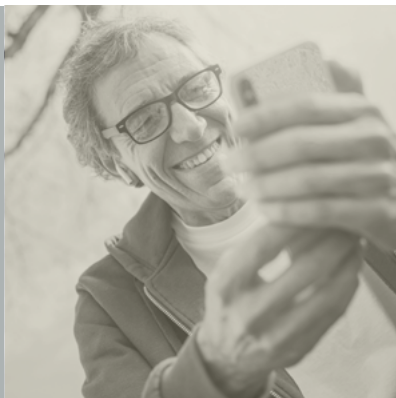


CRYPTOCURRENCIES IN RETAIL

Consumer Adoption Report | 2021

"Market research on perception, preference, and experience of cryptocurrency shoppers."



Cryptocurrencies in Retail

Consumer Adoption Report 2021

May 2021

U.C. Cabuk, M. Silenzi

DOI: 10.6084/m9.figshare.14790384

CryptoRefills Labs
Big Dream Ventures BV
Keizersgracht 482,
1015 EG, Amsterdam, NL



EXECUTIVE SUMMARY

This report presents the outcomes of the first and largest research regarding the consumer use of Bitcoin and other cryptocurrencies for retail shopping and associated payments. What the research reveals includes the demographics of crypto-consumers, their current experiences, their perception of cryptoshopping, and the market-wise adoption of crypto-payments. The report presents quantitative and qualitative insights into who these consumers are and why they use Bitcoin (and other cryptocurrencies) as a means of paying for goods and services, as well as how satisfied they are with their experiences so far.

From our survey with 290 unique participants combined with our business and transaction data, we observed that paying for goods and services with cryptocurrency is in demand and considered useful by users yet faces both technical and business challenges. New solutions, still quite fragmented at the moment, are being offered to crypto shoppers to overcome current challenges and improve the overall shopping experience. Although we feel quite confident in saying that shopping with cryptocurrencies is still in its infancy, it is growing and evolving at an incredible pace and is likely here to stay.

KEY FINDINGS

After careful analysis of the collected data, a number of important findings have been achieved:

1. Crypto-consumers are scattered all around the world. They have varying demographic features and are from different socioeconomic backgrounds. Yet, some prevalent patterns exist. For example, being a male younger than 35, being from a lower-middle-income country, earning less than \$20,000 annually, and being self-employed are widespread, if not stereotypical. As many as one-fifth come from the world's most fragile economies and see a solution for participating in the global digital economy in cryptocurrencies. Others, instead, are from developed markets, often high-income earners, and many have been exposed in one way or another to the blockchain, maybe as part of their work or because of trading.
2. Despite its higher fees and longer blockchain processing times, crypto-consumers favor Bitcoin over all other currencies, as 79% of them claim they hold some Bitcoin. Ethereum (54.5%) and Litecoin (31.7%) are the followers in terms of preference, with the latter being also frequently used for shopping. In general, Ethereum and some top ERC20 tokens are in strong demand but less adopted for shopping, likely due to high "Gas" fees and availability at stores. The same goes for top stablecoins, which are also popular but face the same challenges as other ERC20 tokens. Other currencies (e.g., Dash) may be slightly less favored today, but then for practical reasons (i.e., speed and fees), they are really popular for shopping. In general, the cryptocurrencies the crypto-consumers have to use for shopping today are not necessarily the ones they would like to shop with the most. This may drive adoption for faster blockchains and scalability solutions for the most favored currencies (i.e., BTC, ETH, ERC20 stablecoins), or on the contrary, as shopping with cryptocurrencies increases, users may start changing their preferences towards other currencies that deliver the best shopping experience.
3. The Lightning Network is a viable solution to many issues faced during crypto-shopping (e.g., speed, cost, etc.), and its current recognition and adoption are growing but still quite limited. The Lightning Network is, in fact, the first scalability network available to users for shopping, and it serves the most favored coin by shoppers (i.e., Bitcoin), but it is still early to say if we will see massive adoption of this technology or if it is over-hyped.
4. What crypto-consumers buy most are digital goods, including mobile top-ups, game credits, mobile apps, and digital entertainment services. Most crypto-consumers believe that cryptoshopping has outstanding potential and will be more common in the future. Also, most crypto-consumers (34.1%) claim they will buy something using cryptocurrency within the next 30 days, and a staggering 25% claims they will purchase goods or services using cryptocurrency within the next 7 days, likely meaning that once crypto users adapt their habits and get acquainted with paying for goods and services with crypto-money, they are likely to continue doing so (when given the opportunity).

5. Nearly half of the crypto-consumers prefer or fall back on indirect shopping via gift cards, vouchers, or coupons. This appears to be a neat solution to access stores or products currently unavailable for crypto-shopping (e.g., due to marketing strategies or company policies). The unavailability of a crypto-payments option for most renowned brands and stores likely explains why crypto-consumers consolidate their crypto-shopping activities at one-stop shops (such as CryptoRefills) that can satisfy a variety of the customers' needs via gift cards.
6. High transaction fees (49.4%), store or product unavailability (33.9%), long processing delays (25.9%), and price volatility (19.7%) are the most challenging barriers against the mass adoption of crypto-shopping habits. 55.5% of crypto-shoppers consider themselves innovators, and as such, are willing to overcome costs and complexities in order to utilize the newest technology. When the current technical and business challenges are resolved, it is likely that we will see crypto-shopping moving much faster through the "adoption curve".
7. Crypto-shopping is not just another fancy payment method, rather it is a decent solution for many social, economic, and technical issues. This includes, but is not limited to, financial inclusion of un-or-underbanked people who survive on minor online tasks or small personal businesses, avoiding red-tape, mitigating privacy concerns, preventing losses from buy/sell spreads for people already earning crypto-money, and enabling cheaper and faster alternatives to current international remittance methods.

ABOUT THIS REPORT

The first and largest research into consumer use of Bitcoin and other cryptocurrencies for shopping and payments. Quantitative and qualitative insights into who these consumers are and why they use Bitcoin and other cryptocurrencies as a means to pay for goods and services.

Our research is limited to cases where the end-user (i.e., consumer) pays for goods and services using only blockchain technology. In other words, we are not covering hybrid payment technologies such as debit cards funded by cryptocurrencies or credit cards backed by crypto assets. This does not mean we do not see these as promising services and possibly competing with pure blockchain payments. In fact, such hybrid services do overcome some of the complexities of the user experience we will see in our research. However, hybrid payment systems (e.g., Swipe, Nexo, and Binance cards, etc.) must also rely

on traditional infrastructure (MasterCard, Visa, etc.); therefore, we will consider them out of the scope of our research for the moment. We may consider including them in future studies.

We believe this research to be insightful and useful for professionals operating within the crypto and blockchain industry, as well as for professionals of the general financial industry, regulators, and retailers in general. Ultimately, only by understanding what users really need can we deliver the optimal technical and business solutions.

