trust, stress, cybersecurity, and costs, in order to explain the mobile payment adoption (Liébana-Cabanillas et al., 2020; Singh and Sinha, 2020; Dahlberg et al., 2015; Dahlberg et al., 2008). The findings of Yi et al. (2006) show that innovativeness and perceived usefulness are the strong determinants of user's continuance intention to use mobile payment services. Liébana-Cabanillas et al. (2020) observe a positive and significant relationship between the innovativeness and the perceived usefulness of mobile payment services. There are few significant factors which are behind the increased usage of mobile payments; for example, high internet connectivity, accessibility of mobile data, strong wireless network, inclination towards new and innovative technology, and various financial inclusion initiatives (Kumar et al., 2021; Sinha et al., 2019; Patil et al., 2017).

Another branch of studies examined the relationship between consumer spending behavior, m-payment and device used (Meyll and Walter, 2019). According to Meyll and Walter (2019), the consumers through their smartphones are more likely to exhibit costly credit card behaviour, increasing their overall spending. Besides their results suggest a relationship between innovative payment methods and increases in individuals' overall spending, because mobile payment users which conduct payments through mobile wallets that are often connected to a credit card, might not even recognize that the payment has occurred (Shah et al., 2016) compared to directly paying with credit cards (Dodini et al., 2016; Trütsch, 2016).

These arguments lead to Hypothesis 3.

H3: During COVID-19 lockdown, technological innovation and the proliferation of mobile devices have made it possible for m-payment systems to spread in Italy.

During COVID-19 outbreak, the number of mobile device Italian owners is increased due to the need to stay connected in order to safeguard sociality, but above all for study and work reasons. For the youngest, smartphones, tablets and personal computers were in fact necessary to continue with school attendance in distance learning. Smart and distance learning has allowed university students to continue enjoying lessons and taking exams during the pandemic period. For different and multiple categories of workers, the smart working method was used to carry out the production activities of different sectors.

3. Methodology

This section presents the research and survey design and econometrical procedures.

3.1 Research Design

The data that are used in this research work come from the administration of questionnaires in Italy from the beginning of May 2020 until the end of June 2020. Data collection was possible using Computer Assisted Web Interview (CAWI). This type of methodology was essential in light of the movement restrictions imposed by the Italian government between March and May 2020 in order to reduce the spread of the pandemic due to COVID-19. Using social platforms such as Facebook, Twitter and LinkedIn, around 3,000 randomly selected individuals were invited to participate. 2,950 questionnaires were collected. After cleaning by deleting those with missing values according to the suggestions provided by Schlomer et al. (2010), were reduced to 2,872. Furthermore, our sample appears to be representative of the Italian population following the indications provided by Dattalo (2008).

3.2 Measures

As regards COVID-19 worries, the first release of the “Survey Tool and Guidance: Behavioural Insights on COVID-19” issued by the World Health Organization (WHO) was used. Table 1 describes the variables and presents their codes for the analyses that follow. All questions were based on a 10-point Likert scale, ranging from 1 to 10, where 1 stands for not very worried and 10 for very worried.

Table 1. COVID- 19 Worries Questions

	Coding	Questions	Range
COVID-19 Worries	WR1	How worried are you about getting infected by COVID-19	1-10
	WR2	How worried you are about dying from COVID-19	1-10
	WR3	How worried you are that someone close to you may get sick from COVID-19	1-10

Source: World Health Organizations (WHO)

To measure financial literacy, a methodology proposed by Standard & Poor’s Rating Services Global Financial Literacy Survey (Standard & Poors Global FinLit Survey) (Klapper and Lusardi, 2019) was used. The outcome of each question determines the knowledge of a specific financial theme. There is only one correct option for each question (Table 2).

Table 2. Financial Literacy Questions

	Coding	Questions	Options
--	---------------	------------------	----------------

Financial Literacy	FL1	Suppose you have some money. Is it safer to put your money into one business or investment, or to put your money into multiple businesses or investments?	a. One business or investment b. Multiple businesses or investments c. Don't know d. Refused to answer
	FL2	Suppose over the next 10 years the prices of the things you buy double. If your income also doubles, will you be able to buy less than you can buy today, the same as you can buy today, or more than you can buy today?	a. Less b. The same c. More d. Don't know e. Refused to answer
	L3	Suppose you need to borrow \$100. Which is the lower amount to pay back: \$105 or \$100 plus 3%?	a. 105€ b. 105€ plus 3% c. Don't know d. Refused to answer
	FL4	Suppose you put money in the bank for 2 years and the bank agrees to add 15% per year to your account. Will the bank add more money to your account the second year than it did the first year, or will it add the same amount of money both years?	a. More b. The same c. Don't know d. Refused to answer
	FL5	Suppose you had \$100 in a savings account and the bank adds 10% per year to the account. How much money would you have in the account after 5 years if you did not remove any money from the account?	a. More than 150€ b. Exactly 150€ c. Less than 150€ d. Refused to answer e. Don't know

Note: Italics indicate the correct answer. Source: Klapper and Lusardi (2019)

To investigate the relevance and effects of lockdown purchase behaviour such as of credit cards and/or payment apps, three questions are created. All questions were based on a 10-point Likert scale, ranging from 1 to 10, where 1 stands for not at all and 10 for very much (Table 3).

Table 3. Lockdown Purchase Behavior Questions

Lockdown Purchase Behavior	Coding	Questions	Range
	PP1	How much did you use your card and/or payment app to purchase groceries	1-10
	PP2	How much did you use your card and/or payment app to purchase goods for your personal health	1-10
	PP3	How much did you use your card and/or payment app to purchase goods for your household?	1-10

Source: Authors Elaboration

Regarding Preference for the M-Payment system, three questions are developed with the aim of verifying how and whether the pandemic caused by COVID-19 played a role in the change of Italians' purchase preferences. Respondents could choose their preference on a 10-point Likert scale, ranging from 1 to 10, where 1 stands for not at all and 10 for very much (Table 5)

Table 4. Preference on M-Payment

	Coding	Questions	Range
Preference on M-Payment	MPAY1	Has the pandemic caused by COVID-19 prompted you to use payment tools like cards and/or apps?	1-10
	MPAY2	Has the pandemic caused by COVID-19 caused you to prefer payment instruments like cards and/or apps over banknotes?	1-10
	MPAY3	Has the pandemic caused by COVID-19 prompted you to consider payment tools like cards and/or apps for your future payments?	1-10

Source: Authors Elaboration

Finally, respondents were asked about their preference for mobile devices used for M-Payment. In particular, respondents could choose between smartphones, tablets and desktop/laptop computers.