Support Our Research

We joined the blockchain industry in 2018, later than many other players. We quickly learned that this industry is all about (its) community: "join for greed, stay for the revolution". In 2020, while reviewing our data and the surveys we used to improve our product, we realized there was so much value in this information, we could not keep it only for ourselves. Despite being hesitant at first, we want publicly share our knowledge as we believe this can only be beneficial to our industry.

Despite this product being distributed free of charge for non-commercial use, under a Creative Commons license, a lot of hard work was put into it. So please consider making a donation. Commercial licenses for this report, are also available for purchase.

Donate or Buy!

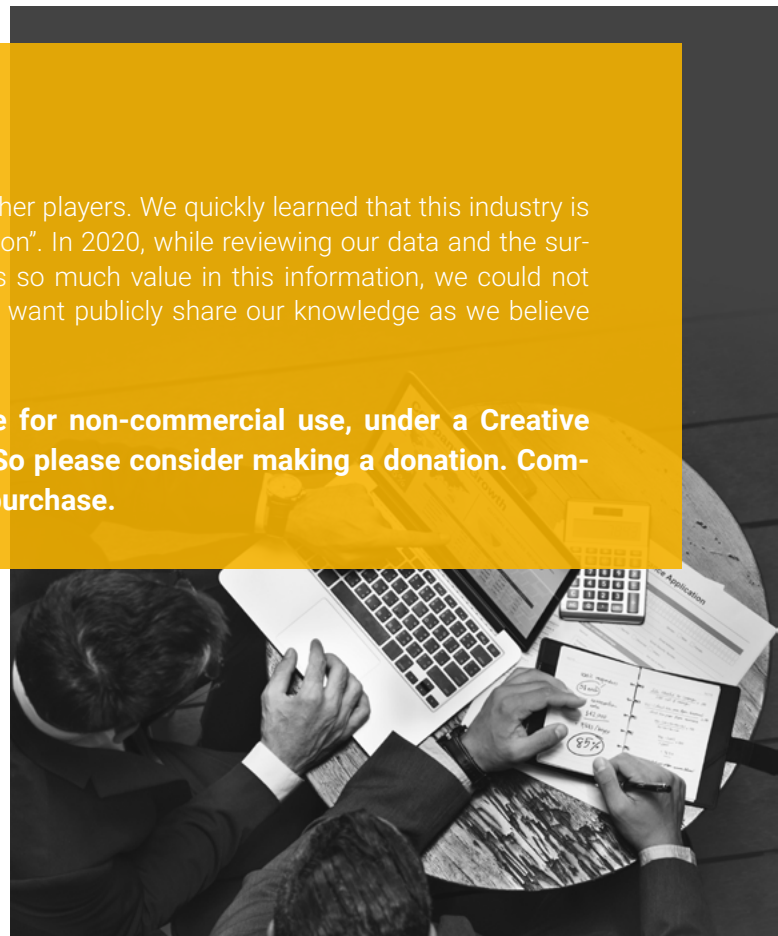


Scan QR Code



Visit Link

https://www.cryptorefills.com/netherlands/report/cryptocurrencies_in_retail_report_2021



Cite this research as;

U. C. Çabuk and M. Silenzi. May 2021. "Cryptocurrencies in Retail: Consumer Adoption Report 2021". Amsterdam: CryptoRefills Labs.

FOREWORDS

Today access to Bitcoin and/or crypto-asset investments, trading, and person-to-person transactions are relatively easy. However, this only serves a limited scope of need for these currencies. Our vision is and remains that for blockchain-based currencies to gain mass adoption, these must be able to be used as a medium of exchange for everyday needs, in other words, to purchase goods and services.

At the end of February 2021, which is when we finished conducting the surveys for this research, the total market capitalization of cryptocurrencies has reached a whopping 1.4 trillion USD, of which 40% was Bitcoin. Yet, there are very few ways this value can be directly transferred into the real economy. Processing cryptocurrency-based payments for goods and services is not easy at all. Not surprisingly, merchants and processors avoid this form of payment (at least today). The main difficulties we will see are in guaranteeing a good user experience in the process (simplicity, speed of the transaction on the blockchain, transaction fees) as well as technological complexity, currency fragmentation exchange risks, regulation, and taxation.

Very little research has been conducted on the adoption of cryptocurrencies for the payment of goods and services, and was entirely focused on the merchant side. Our research is instead solely dedicated to the consumer side. Our goal is to explore and understand the current adoption of Bitcoin and cryptocurrency payments for purchasing goods and services, describing the demographics, defining adoption drivers and barriers, explaining in detail the user experiences and difficulties. We will outline which markets are seeing stronger adoption and outline goods and services categories as well as which cryptocurrencies have the highest demand. We will also dig into some of the hottest topics and promising technologies,

such as Lightning Network, to understand adoption and measure the reality versus the hype.

Many today argue that Bitcoin technology has certain characteristics that limit its use as a medium of exchange (especially for smaller and more frequent transactions). At the same time, different blockchains, scalability solutions, and cryptocurrencies are emerging to overcome such limitations, and probably, even more, will be developed in the future. The amount of innovation happening within the use of blockchain for processing payments is truly exceptional. Without anticipating too much of what we will read in this research, the adoption is being driven by a mixed demographic that includes the most innovative people of our society all over the globe (people working in blockchain and technology, people that consider themselves innovators) as well as by that part of society that is hidden and left behind (unbanked, underbanked, young people from emerging markets that perform micro-tasks and freelance works online).

A transverse adoption of blockchain-based payments is springing up throughout the globe, from the most developed markets to the most fragile economies. There is the sense that new rails and pipes are now truly being laid. And that these will soon lead to a dramatic disruption of our financial and payment system, which will ultimately impact us all, and at all levels, economic, financial, societal, and political.

Massimiliano Silenzi

CEO of Cryptorefills



CRYPTO-GLOSSARY

The field of blockchain and cryptocurrency technologies is very new and still under comprehensive development. Hence, it is not uncommon for users and developers throughout the world to use various terms for many different concepts. For the sake of consistency, we explain what we mean by using some terms, as follows:

Crypto-consumers (or crypto-shoppers) are customers who purchase digital items (except for cryptoassets), physical goods, or services of any kind by means of crypto-shopping.

Crypto-shopping is a kind of online shopping, where the price of the purchased goods or services are paid in terms of crypto-assets, instead of by fiat money or other commodities.

Crypto-shops (or crypto-stores) are (mostly, but not necessarily) online stores that accept payments from customers using crypto-assets.

Crypto-assets are digital and decentralized means for storing value. They are created via cryptographic methods and may be in the form of currencies, coins, tickets, non-fungible tokens (NFT), securities, bonds, etc. Note that not all crypto-assets can be used as digital money.

Cryptocurrencies constitute a large subset of crypto-assets that can be exchanged between users and can be used for trading or commerce purposes as a means for payments. It is sometimes called "cryptomoney", or more briefly as "crypto".