4. Results

4.1 Preliminary Data Analysis

Table 5 presents the descriptive analysis of the sample. Mean sample age is 41.75 ($SD = 14.15$), and respondents are almost equally distributed. Regarding gender, the percentage of women interviewed is 47.9% ($N= 1372$) and 52.1% ($N= 1492$) for men. Regarding civil status, 45.6% ($N= 1306$) were married, 42.3% ($N= 1211$) single/unmarried, 8.8% divorced ($N= 252$) while 3.3% ($N= 95$) stated they were widowed. About the level of education, 14.2% ($N= 406$) had up to nine years of education, 23.2% ($N= 665$) had between 9 to 12 years of education, and 62.6% ($N= 1793$) had more than 12 years of education. Regarding Work Status, 49.7% ($N= 1422$) held a full-time job, 16.2% ($N=465$) held a part-time job, 16.2% ($N= 465$) claimed to be students, 4.9% ($N= 141$) claimed to be homemakers, 6.3% ($N= 181$) were retired, 0.6% ($N= 16$) claimed to be disabled or unable to work while 6.0% ($N=173$) were unemployed. Regarding the income variable, 19.1% ($N=564$) preferred not to say, 8.6% ($N=246$) had less than 10,000 €, 23.3% ($N=666$) stated that they had between 10,000 and 20,000 €, 31.7% ($N=909$) had between 20,000 and 40,000 €, 13.9% ($N=397$) had between 40,000 and 80,000 € and 3.5% ($N=100$) had more than 80,000 €. Regarding the variables covered in this research, respondents using m-payment software were 39.9% of the sample. The average amount paid for m-payment transactions was between 200 € and 300 € (20.2%). In addition, the preferred mobile device for making online purchases was the smartphone, used by 59% of the sample.

Table 5. Descriptive Results

Variables		Coding	No	Percentage %	Cumulative %
Age	18 - 25 years old	1	192	6.7	6.7
	26 - 35 years old	2	1126	39.3	46.0
	36 - 45 years old	3	402	14.0	60.1
	46 - 55 years old	4	600	20.9	81.0
	56 - 65 years old	5	398	13.9	94.9
	65 - 75 years old	6	92	3.2	98.1
	> 75 years old	7	54	1.9	100
Gender	Male	0	1492	52.1	52.1
	Female	1	1372	47.9	100
Civil Status	Married	1	1306	45.6	45.6
	Single/Unmarried	2	1211	42.3	87.9
	Divorced	3	252	8.8	96.7
	Widowed	4	95	3.3	100
Education	< 0 - 9 Years	1	406	14.2	14.2
	9 - 12 Years	2	665	23.2	37.4
	> 12 Years	3	1793	62.6	100
Work Status	Full-Time Work	1	1422	49.7	49.7
	Part- Time Work	2	465	16.2	65.9
	Students	3	465	16.2	82.2
	Unemployed	4	173	6.0	88.2
	Stay at Home	5	141	4.9	93.1
	Retired	6	181	6.3	99.4
	Disabled or Unable to work	7	16	.6	100
Income	Less than \$10.000	1	246	8.6	8.6
	€10.000 - €20.000	2	666	23.3	31.8
	€20.000 - €40.000	3	909	31.7	63.6
	€40.000 - €80.000	4	397	13.9	77.4
	€80.000 or more	5	100	3.5	80.9
	Prefer not to say	99	564	19.1	100

M-Payment Software Preference	No	0	1720	60.1	60.1
	Yes	1	1144	39.9	100
Average amount paid with M-Payment instruments	I did not use m-payment tools	0	283	9.9	9.9
	Between 0 - 50€	1	445	15.5	25.4
	Between 50€ - 100€	2	385	13.4	38.9
	Between 100€ - 200€	3	371	13.0	51.8
	Between 200€ - 300€	4	579	20.2	72.0
	Between 300€ - 500€	5	417	14.6	86.6
	More than 500€	6	384	13.4	100
Preference for Mobile Devices	Smartphone	1	1689	59.0	59.0
	Personal Digital Assistant (Tablet)	2	104	3.6	62.6
	Computer (Desktop/Notebook/Laptop)	3	1071	37.4	100

4.2 Validity and Reliability of the scale

The constructs, namely, COVID-19 Worries, Financial Literacy and Lockdown Purchase that are the subject of this research are identified by at least three questions, as recommended by MacCallum et al. (1999) and Raubenheimer (2004). To test the validity of the measurement scales, the Cronbach's alpha value was analysed for each construct. The results show that each construct exhibits a Cronbach's alpha value greater than the value of 0.7 that is considered the minimum acceptable value (van Griethuisen et al., 2015; Taber, 2018). Regarding Average Variance Extracted (AVE), all constructs exhibit values greater than .50, as recommended by Fornell and Larcker (1981), Hair et al. (2010) and Diamantopoulos and Siguaw (2000). Furthermore, regarding Composite Reliability (CR), all constructs present values higher than .80, as recommended by Netemeyer et al. (2003), and, at the same time, less than .95, as recommended by Hair et al. (2017) (Table 6).

Table 6. Psychometric Properties of Scales

Variable	Cronbach's α	Standardized Factor Loading λ	Average Variance Extracted ρ	Composite Reliability
COVID-19 Worries	.880		.804	.924
FEAR1		.917		

FEAR3		.900		
FEAR2		.873		
Financial Literacy	.807		.569	.867
FL3		.830		
FL2		.813		
FL4		.805		
FL1		.655		
FL5		.648		
Preference for M-Payment	.811		.719	.884
MPAY1		.907		
MPAY2		.883		
MPAY3		.746		
Lockdown Purchase Behavior	.747		.655	.850
PP1		.836		
PP2		.835		
PP3		.756		

4.3 SEM analysis and hypothesis testing

A second order Structural Equations Model (SEM) analysis was conducted in order to investigate the relationship between Italian payment habits during the period of the March lockdown, the relationships between Italian financial literacy and the adoption of mobile/electronic payments.

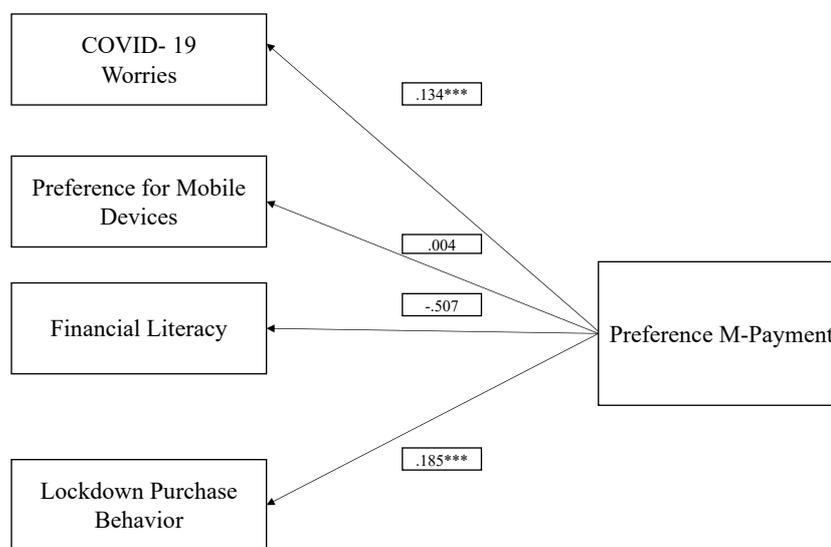
Expected results predict that the latent variable, represented by Preference for M-Payment, is determined both by financial literacy level, COVID-19 Worries, Lockdown Purchase Behaviour and Preference for Mobile Devices. The fit indices for the structural model indicate a very good model fit ($\chi^2 [149] = 1152.500, p < .001, RMSEA = .048, CFI = .945, TLI = .937$).

In Figure 1, we display the results: Preference for M-Payment is composed of the joint contribution of financial literacy level and COVID-19 Fear, Lockdown Purchase Behaviour and Preference for Mobile Devices. In particular, COVID-19 Worries (Standardised Path Coefficient [SPC] = .134; $p < .000$) and Lockdown Purchase Behaviour ([SPC] = .185; $p < .000$) show a positive and significant effect on Preference on M-Payment, in line with hypotheses H1 and H1a and with the existing literature (Anderson et al., 2020; Ardizzi et al., 2020; Cevik, 2020; Dimitriadis et al., 2018; Husain et al., 2020; Yan et al., 2021). Conversely, Financial Literacy shows a negative relationship with Preference for M-Payment ([SPC] = -.507; $p > .01$), but not a statistically significant relationship, contradicting studies on the topic (Dahlberg et al., 2015; Liao and Chen, 2020; Lusardi et al., 2018; Meyll and Walter, 2019).

This finding is in line with the lockdown period due to COVID-19, in which individuals were forced to use M-Payments to satisfy the purchase of basic necessities, regardless of their level of financial literacy.

Preference for Mobile Devices show a no significant relation with M-Payment ($[SPC] = .002; p > .01$). This result shows that the preference for m-payment instruments is not conditioned by the device through which the purchase is made. Contrary to previous studies (Liébana-Cabanillas et al., 2020; Singh et al., 2017; Singh and Sinha, 2020; Dahlberg et al., 2015; Dahlberg et al., 2008), the lack of statistical significance is also probably attributable to the fact that mobile devices and their use during the lockdown have increased due to the forced cloister and not because it is considered a useful means of making payments. The increase in m-payments is independent of the increase in payments made regardless of the greater diffusion of mobile devices, such as smartphones and tablets.

Figure 1. Structural Model



Note: asterisks indicate the significance of the coefficients at 10% (*), 5% (**) and 1% (***).

5. Discussion

With the COVID-19 pandemic and the increasing popularity of mobile phones and novel technologies, consumers' behaviours have undergone a very dramatic change. In particular, regarding Italy, where the pandemic first arrived after its appearance in China, different strategies and methods that allow consumers to avoid direct physical contact, such as e-commerce and digitalisation, are being promoted, causing an increase in usage of mobile payment. The innovative and unusual aspect inserted in the recent academic studies, like this research, concerns the moment in which the study was conducted: the COVID-19 pandemic

was an exogenous shock that caused a rapid increase in the use of m-payments, especially during the lockdown period (Anderson et al., 2020; Kasab et al., 2020; Yan et al., 2021). Italy was one of the first countries to experience this dramatic condition. In order to demonstrate the research hypothesis, a factorial model was proposed and tested, while the causal relationships were analysed using SEM.

From theoretical point of view with respect to previous literature, this study contributes to extending the literature of consumers' behaviour on mobile payment adoption. Consumers' habits are pivotal in payment behaviour. As individuals buy goods or services, the importance they give to the purchasing experience and the preference for the use of cash linked to the conviction of greater control of expenses, have long conditioned the diffusion and the use of non-contact payment tools, such as contactless payment cards and apps.

From a managerial point of view, the new payment habits of Italians and the "open banking" models introduced by *Payment Service Directive 2* (PSD2) may have a very significant impact on the Italian banking market. As already experienced in other sectors, for example telecommunications, we are witnessing a constant development of infrastructure services capable of having a decisive impact on the competitive assets of the sector.

There are various challenges facing incumbents in relation to the possibility of taking advantage of traditional bundling and the possibility of exploiting synergies between collection and employment services and the growing digitalisation of payment services.

From an operational point of view, as the use of non-cash payment services in Italy grows, so does the ability of PSPs to obtain free information from their customers. Access to "data" is the biggest value-add in the payment service value chain. With Big Data, operators can access levels of customer profiling that highlight more specific and targeted needs, preferences and shopping habits and on the other hand, offer new impetus for the development of innovative financing services, such as crowdfunding and peer-to-peer lending. Furthermore, banks can create more accurate alert systems with respect to fraud, and access information that builds better risk profiles of their customers as well as personalised marketing campaigns.