Crypto-exchanges (or cryptocurrency exchanges) are web platforms (usually with mobile apps) that allow people to buy, sell, store, exchange, and invest in various cryptocurrencies.

Crypto-commerce is an umbrella term for commercial activities of any kind (including crypto-shopping) that are achieved through sending and receiving crypto-assets.

Lightning Network is a special "layer-2" payment protocol that operates on the Bitcoin blockchain. It aims to accelerate the transactions among participating nodes and is a solution to the scalability problem. It features a peer-to-peer mechanism for making payments on a network of bidirectional payment channels without delegating custody of funds.

Stablecoins are a type of cryptocurrency whose value is fixed to (or is in parallel with) a fiat currency, a commercial commodity, or another cryptocurrency.



Contents

1. INTRODUCTION	7	5.1 Currencies	24
1.1 Introducing blockchain payments	7	5.2 Goods & Services	26
1.2 Centralized vs. Decentralized Payments	8	5.3 Lightning Network	29
1.3 Impact of blockchain payments on purchases	9	5.4 Recurrence	30
2. DEMOGRAPHICS	11	6. EXPERIENCE	32
2.1 Geography	11	6.1 Satisfaction	32
2.2 Personal	13	6.2 Issues	34
2.2.1 Age	13	6.2.1 Overview	34
2.2.2 Gender	14	6.2.2 Fees	35
2.3 Socioeconomic Indicators	14	6.2.3 Demographic Breakdowns	37
2.3.1 Education	15	6.3 Future Use	39
2.3.2 Occupation	16	6.4 Expertise	40
2.3.3 Income	17	7. MOTIVATIONS	41
3. PERCEPTION & ATTITUDE	18	7.1 Drivers	41
3.1 Ease of Use	18	7.2 Barriers	42
3.2 Usefulness	19	8. CONCLUSION	44
3.3 Social Norm	20	8.1 Bridging Markets	44
3.4 Confidence	21	8.2 Financial Inclusion	45
4. EXPOSURE & ADOPTION	22	8.3 A Better Way of Payments	45
4.1 Personal Adoption	22	9. METHODOLOGY	46
4.2 Business Adoption	23	9.1 Survey & Data Collection	46
5. PREFERENCES & BEHAVIORS	24	9.2 Population & Sample Size	47
		9.3 Criticism	47

1. INTRODUCTION

1.1 Introducing blockchain payments

Blockchain payments are what make crypto-shopping possible. For the readers less knowledgeable about blockchain technology and the associated payments, we provide a brief introduction, mainly aimed at providing a framework to use as a reference for understanding the scope of this research.

Figure 1 illustrates a sample of the step-by-step user experience of a blockchain-based purchase (a.k.a., crypto-shopping).

1. The user is shown the product to be purchased with a price in the selected cryptocurrency. The price of goods and services in a cryptocurrency is usually calculated on the fly by converting the related fiat price to the selected cryptocurrency price.
2. Once the order is completed, the user is shown a payment page with the payment instructions, thus the recipient wallet address of the merchant and the amount to be transferred. Usually, the user is given a short time frame (e.g., 15 minutes) to initiate the payment due to the volatility of the cryptocurrency rates and the risk of exchange loss for the merchant.
3. The user then opens his/her crypto wallet, inserts the required amount and address of the merchant. Later he/she authorizes the transfer of the cryptocurrency.
4. As soon as the merchant detects that the payment has been initiated on behalf of the user, the merchant will usually inform the user that the payment is being processed.
5. When the merchant deems that sufficient confirmations have taken place on the blockchain, the merchant will confirm the completion of the transaction and authorize the delivery of the product or service to the user.

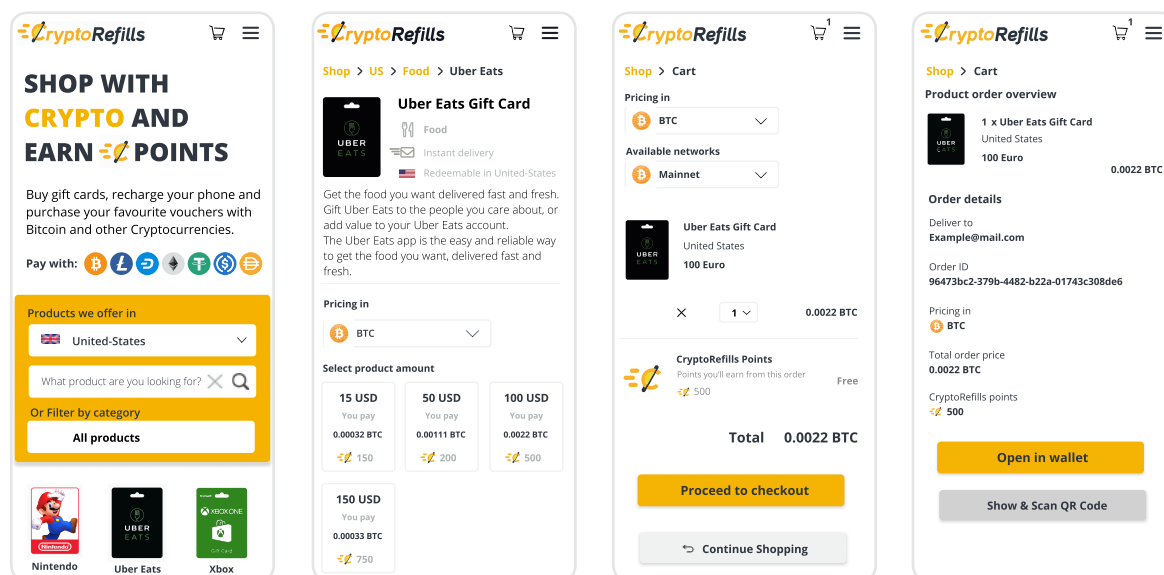


Figure 1: An example indirect (i.e., via gift card) crypto-shopping procedure, shown step-by-step.

1.2 Centralized vs. Decentralized Payments

The purchase experiences within a blockchain payment system are very different from traditional digital payments, as illustrated in the example provided in Figure 1 above. It is beyond the scope of this report to provide a detailed and exhaustive explanation of how blockchain payments work and why they are different from the current "centralized" digital payments. So, we present here only a brief overview of the functionality of blockchain payments, as well as what makes them so special and different.

In a centralized payment system, the user gives a "confirmation" to an organization (i.e., a central authority), generally a payment processor, to authorize the payment or transfer of a certain amount held for the user by another central authority (e.g., a bank or a credit institution) to an account belonging to another user or an organization. The user generally gives such confirmation by typing credit card details or logging in with a PIN code and/or submitting two-factor authentication (2FA) codes. When

the processor is sure that the user wants to proceed with the transaction, it will inform other "centralized authorities" (e.g., banks, acquiring banks, e-money providers, credit institutions, etc.) to proceed with the transaction, thus, charging the user with the amount of the transaction, for example by deducting it from the balance of the bank account or charging it to the credit card balance.

Blockchain-based payments (in their most common form) are written on a decentralized ledger. This means that every single transfer of value occurring between two different accounts (i.e., public addresses or wallets) is written on a single ledger by broadcasting this transaction to the rest of the network and waiting for the blockchain network to confirm the validity of this transaction. There are a few noteworthy technological and business-related aspects of such uses of decentralization within the most common blockchain networks for payment purposes:

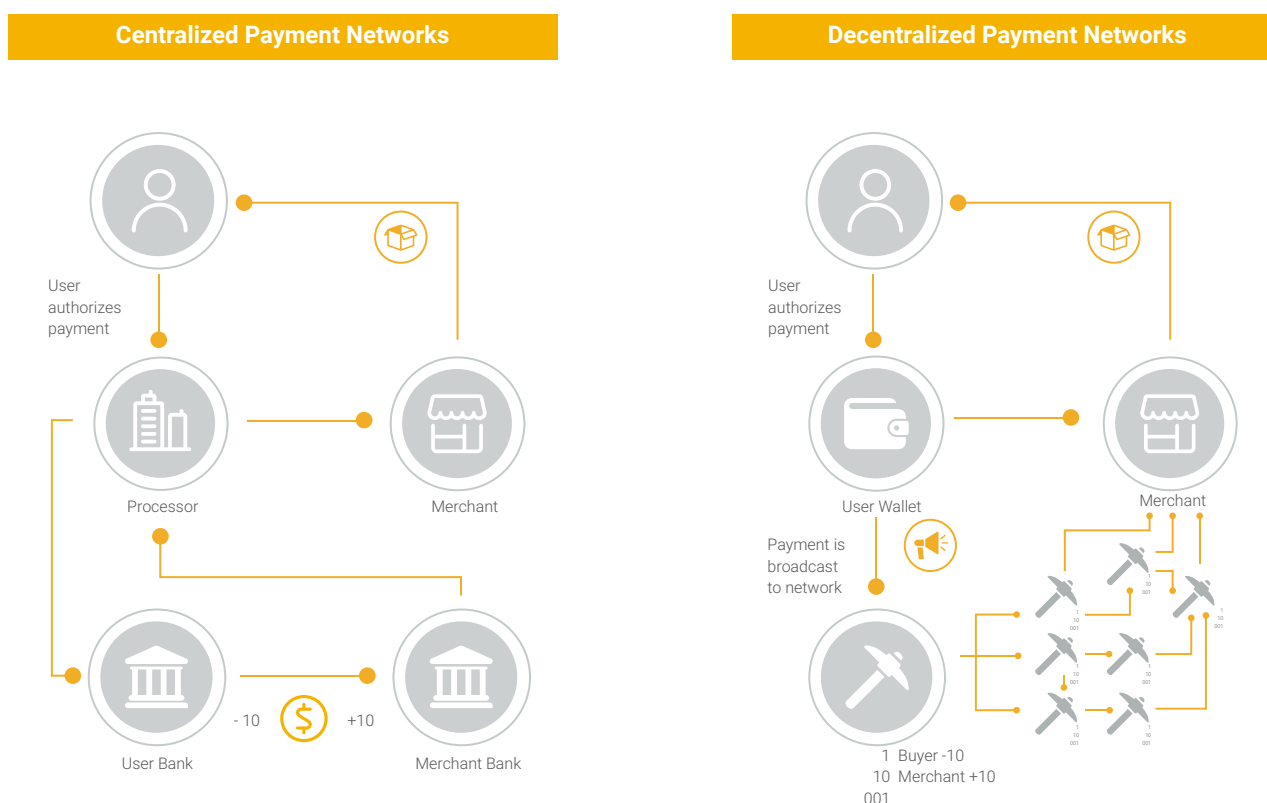


Figure 2: The difference between the procedures of centralized and decentralized payments.

Authorization: The user (i.e., the consumer) is responsible for the payment authorization. So that it is the consumer's responsibility to:

- Set the correct amount of currency for the payment to be made,
- Provide the correct address of the recipient of the payment or transfer,
- Authorize the payment by creating a payment transaction and broadcasting it to the network (unless a centralized authority is holding the funds for the consumer, such as a custodian or an exchange).

Confirmation: In order for the payment to be correctly processed on the network, the consumer must (generally):

- Pay a certain amount of network fees to reward the nodes which confirm the validity of the transaction,
- Wait a varying amount of time in order for a certain amount of nodes to confirm the validity of the transaction.

Exchange: Currently, the most widely adopted cryptocurrencies for making purchases (Bitcoin, Litecoin, Ethereum, etc.) are "volatile" in terms of their fiat values, and their prices (i.e., exchange rates) fluctuate with respect to the USD, EUR, or other fiat currencies. This may bring a wide array of implications both on the consumer's and the merchant's sides, ranging across pricing transparency, exchange rate losses/gains, accounting, and taxation.



1.3 Impact of blockchain payments on purchases

The impacts of blockchain payments on the user experience can be significant. Depending on various factors (mainly the blockchain technology and the currency preferred, the type of wallet from which the consumer is paying, as well as how the recipient is proposing and handling the payment), the following implications should be considered:

- Mistakes are generally irrecoverable (i.e., not refundable), so if a consumer sends an amount to a wrong address, it is generally impossible to retrieve the funds. They will be lost forever (unless the incorrect address belongs to a real, active, and kind user that is eager to send the amount back, which is a far-fetched probability).
- Users may make mistakes also in the amounts to be sent (since the user authorizes the amount, not a centralized processor). Users may be unaware that some custodians or exchanges may charge a transaction fee that will be deducted from the funds sent

by the user. This can lead the merchants to receive less funds than expected; thus, they may be unwilling or unable to deliver the product ordered.

- Depending on the blockchain, users may end up paying exorbitant fees in proportion to the amount being paid, since with most blockchains such as Bitcoin and Ethereum, the fees must reward miners for maintaining the integrity of the ledger, independently from the amount being transferred. Fees are generally variable and depend on the technology being used as well as the congestion of the network.
- Within the Bitcoin network, the most commonly adopted cryptocurrency, users may end up waiting for minutes, hours, or even days to see their transaction confirmed. The processing time thus depends on the blockchain being used and on the fees the user decides to contribute to the nodes which will be processing the transaction.

- Some cryptocurrency systems are much faster and cheaper (than Bitcoin). But they may be less widely (or even rarely) adopted. Different solutions have been utilized to increase the scalability and reduce the costs of Bitcoin and Ethereum payments. These include sidechains or “Layer-2” solutions, such as the Lightning Network for the Bitcoin protocol. Sidechains, “Layer-2”, and scalability network solutions are newer, therefore, are still in an early phase. So, they may be more difficult to use or face other issues such as the lack of liquidity.
- Most cryptocurrencies can be received, stored, and transferred anonymously. All the user needs is a public key (i.e., an address), a private key, and an application that allows the user to interact with the funds stored on the blockchain ledger. From a purely technical (non-reglementary) perspective, it is unnecessary to identify the sender or the recipient of a blockchain-based payment.