From a regulators and policy-makers point of view, the growth in the use of mobile payment services, due also to a strong growth in the use of digital technologies, which allow for greater distancing between the consumer and the merchant, as witnessed by the share of total card purchases both of transactions using contactless technology cards at the physical point of sale and those via the internet, can expose customers to an increasing risk of fraud and abuse in the processing of data. All efforts must be made to make the tools linked to these rules increasingly effective and within the reach of the weaker sections of the population.

References

- Abdillah, L. A., (2020), "FinTech E-Commerce Payment Application User Experience Analysis during COVID-19 Pandemic", *Science Journal Informatics*, 7(2), 265–278. <https://arxiv.org/ct?url=https%3A%2F%2Fdx.doi.org%2F10.15294%2Fsji.v7i2.26056&v=9765b51f>
- Abrams, B. L. and Waterman, N. G., (1972), "Dirty Money", *JAMA: The Journal of the American Medical Association*, Vol. 219, No. 9, pp. 1202–1203. <https://doi.org/10.1001/jama.1972.03190350038011>
- Agarwal, S., Ghosh, P., Li, J., and Ruan, T. (2020), "Digital Payments and Consumption: Evidence from the 2016 Demonetization in India". Available at: <http://dx.doi.org/10.2139/ssrn.3641508>
- Anderson, R. M., Heesterbeek, H., Klinkenberg, D., Hollingsworth, T.D., (2020), "How will country-based mitigation measures influence the course of the COVID-19 epidemic?", *The Lancet*, Vol. 395, No. 10228, pp. 931–934. [https://doi.org/10.1016/S0140-6736\(20\)30567-5](https://doi.org/10.1016/S0140-6736(20)30567-5)
- Angelakis, E., Azhar I. E., Bibi, F., Yasir, M., Al-Ghamdi, A. K., Ashshi, A. M, Elshemi A. G., Raoult, D., (2014), "Paper money and coins as potential vectors of transmissible disease", *Future Microbiology*, Vol. 9, No. 2, pp. 249-261. <http://dx.doi.org/10.2217/fmb.13.161>
- Arango, C. A., Hogg, D., and Lee, A. (2015), "Why is cash (still) so entrenched? Insights from Canadian shopping diaries", *Contemporary Economic Policy*, 33(1), 141-158. <https://onlinelibrary.wiley.com/doi/full/10.1111/coep.12066>
- Ardizzi, G., Nobili, A., Rocco, G., (2020), "A game changer in payment habits: evidence from daily data during a pandemic", *Bank of Italy - Occasional Paper 591*. Available at: https://www.bancaditalia.it/pubblicazioni/qef/2020-0591/QEF_591_20.pdf?language_id=1
- Arvidsson, N. (2014), "Consumer attitudes on mobile payment services – results from a proof of concept test", *International Journal of Bank Marketing*, Vol. 32 No. 2, pp. 150-170. <https://doi.org/10.1108/IJBM-05-2013-0048>
- Auer, R., Corneli, G. and Frost, J., (2020). "COVID-19, cash, and the future of payments", *BIS Bulletin n. 3*, April 2020. Available at: <https://www.bis.org/publ/bisbull03.pdf>
- Bank of Italy, (2020), *Annual Report for 2019*. <https://www.bancaditalia.it/pubblicazioni/relazione-annuale/2019/index.html>
- Bank of Italy, (2020), *Il costo sociale degli strumenti di pagamento in Italia - Tematiche istituzionali*, https://www.bancaditalia.it/pubblicazioni/tematiche-istituzionali/2020-costo-soc-strum-pagamento/Tem_Istituzionali_2020_costo_sociale_strumenti_pagamento.pdf
- Bannier, C. E., and Gärtner, F. (2019), "Does credit card repayment behavior depend on the presentation of interest payments? The Cuckoo Fallacy", 1–48.
- Barboza, G. (2018), "I will pay tomorrow, or maybe the day after. Credit card repayment, present biased and procrastination", *Economic Notes*, 47(2–3), 455–494.
- Bijlsma, M., Bolt, W., van der Cruijssen, C., & Jonker, N. (2020). *Pandemic payment patterns*. De Nederlandsche Bank, De Nederlandsche Bank Working Paper No. 701.
- Brown, M., Hentschel, N., Mettler, H. and Stix, H. (2020), "Financial Innovation, Payment Choice and Cash Demand - Causal Evidence from the Staggered Introduction of Contactless Debit Cards", *University of St. Gallen, School of Finance Research Paper No. 2020/02*, <http://dx.doi.org/10.2139/ssrn.3582388>
- Canner, G. B., and Elliehausen, G. (2013), "Consumer experiences with credit cards", *Federal Reserve Bulletin*, 99(5), 1–36.
- Cevik, S., (2020), "Dirty Money: Does the Risk of Infectious Disease Lower Demand for Cash?", *International Monetary Fund. (WP/20/255)*. ISBN/ISSN: 9781513560892/1018-5941.

Available at: <https://www.imf.org/en/Publications/WP/Issues/2020/11/20/Dirty-Money-Does-the-Risk-of-Infectious-Disease-Lower-Demand-for-Cash-49877>

Chin, A. W. H., Chu, J. T. S., Perera, M. R. A., Hui, K. P. Y., Yen, H.-L., Chan, M. C. W., Poon, L. L. M., (2020), “Stability of SARS-CoV-2 in Different Environmental Conditions”, *The Lancet Microbe*, Vol. 1, No. 1, DOI: [https://doi.org/10.1016/S2666-5247\(20\)30003-3](https://doi.org/10.1016/S2666-5247(20)30003-3)

Ching, A. T., and Hayashi, F. (2010), “Payment card rewards programs and consumer payment choice”, *Journal of Banking & Finance*, 34(8), 1773- 1787. <https://doi.org/10.1016/j.jbankfin.2010.03.015>

Dahlberg, T., Guo, J., Ondrus, J., (2015), “A critical review of mobile payment research”, *Electronic Commerce Research and Applications*, Vol. 14, No. 5, pp. 265-284. <https://doi.org/10.1016/j.elerap.2015.07.006>

Dahlberg, T., Mallat, N., Ondrus, J., Zmijewska, A., (2008), “Past, present and future of mobile payments research: a literature review”, *Electronic Commerce Research and Applications*, Vol. 7, No. 2, pp. 165-181. <https://doi.org/10.1016/j.elerap.2007.02.001>

Dattalo, P. (2008). *Determining sample size: Balancing power, precision, and practicality*. Oxford University Press. <http://dx.doi.org/10.1093/acprof:oso/9780195315493.001.0001>.

de Luna, I.R., Lièbana-Cabanillas, F., Sánchez-Fernández, J. and Muñoz-Leiva, F. (2018), “Mobile payment is not all the same: the adoption of mobile payment systems depending on the technology applied”, *Technological Forecasting and Social Change*, Vol. 146, pp. 931-944.

Diamantopoulos, A. and J. A. Siguaw (2000), “Introducing LISREL: A Guide for the Uninitiated”, London: Sage Publications.

Dimitriadis, S., Kyrezi, N. and Chalaris, M. (2018), "A comparison of two multivariate analysis methods for segmenting users of alternative payment means", *International Journal of Bank Marketing*, Vol. 36 No. 2, pp. 322-335. <https://doi.org/10.1108/IJBM-10-2016-0157>

Disney, R. and Gathergood, J., (2013). “Financial literacy and consumer credit portfolios”, *Journal of Banking & Finance*, Vol. 37, No. 7, pp. 2246–2254. <https://doi.org/10.1016/j.jbankfin.2013.01.013>

Dodini, S., Lopez-Fernandini, A., Merry, E., and Thomas, L. (2016) *Consumers and mobile financial services*, <https://www.federalreserve.gov/publications.htm>

European Central Bank, (2020), “Study on the payment attitudes of consumers in the euro area (SPACE)”, December. Available at: <https://www.ecb.europa.eu/pub/pdf/other/ecb.spacereport202012~bb2038bbb6.en.pdf>

Farias, P., (2019), “Determinants of knowledge of personal loans' total costs: How price consciousness, financial literacy, purchase recency and frequency work together”, *Journal of Business Research*, Vol.102, No. C, pp. 212-219. <https://doi.org/10.1016/j.jbusres.2018.01.047>

Fernandez, S., Jenkins, P. and Vieira, B., (2020), “Europe’s digital migration during COVID-19: Getting past the broad trends and averages”, McKinsey Digital, July. Available at <https://www.mckinsey.com/business-functions/mckinsey-digital/our-insights/europes-digital-migration-during-covid-19-getting-past-the-broad-trends-and-averages>

Flavian, C., Guinaliu, M. and Lu, Y. (2020), "Mobile payments adoption – introducing mindfulness to better understand consumer behavior", *International Journal of Bank Marketing*, Vol. 38 No. 7, pp. 1575-1599. <https://doi.org/10.1108/IJBM-01-2020-0039>

Fornell, C., and Larcker, D. F. (1981), “Evaluating structural equation models with unobservable variables and measurement error”, *Journal of Marketing Research*, Vol. 18, No. 1, pp. 39-50, <https://doi.org/10.2307/3151312> .

Gathergood, J., Mahoney, N., Stewart, N., and Weber, J. (2019), “How do Americans repay their debt? The balance-matching heuristic”, *American Economic Review*, 109(3), 844–875.

Graf, S., Heim, N., Stadelmann, M., and Trütsch, T. (2021), “Swiss Payment Monitor 2021: How does Switzerland pay? - Short Report Issue 1/2021”, University of St. Gallen/Zurich University of Applied Sciences, Available at: <https://www.swisspaymentmonitor.ch/>

Grohmann, A. and Menkhoff, L., (2017), "Financial literacy promotes financial inclusion in both poor and rich countries", Deutsches Institut für Wirtschaftsforschung (DIW) Economic Bulletin, Vol. 7, No. 41, pp. 399-407. <http://hdl.handle.net/10419/170500>

Guha A., Bhargava R. and Kapitan S. (2013), "Spending Sadly: How Time Versus Money Impacts Enhanced Valuations Under Sadness ", in NA - Advances in Consumer Research Volume 41, eds. Botti S. and Labroo A., Duluth, MN: Association for Consumer Research.

Hair, J. F., Hult, G. M., Ringle, C. M., & Sarstedt, M. (2017), "A primer on partial least squares structural equation modeling (PLS-SEM) - (2nd ed.)", Thousand Oaks, CA: Sage Publications.

Hair, J., Black, W., Babin, B., and Anderson, R. (2010), "Multivariate data analysis - (7th ed.)", Upper Saddle River, NJ, USA: Prentice-Hall, Inc.

Haliassos, M., and Reiter, M. (2005), "Credit card debt puzzles", CFS Working Paper, No. 2005/26.

Hamid, F. S. and Loke, Y. J., (2020), "Financial literacy, money management skill and credit card repayments", International Journal of Consumer Studies. Available at: <https://doi.org/10.1111/ijcs.12614>

Harbourt, D. E., Haddow, A. D., Piper, A. E., Bloomfield, H., Kearney, B. J., Fetterer, D., Gibson, K., Minogue, T., (2020), "Modeling the stability of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) on skin, currency, and clothing.", PLOS Neglected Tropical Diseases, Vol. 14, No. 11. doi: 10.1371/journal.pntd.0008831

Hart, C.W., (2020), "Spiritual lessons from the coronavirus pandemic", Journal of Religion and Health, Vol. 59, pp. 623–624. <https://doi.org/10.1007/s10943-020-01011-w>

Hasan, I., De Renzis, T., Schmiedel, H., (2013), "Retail Payments and the Real Economy, European Central Bank", Working Paper Series n. 1572, August. Available at: <https://www.ecb.europa.eu/pub/pdf/scpwps/ecbwp1572.pdf?0568b27871896eb01f54b0c4c40a8f63>