The above points, when compared with the centralized digital payments within a context of purchasing behavior, can have a significant impact on the consumer-merchant

relationships, as well as on the adoption of blockchain-based payment systems by consumers and businesses. Obviously, these will vary to a certain degree, depending on the blockchain platforms, cryptocurrencies, and wallet implementations being used, as well as the payment solutions being offered by the merchants. Certain topics described above will surely continue emerging in relation to the characteristics of blockchain payments and purchases. For example, the issues related to the network scalability, speed, and fees, or the opportunity to address undocumented and unbanked users, or the need for securing, easing, and improving the customer purchase experiences. But these topics just scratch the surface of our investigation, which dives deep into many different aspects of the adoption. The impacts of blockchain payments on the user experience can be significant. Depending on various factors (mainly the blockchain technology and the currency preferred, the type of wallet from which the consumer is paying, as well as how the recipient is proposing and handling the payment), the following implications should be considered:

2. DEMOGRAPHICS

To understand the dynamics of the crypto-shopping market and to take necessary actions on time, especially for businesses and investors, it is vital to find out who the crypto-consumers are and what do they have in common. Crypto-consumers, by no means, constitute a uniform group of customer segments. In fact, quite the contrary, they have a wide range of backgrounds, including but not limited to countries of origin, age, education, income, occupation, and many others. However, there are some similar characteristics or tendencies which large portions of them may have in common. This section introduces the fundamental demographic features of crypto-consumers.

2.1 Geography

There are crypto-consumers in almost every single country or territory of the world. Nevertheless, their distribution across these regions varies remarkably, depending on social and economic factors. Before proceeding to the regional breakdowns and inferences, it is important to state that there is a significant difference between a crypto-consumer's country of origin and their country of current residence. Per our data, 16.6% of crypto-consumers are migrants of any kind (e.g., immigrants, expats, asylum-seekers, etc.). Since the overall percentage of migrants within the entire world is only at 3.5% according to United Nations [1], it can be said that migrants have a

much stronger interest than non-migrants in shopping online using cryptocurrencies, as given in Figure 3. This may be due to the possibility of making easier and cheaper international remittances via cryptocurrencies, considering how costly making traditional international money transfers are. This makes great sense since migrants have additional reasons to resort to remittance (as well as to cryptocurrencies) more often, such as sending/receiving financial support to/from their relatives in the homelands or innately setting up international businesses, etc.

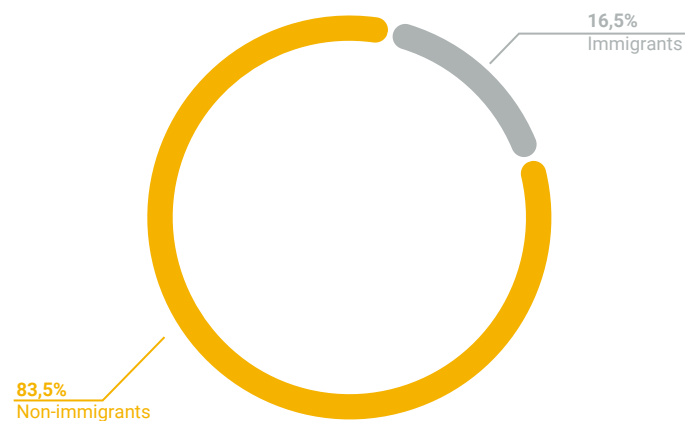


Figure 3: Share of migrants among the crypto-consumers.

The top 3 countries with the most crypto-consumers are the USA (7.6%), Nigeria (6.6%), and India (6.2%). These three countries together host nearly one-fifth of the total crypto-consumers. When looking at the regional breakdowns (as defined by the World Bank) given in Figure 4, apparently, most crypto-consumers are from South Asia. This ratio is quite similar (although slightly lower) to the rate of the population of this area to the world's population. South Asia is followed by Sub-Saharan Africa, Europe, and Central Asia, Middle East and North Africa, South America (incl. the Caribbean), North America, and finally, East Asia and Pacific. The fact that the East Asia and Pacific region, which hosts 30.5% of the world's population, sees a much lower cryptoshopping rate compared to other regions (given the exceptional advancement in blockchain technologies) is possibly caused by different reasons. Politically induced embargoes, bans, and other regulations prevent consumers from these markets from accessing Europe-based commercial services. Language barriers might also be a limitation of our research (see the research methodology at the end of the report). The share of crypto-consumers from the Middle East and North Africa and North America regions is also worth noting since the rates in these regions are nearly twice their populations' rate. This indicates the existence of significant interest from these regions.

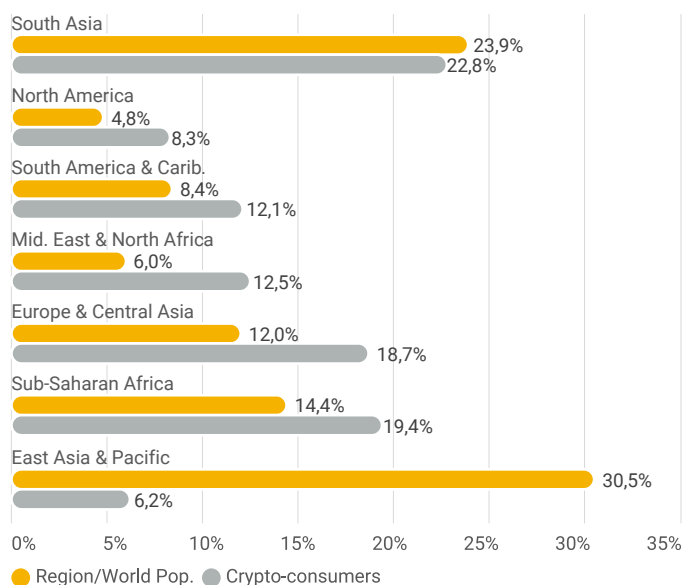


Figure 4: Breakdown of crypto-consumers per world regions.

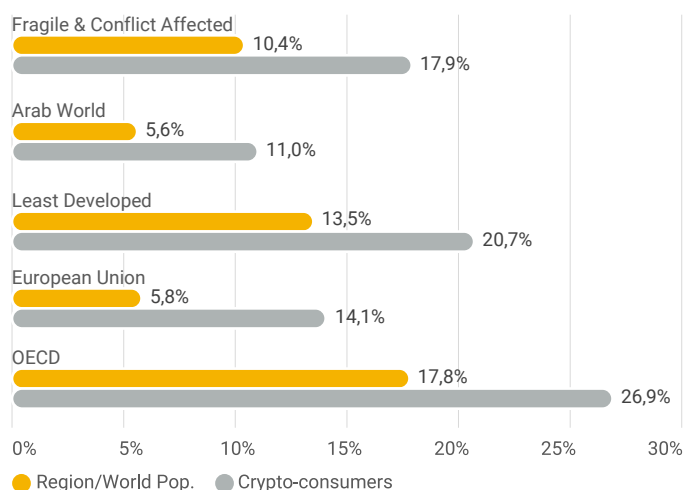


Figure 5: Breakdown of crypto-consumers per various country groupings.

In addition, from Figure 5 we see that 26.9% of the crypto-consumers are from the OECD countries, whereas 14.1% are from the European Union. 20.7% of them are from the least developed countries (as defined by World Bank [2]), 11% from the Arab World, 17.9% from the fragile and conflict-affected economies. As can be deduced from the data, there is a strong interest in using cryptocurrencies as a means for shopping both in developed economies and in less developed economies.

Figure 6 shows the breakdown of country of residence of crypto-consumers according to the countries' wealth levels (as defined by the World Bank [2]). 30.1% of crypto-consumers are resident in high-income, 17.7% from upper-middle-income, 46% from lower-middle-income, and 6.2% from the low-income countries. Interest from high-income and lower-middle-income countries is remarkable, although the main motivations behind this common interest are most likely different, as this report reveals later.



Figure 6: Breakdown of crypto-consumers per country income level.

2.2 Personal

The diversity among crypto-consumers also applies to their personal features. Crypto-consumers' personal features are analyzed by their age, gender, education, and socioeconomic parameters. Yet, the median crypto-con-

2.2.1 Age

Age is an important factor in market analyses since it directly affects the consumers' behaviors and perceptions. The average age of crypto-consumers is found to be 31.02 (0.2% upper-limit winsorized to suppress outliers.), whereas the world population's median age is estimated to be 30.9 for 2020 by the UN [3]. The result looks like in par with the world's population average. However, please note that crypto-consumer ages start from 15. Children younger than 15 are not shopping with crypto. Yet, about 26.6% of the world's population is reported to be under the age of 15 [4]. Hence, excluding children below 15, the world's mean age becomes roughly around 39.5 (estimated between 37.1 and 41.7). Therefore, it can be said that crypto-consumers are considerably younger, on average. Figure 7 presents the age group distribution of crypto-consumers. Generation Z (ages 15 to 24) constitute 32.8% of crypto-consumers, while young adults of Generation Y (ages 25 to 34), occasionally called millennials,

sumer appears to be a 25 to 34 years old male, holding a high school degree and is self-employed (or an entrepreneur) with an annual income of \$10,000 to \$20,000.

are the largest group with a share of 39%. Generation X (ages 35 to 44) has a share of 18.3%, and only 10% of crypto-consumers are older. Young peoples' interest in crypto-shopping is spectacular, although not a total surprise. Even so, our research shows that their interest in crypto-shopping (as a share of all age groups) appears to be higher than their interest in conventional (i.e., non-crypto) online shopping (from the report [5]).

"Young adults of Gen-Y and Gen-Z find it easier to buy products and services using cryptocurrencies. While that perception reduces significantly as age increases."



Figure 7: Breakdown of crypto-consumers per age groups.

"71.8% of crypto-consumers are younger than the age of 35."



2.2.2 Gender

With an extreme rate at 91.2%, crypto-consumers are predominantly male. Female presence is limited to 8.8% of the total number, as shown in Figure 8. Although female interest in cryptocurrency trading and exchanging is also reported to be lower than that of males [6], the situation is even worse when it comes to shopping with cryptocurrencies. Such a vast difference needs further research to be justified. Potential reasons may include women's lower rate of literacy, less economic freedom, lower participation in STEM education [7], and limited access to businesses, especially in underdeveloped regions (e.g., low-income countries, conflict-affected territories, etc.).



Figure 8: Gender distribution among crypto-consumers.

"Females' interest in using cryptocurrencies as a means of making payments for shopping is as low as 8.8%."

2.3 Socioeconomic Indicators

Socioeconomic indicators of crypto-consumers uncover particular social and economic features, such as income or education. Despite the diverse background of crypto-consumers, it is possible to find out meaningful patterns that describe the majority or certain groupings.

2.3.1 Education

The median education level of crypto-consumers is a high school degree. As of 2010, the world population aged 15 and over had an average schooling period of 7.8 years, which roughly corresponds to a secondary (middle) school degree. Thus, crypto-consumers are generally more educated than the general public, which implies that the tendency to shop with crypto increases as the education level increases.

While 9.7% of the world's entire population above 15 years old have no schooling at all [8], among crypto-consumers, this is only as low as 3.5%. 10.5% have completed a primary or secondary school, 35.2% have completed a high school, 20.7% have obtained a bachelor's degree, and 17.5% have a post-grad degree. The detailed breakdown is provided in Figure 9. When looking at the crypto-consumers older than 24 years, the average level of education increases even more. Among them, the share of consumers with no schooling reduces to 1.9%. Yet, the ones with a degree higher than a high school degree increase as well (except for the master's degree). Among crypto-consumers older than 24, the share of bachelor's degree holders is 23.6%, which is 15% higher than the overall crypto-consumer average.

Generally speaking, the higher the education levels are, the higher the possibility of doing crypto-shopping, although the correlation is not simply linear. First, using cryptocurrencies requires people to be familiar with some basic (well, maybe more than basic) computer and internet skills and a foreign language for many. Second, people with higher education are more likely to be exposed to blockchain-related projects in their work, which may eventually be motivating for wider adoption. Last but not least, higher education levels are globally associated with lower unemployment rates.

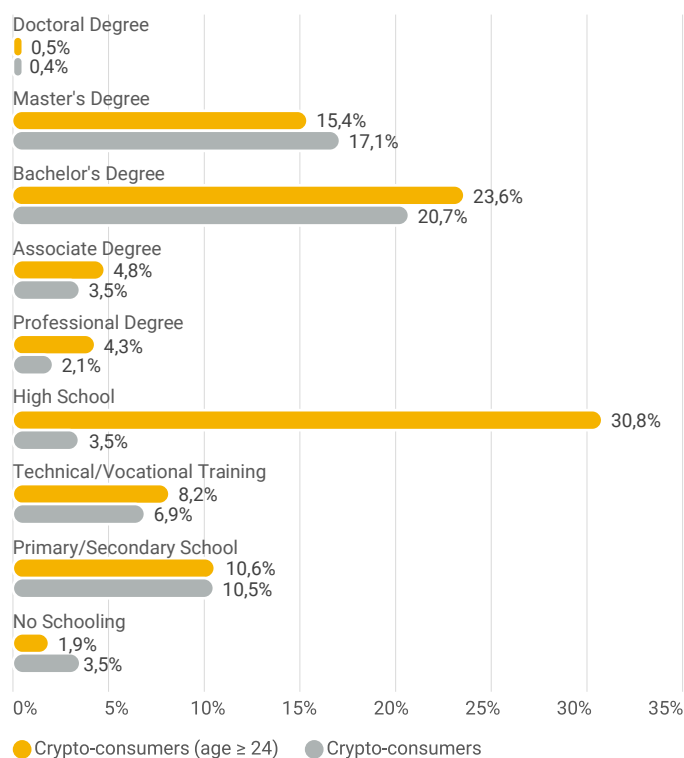


Figure 9: Share of education level of crypto-consumers, as of latest completed degree.