Hasan, I., Schmiedel, H., Song, L., (2009), "Return to Retail Banking and Payments, European Central Bank", Working Paper Series n. 1135, December. Available at: <https://www.ecb.europa.eu/pub/pdf/scpwps/ecbwp1135.pdf>

Hilgert, M. A., Beverly, S., Hogart, J. M., (2003), "Household financial management: The connection between knowledge and behavior", Federal Reserve Bulletin, pp. 309–322. <https://econpapers.repec.org/scripts/redir.pf?u=http%3A%2F%2Fwww.federalreserve.gov%2Fpubs%2Fbulletin%2F2003%2F0703lead.pdf;h=repec:fip:fedgrb:y:2003:i:jul:p:309-322:n:v.89no.7>

Husain, A., Jain, R., Satsangi, A. K., (2020), "COVID-19 Effect on Consumer Payment Systems: Establishing Cause & Effect Relationship", Proceedings of International Conference on the 'New normal' in Management, Social Sciences & Economic Development, Amity Business School, Amity University, Madhya Pradesh, Gwalior, INDIA, November 5th-6th. Available at SSRN: <https://ssrn.com/abstract=3738932>

Innovative Payments Observatory (2021), "Innovative payments: da alternative a necessità", Politecnico di Milano School of Management, https://osswestorageecom.blob.core.windows.net/productassets/Ita/Infografica/4001691/Infografica_InnovativePayments_110321_sku_4001691.png?sv=2018-0328&sr=b&sig=2g8V4wx25RINFgbDDbGgoKE7I1IQ%2BZYxfiUtq5pnnD4%3D&se=2021-04-26T11%3A04%3A07Z&sp=r

Jenkins, A. J., (2001), "Drug contamination of US paper currency", Forensic Science International, Vol. 121, No. 3, pp. 189-193. [https://doi.org/10.1016/s0379-0738\(01\)00401-7maron](https://doi.org/10.1016/s0379-0738(01)00401-7maron)

Jonker, N., van der Crujisen, C., Bijlsma, M., Bolt, W., (2020), "Pandemic payment patterns.", De Nederlandsche Bank Working Paper, No. 701. Available at SSRN: <https://ssrn.com/abstract=3760322> or <http://dx.doi.org/10.2139/ssrn.3760322>

Kakushadze, Z., and Liew, J. K.-S., (2020), "Coronavirus: Case for Digital Money?", *World Economics*, Vol. 21, No. 1, pp. 177-190. Available at SSRN: <https://ssrn.com/abstract=3554496> or <http://dx.doi.org/10.2139/ssrn.3554496>

Kapoor, K., Dwivedi, Y. K., and Williams, M. D. (2013), "Role of innovation attributes in explaining the adoption intention for the interbank mobile payment service in an Indian context", *International working conference on transfer and diffusion of IT*. Berlin, Heidelberg: Springer.

Kasab, A. K., Almallouhi, E., and Holmstedt, C. A. (2020), "Optimizing the Use of Teleneurology during the COVID-19 Pandemic", *Telemedicine and e-Health*, Vol. 26, No. 10, pp. 1197-1198. <https://doi.org/10.1089/tmj.2020.0109>

Kirana, M. Y., & Havidz, S. A. H. (2020), "Financial Literacy and Mobile Payment Usage as Financial Inclusion Determinants". 2020 International Conference on Information Management and Technology (ICIMTech). doi:10.1109/icimtech50083.2020

Klapper, L. and Lusardi, A., (2019), "Financial literacy and financial resilience: Evidence from around the world", *Financial Management*, Vol. 49, No. 3, pp. 589–614. <https://doi.org/10.1111/fima.12283>

Kumar, V., Lai, K.-K., Chang, Y.-H., Bhatt, P.C. and Su, F.-P. (2021), "A structural analysis approach to identify technology innovation and evolution path: a case of m-payment technology ecosystem", *Journal of Knowledge Management*, 25(2), 477-499. <https://doi.org/10.1108/JKM-01-2020-0080>

Liao, C.-F. and Chen, C.-D., (2020), "Financial Literacy and Mobile Payment Behaviors", *Journal of Accounting & Finance*, Vol. 20, No. 7, pp. 126-138.

Liébana-Cabanillas, F., Japutra, A., Molinillo, S., Singh, N. and Sinha, N. (2020), "Assessment of mobile technology use in the emerging market: Analyzing intention to use m-payment services in India", *Telecommunications Policy*, 44(9), doi:10.1016/j.telpol.2020.102009

Liébana-Cabanillas, F., Molinillo, S. and Ruiz-Montañez, M. (2019), "To use or not to use, that is the question: analysis of the determining factors for using NFC mobile payment systems in public transportation", *Technological Forecasting and Social Change*, Vol. 139, pp. 266-276.

Loh, X.-M., Lee, V.-H., Tan, G.W.-H., Ooi, K.-B. and Dwivedi, Y.K. (2021), "Switching from cash to mobile payment: what's the hold-up?", *Internet Research*, Vol. 31 No. 1, pp. 376-399. <https://doi.org/10.1108/INTR-04-2020-0175>

Lu, Y., Yang, S., Chau, P.Y. and Cao, Y. (2011), "Dynamics between the trust transfer process and intention to use mobile payment services: a cross-environment perspective", *Information and Management*, Vol. 48 No. 8, pp. 393-403.

Lusardi, A. and de Bassa Scheresberg, C., (2013), "Financial Literacy and High-Cost Borrowing in the United States", *National Bureau of Economic Research, Working Paper*, No. 18969. doi 10.3386/w18969

Lusardi, A. and Mitchell, O. S., (2011), "Financial literacy around the world: An overview". *Journal of Pension Economics and Finance*, Vol. 10, No. 4, pp. 497–508. <http://dx.doi.org/10.1017/S1474747211000448>

Lusardi, A., (2019), "Financial literacy and the need for financial education: Evidence and implications", *Swiss Journal of Economics and Statistics*, Vol. 155, No. 1, pp. 1–8. <https://doi.org/10.1186/s41937-019-0027-5>

Lusardi, A., Hasler, A., Scheresberg, C. D. B., (2018), "Millennial mobile payment users: a look into their personal finances and financial behaviors", *ADB Working Paper Series*, No.