"The median education level among crypto-consumers is equivalent to a high school degree, whereas more than one-fifth are university graduates."

2.3.2 Occupation

It is not a surprise to see that people with certain types of employment are more likely to prefer crypto-shopping. In fact, people working independently tend to use cryptocurrencies in their purchases to a greater extent. Among crypto-consumers, 29.3% are self-employed, and 13.5% describe themselves as entrepreneurs or investors, which accounts for a vast 42.8%. On the other hand, 28.3% are employed (e.g., in an SME, company, institution or government body, etc.), 20.7% are students with no other affiliation, 6.9% are unemployed, and a mere 1.4% are retired. Overall, evidence shows high interest in crypto-shopping from the working population, but what is even more interesting is the higher interest from the independent workers (i.e., self-employed and entrepreneurs). Throughout the world, the average rate of self-employed people is 47.9%. While it is only 12.4% in high-income economies, it is as high as 81.9% in low-income countries [9]. As 12.8% of crypto-consumers from high-income countries reported to be self-employed, entrepreneurs, or investors, the information mentioned above justifies our findings and is also consistent with our income and regionbased breakdowns given in Figures 12 and 6.

Excluding the students, retired, and unemployed, the top 3 most common sectors among crypto-consumers are software, education, and computer/electronics, with a share of nearly one-tenth for each. They are followed by the construction (7.8%) and finance (6.3%) industries. The extensiveness of the software, electronics, and finance

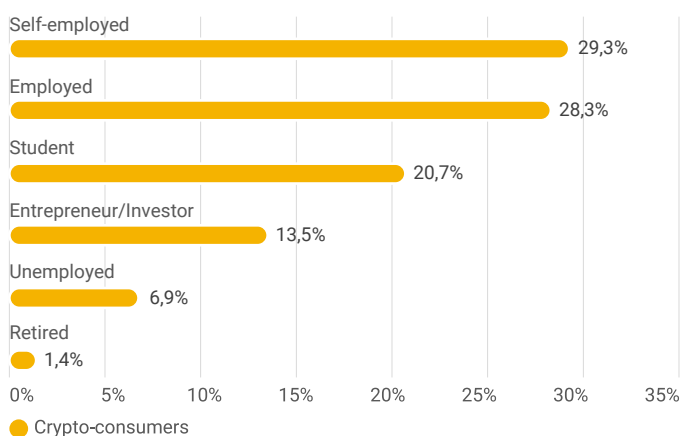


Figure 10: Occupation types of crypto-consumers.

sectors can already be expected due to higher exposure potentials. The remarkable presence of education is likely explained by an interest in studying and learning new technologies. The interest from construction, education, hospitality, and arts sectors needs further elaboration to see if there is something beyond personal interests. The fragmentation of crypto-consumers across many industries may point out the probability that people in these sectors make or accept payments in cryptocurrencies as these sectors host large numbers of self-employed people. The detailed breakdown of the crypto-consumers' sectors is given in Figure 11.

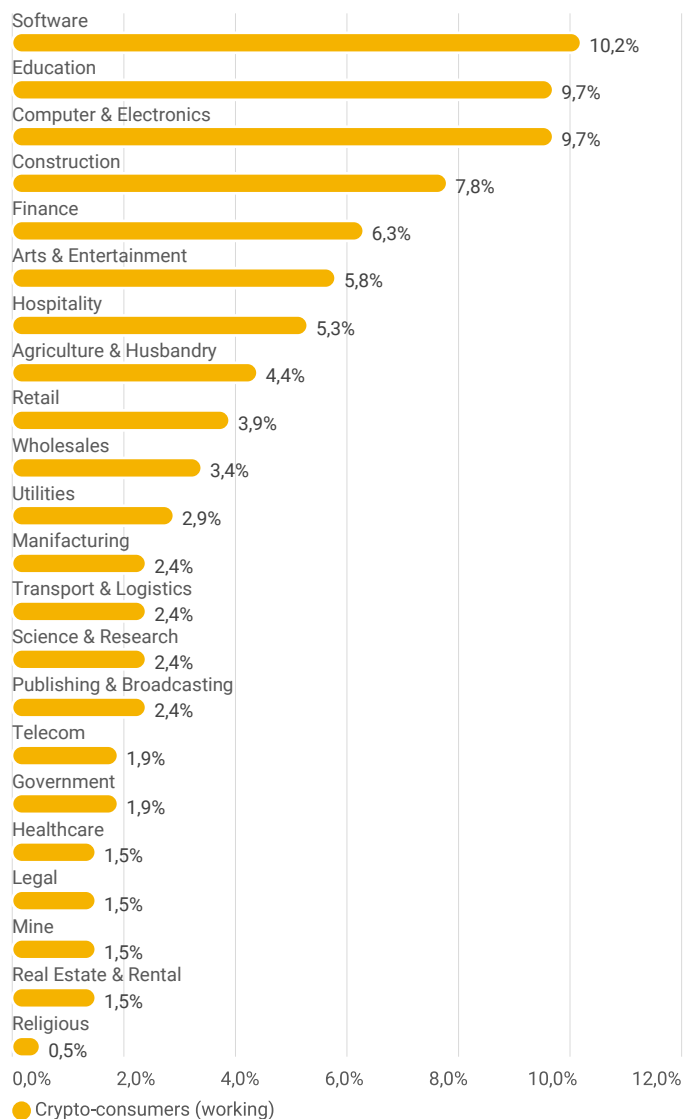


Figure 11: Breakdown of crypto-consumers per the sectors they are working in.

2.3.3 Income

Income levels of customers are always a handy indicator for understanding the consumer interest and potential spending in the retail markets. There are many crypto-consumers at all income levels, but their distribution is uneven. From the data depicted in Figure 12, we see that a little less than half of the crypto-consumers have a mere annual income lower than \$10,000. This can be interpreted to mean that cryptoshopping is widely used among low-income consumers since they constitute a much larger portion of all (please note that here we do not follow any standardized term when describing people's income levels). Nevertheless, a previous study [10] suggest that 53.6% of the world's entire adult population earn less than \$10,000, as of 2019. Therefore, the share of low-income crypto-consumers is still less than its mean expected value. Low-income people's demand for crypto-shopping is obvious, yet the gap between the worldwide data and the crypto-consumers' distribution can be explained by the existence of people living in extreme poverty that still struggle to get access to enabling technologies (e.g., broadband internet services, mobile devices, etc.).