1074. <https://www.adb.org/publications/millennial-mobile-payment-users-personal-finances-financial-behavior>

Lusardi, A., Schneider, D. and Tufano, P. (2015), The Economic Crisis and Medical Care Use: Comparative Evidence from Five High-Income Countries. *Social Science Quarterly*, Vol. 96, pp. 202-213. <https://doi.org/10.1111/ssqu.12076>

MacCallum, R. C., Widaman, K. F., Zhang, S., and Hong, S. (1999), "Sample size in factor analysis", *Psychological Methods*, Vol. 4, No. 1, pp. 84-89, <https://doi.org/10.1037/1082-989X.4.1.84>

Marcotty-Dehm, N., and Trütsch, T. (2021), "Financial Literacy and Payment Behaviour: Evidence from Payment Diary Survey Data", Electronic copy available at: <https://ssrn.com/abstract=3918910>

Maron, D. F., (2017), "Dirty Money: The public health case for a cashless society", *Scientific American*, January 3. Available online: <https://www.scientificamerican.com/article/dirtymoney/>

Mastercard, (2020), "Mastercard enables Contactless limit raise across 29 Countries and champions permanent increase". Available at: <https://newsroom.mastercard.com/eu/press-releases/mastercard-enables-contactless-limit-raise-across-29-countries-and-champions-permanent-increase/>.

McHugh, S., and Ranyard, R. (2016), "Consumers' credit card repayment decisions: The role of higher anchors and future repayment concern", *Journal of Economic Psychology*, 52, 102–114. <https://doi.org/10.1016/j.joep.2015.12.003>

Meyll, T. and Walter, A. (2019), "Tapping and waving to debt: Mobile payments and credit card behavior", *Finance Research Letters*, Vol.28, No. C, pp. 381-387. <https://doi.org/10.1016/j.frl.2018.06.009>

Mottola, G. R., (2013), "In our best interest: Women, financial literacy, and credit card behavior", *Numeracy Advancing Education in Quantitative Literacy*, Vol. 6, No. 2. <http://dx.doi.org/10.5038/1936-4660.6.2.4>

Netemeyer, R., Bearden, W.O., and Sharma, S. (2003), "Scaling Procedures: Issues and Applications", Atlanta, GA: Sage Publications.

Norvilitis, J. M., Merwin, M. M., Osberg, T. M., Roehling, P. V., Young, P. and Kamas, M. M. (2006), "Personality Factors, Money Attitudes, Financial Knowledge, and Credit-Card Debt in College Students", *Journal of Applied Social Psychology*, 36, 1395-1413. <https://doi.org/10.1111/j.0021-9029.2006.00065.x>

Oyler, J., Darwin, W. D., Cone, E. J., (1996), "Cocaine Contamination of United States Paper Currency", *Journal of Analytical Toxicology*, Vol. 20, No. 4, pp. 213-216. <https://doi.org/10.1093/jat/20.4.213>

Pal, R. and Bhadada, S. K., (2020), "Cash, currency and COVID-19." *Postgraduate Medical Journal*, Vol. 96, No. 1137, pp. 427–428. <http://dx.doi.org/10.1136/postgradmedj-2020-138006>

Panetta, F., (2020), "The blog post by Fabio Panetta, member of the Executive Board of the ECB, Money in the digital era". Available at: <https://www.ecb.europa.eu/press/blog/date/2020/html/ecb.blog201202~e493105c2e.en.html>

Patil, P. P., Dwivedi, Y. K., and Rana, N. P. (2017), "Digital payments adoption: An analysis of literature", in *Conference on e-Business, e-Services and e-Society*, 61–70. Cham: Springer.

Perrazzelli, A., (2021), "L'accelerazione digitale del sistema finanziario: nuove sfide per il mercato e per le autorità", intervento Webinar - Open finance: il futuro del banking a portata di mano Associazione CIVITA – CBI 25 febbraio 2021. Available at: https://www.bancaditalia.it/pubblicazioni/interventi-direttorio/int-dir-2021/Perrazzelli_accelerazione_digitale_sistema_finanziario_25022021.pdf

- Politecnico of Milan, (2021), Mobile B2c Strategy Observatory, <https://www.osservatori.net/it/ricerche/osservatori-attivi/mobile-b2c-strategy>
- Pope, T., Ender, P. T., Woelk, W. K., Koroscil, M. A., Koroscil, T. M., (2002), "Bacterial Contamination of Paper Currency," *Southern Medical Journal*, Vol. 95, No. 12, pp. 1408–1410. Available at: <https://pubmed.ncbi.nlm.nih.gov/12597308/>
- Prelec, D., & Semster, D. (2001), "Always leave home without it. A further investigation of the credit card effect on willingness to pay", *Marketing Letters*, 12(1), 5–12.
- Raubenheimer, J. (2004), "An item selection procedure to maximise scale reliability and validity", *SA Journal of Industrial Psychology*, Vol. 30, No. 4, <https://doi.org/10.4102/sajip.v30i4.168>
- Riddell, S., Goldie, S., Hill, A., Eagles, D., Drew, T. W., (2020), "The effect of temperature on persistence of SARS-CoV-2 on common surfaces", *Virology Journal*, Vol. 17, No. 145. <https://doi.org/10.1186/s12985-020-01418-7>
- Risqiani, R., (2015), "Antecedents and consequences of impulse buying behavior", *Business and Entrepreneurial Review*, Vol. 15, No.1, pp.1-20.
- Runnemark, E., Hedman, J. and Xiao, X. (2015), "Do consumers pay more using debit cards than cash?", *Electronic Commerce Research and Applications*, 14(5), 285–291.
- Schlomer, G. L., Bauman, S., & Card. N. A. (2010), "Best practices for missing data management in counseling psychology", *Journal of Counseling Psychology*, Vol. 57, No. 1, pp. 1-10. doi: 10.1037/a0018082
- Scholnick, B., Massoud, N., Saunders, A., Valverde, S., Fernández, F. (2008), "The Economics of Credit Cards, Debit Cards and Atms: A Survey and Some New Evidence", *Journal of Banking & Finance*, Vol. 32, No. 8, pp. 1468-1483. <https://doi.org/10.1016/j.jbankfin.2007.05.001>
- Schuh, S., and Stavins, J. (2011), "How consumers pay: adoption and use of payments. FRB of Boston", *FRB of Boston Working Paper No. 12-2*. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2564179
- Shah, A. M., Eisenkraft, N., Bettman, J. R., and Chartrand, T. L. (2016), "Paper or plastic?": How we pay influences post-transaction connection, *Journal of Consumer Research*, 42(5), 688–708. <https://doi.org/10.1093/jcr/ucv056>
- Shefrin, H. and Nicols, C. M., (2014), "Credit card behavior, financial styles, and heuristics", *Journal of Business Research*, Vol. 67, pp. 1679-1687. <https://doi.org/10.1016/j.jbusres.2014.02.014>
- Singh, N., and Sinha, N. (2020), "How perceived trust mediates merchant's intention to use a mobile wallet T technology", *Journal of Retailing and Consumer Services*, 52. <https://doi.org/10.1016/j.jretconser.2019.101894>
- Sinha, M., Majra, H., Hutchins, J. and Saxena, R. (2019), "Mobile payments in India: the privacy factor", *International Journal of Bank Marketing*, 37(1), 192-209. <https://doi.org/10.1108/IJBM-05-2017-0099>
- Stango, V. and Zinman, J., (2009), "Exponential growth bias and household finance". *Journal of Finance*, Vol. 64, No 6, pp. 2807–2849. <https://doi.org/10.1111/j.1540-6261.2009.01518.x>
- Taber, K.S. (2018), "The Use of Cronbach's Alpha When Developing and Reporting Research Instruments in Science Education", *Research in Science Education*, Vol. 48, pp. 1273–1296, <https://doi.org/10.1007/s11165-016-9602-2> .
- Tagoe, D. N. A., Baidoo, S. E., Dadzie, I., Ahatore, D., (2009). "A study of Bacterial Contamination of Ghanaian Currency Notes in Circulation", *The Internet Journal of Microbiology*, Vol. 8, No. 2. Available at: <https://ispub.com/IJMB/8/2/6218>

Tanglao, L., (2014), “Dirty money: Your cash is home to thousands of bacteria”, CBC News, April 24. Available online: <https://www.cbcnews.com/news/dirty-money-your-cash-is-home-to-thousands-of-bacteria/>

The European House - Ambrosetti, (2021), “Italia Cashless: cambiamenti in atto e prospettive future”, Rapporto 2021 della Community Cashless Society, 6th edition.

Thomas, Y., Vogel, G., Wunderli, W., Suter, P., Witschi, M., Koch, D., Tapparel, C., Kaiser, L., (2008), “Survival of influenza virus on banknotes”, *Applied and Environmental Microbiology*, Vol. 74, No. 10, pp. 3002-3007. <http://dx.doi.org/10.1128/AEM.00076-08>

Toraman, C., Kılıç, Y., and Buğan, M. F. (2016), “Credit card literacy levels and credit card usage behaviors of college students”, *Journal of Business Research - Turk*, 8(4), 266. <https://doi.org/10.20491/isard er.2016.218>

Trütsch, T. (2016), “The impact of mobile payment on payment choice”, *Financial Markets and Portfolio Management*, 30(3), 299–336. <https://doi.org/10.1007/s11408-016-0272-x>

van der Crujisen, C., Hernandez, L., and Jonker, N. (2017), “In love with the debit card but still married to cash”, *Applied Economics*, 49(30), 2989-3004. <https://doi.org/10.1080/00036846.2016.1251568>

van Doremalen, N., Bushmaker, T., Morris, D. H., Holbrook, M. G., Gamble, A., Williamson, B. N., Tamin, A., Harcourt, J. L., Thornburg, N. J., Gerber, S. I., Lloyd-Smith, J. O., De Wit, E., Munster, V. J., (2020), “Aerosol and Surface Stability of SARS-CoV-2 as Compared with SARS-CoV-1,” *New England Journal of Medicine*, Vol. 382, No. 16, pp. 1564–1567. doi: 10.1056/NEJMc2004973

van Griethuijsen, R. A. L. F., van Eijck, M. W., Haste, H., den Brok, P. J., Skinner, N. C., Mansour, N., Gencer, A. S., & BouJaoude, S. B. (2015), “Global patterns in students' views of science and interest in science”, *Research in Science Education*, Vol. 45, No. 4, pp. 581-603, <https://doi.org/10.1007/s11165-014-9438-6>

van Rooij, M., Lusardi, A., Alessie, R., (2011), “Financial Literacy and Stock Market Participation”, *Journal of Financial Economics*, Vol. 101, No. 2, pp. 449-472. <http://dx.doi.org/10.1016/j.jfineco.2011.03.006>

Vriesekoop, F., Chen, J., Oldaker, J., Besnard, F., Smith, R., Leversha, W., Smith-Arnold, C., Worrall, J., Rufraay, E., Yuan, Q., Liang, H., Scannell, A., Russell, C., (2016), “Dirty Money: A Matter of Bacterial Survival, Adherence, and Toxicity”, *Microorganisms*, Vol. 4, No. 42. <http://dx.doi.org/10.3390/microorganisms4040042>

Wisniewski, T. P., Polasik, M., Kotkowsky, R., Moro, A., (2021), “Switching from Cash to Cashless Payments during the COVID-19 Pandemic and Beyond”. Available at SSRN: <https://ssrn.com/abstract=3794790> or <http://dx.doi.org/10.2139/ssrn.3794790>

Yan, L.-Y., Tan, G. W.-H., Loh, X.-M., Hew, J.-J., Ooi, K.-B., (2021), “QR code and mobile payment: The disruptive forces in retail”, *Journal of Retailing and Consumer Services*, Vol. 58, No. C. <https://dx.doi.org/10.1016%2Fj.jretconser.2020.102300>

Yi, M. Y., Fiedler, K. D., & Park, J. S. (2006), “Understanding the role of individual innovativeness in the acceptance of IT-based innovations: Comparative analyses of models and measures”, *Decision Sciences*, 37(3), 393–426.