The combined data suggest that obtaining cryptocurrencies through modest freelance jobs or minor online tasks is most common among the low-income crypto-consumers as more than half of them practice that. They also have more interest in affiliation and loyalty programs. Those indicate that cryptoshopping has a more important role in low-income people's everyday lives since it may be a matter of survival for some. More details on this topic are discussed later.

According to our data, one-fifth of crypto-consumers earn between \$10,000 and \$19,999. This is the second-largest income group. Slightly less than 30% earn between \$20,000 and \$99,999. According to the above-mentioned study [10], 34% of the world's adult population earns between \$10,000 and \$99,999; this is observed at 47.8% among the crypto-consumers, much larger than the global average. Thus, we can conclude that middle and high-income consumers have a higher interest in crypto-shopping, whereas only 6.3% of crypto-consumers (lower than the global rate) have an annual income above \$100,000.

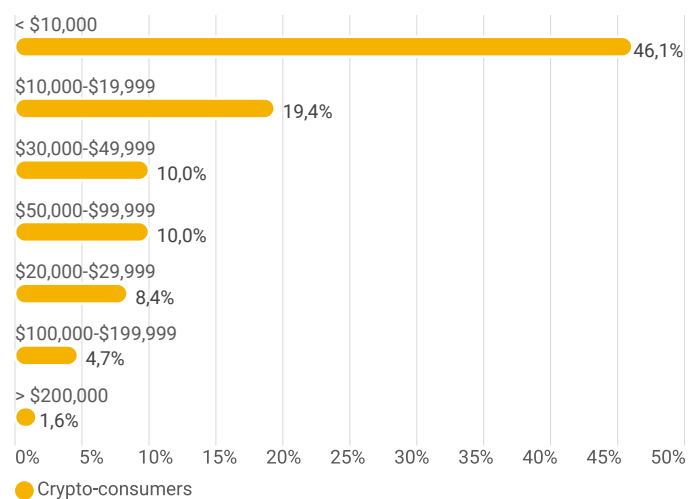


Figure 12: Breakdown of crypto-consumers per their annual income levels.



3. PERCEPTION & ATTITUDE

Understanding crypto-consumers' opinions regarding the use of cryptocurrencies for shopping is vital for the entire crypto-industry to be able to present more value to people and, of course, to get the most in return from the market. Consumers' opinions originate primarily from their own needs and experiences, but there are other factors such as society's stance and the legal status of using cryptocurrencies.

3.1 Ease of Use

Ease of use is a great enabler of any technology that serves end-users as customers. Blockchain technologies, including cryptocurrencies, rely upon very complex systems (especially in their backgrounds). Thus, one may think that using them would be very difficult. But fortunately, this is not exactly the case, as shown in Figure 13. Nearly two-thirds of all crypto-consumers already find crypto-shopping easy to perform, while only one-fifth find it challenging to pay with cryptocurrencies. Possible reasons for such adaptation may include the high proportion of younger users, innovators, and open-minded among crypto-consumers.

70% of the crypto-consumers already know how to buy what they need through crypto-shopping, while 16.5% do not. They may be unable to satisfy the variety of their purchase needs via crypto-shopping or require assistance during the process. Only 48.3% know where to find stores that accept cryptocurrencies. This is a clear indication of an opportunity for businesses and entrepreneurs since more than half of crypto-shoppers are willing to buy goods and services but are unable to find a store that accepts their cryptocurrencies. Here we see a clear chance for those stores that do not accept cryptocurrencies to

address an underserved demand and for those that do accept cryptocurrencies to inform their current and potential customers about this "feature" to increase sales. Even more worrying is the fact that only 41.4% of crypto-consumers think it is easy to find stores that are reliable and safe. Also, considering that the demand is underserved already, this is likely a further indication of that some crypto-consumers are afraid of falling prey to scams or resort to having to purchase from unreliable or lesser-known stores. We believe that stores accepting cryptocurrency will perform better if they can address the reliability and safety concerns of crypto-shoppers. Especially in the case of smaller businesses and e-commerce brands offering crypto-payments, it is important to offer the best possible crypto-payments experience, build a reputation (e.g., through reviews, forums, etc.) or by partnering with well-known brands in the crypto community, for example, for the crypto-payments processing.

"Two-thirds of crypto-consumers find it easy to buy goods and services by paying in cryptocurrencies."

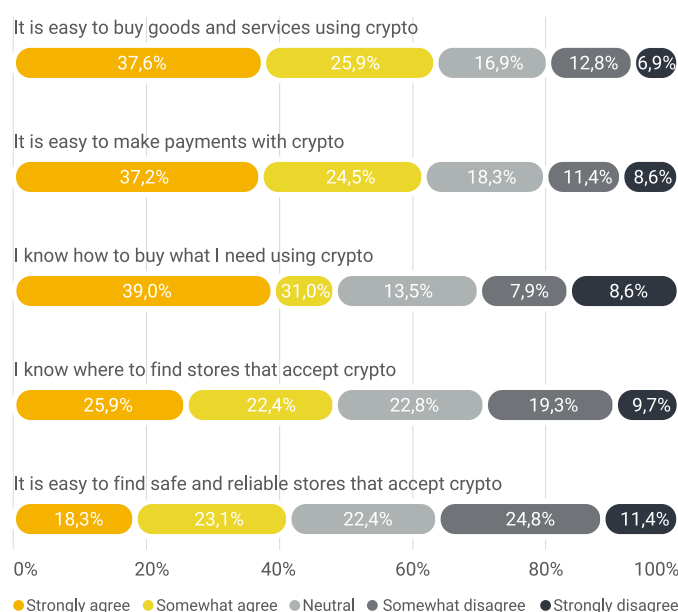


Figure 13: Crypto-consumers' agreement with the statements related to ease of use.

Besides, 61.7% find it easy to make payments using cryptocurrencies, while one-fifth are struggling during the payment phase. Over the past years, stores and payment processors have already adopted significant improvements to ensure easier crypto-payment experiences. Other findings in this report indicate that most crypto-shoppers make repeating purchases using cryptocurrency. It is likely that the prevalence of “young” and “innovative” segments and the improvements made in user experiences so far, combined with the repeating purchase habits that

3.2 Usefulness

Crypto-shopping cannot be a widespread form of shopping unless it is useful to consumers. Nonetheless, it is apparent from Figure 14 that, to a large extent, crypto-consumers generally see value in crypto-shopping. 70.4% explicitly finds it useful to buy goods and services via cryptocurrencies. This also means that crypto-shopping satisfies some needs, and therefore, it can be preferred over other forms of shopping as long as such needs exist. Two-thirds of crypto-consumers already perceive cryptocurrency as a means for payments and purchases, whereas the remaining one-third may see them as an occasional method or a backup case. This is quite remarkable for different reasons. First of all, this shows that the majority of crypto-shoppers have transitioned to see paying with cryptocurrencies as a new payment standard. Later in this report, our data show that Bitcoin is the most preferred cryptocurrency for shopping. Many in the crypto community recognize the “store of value” properties of Bitcoin but point out the strong limitations of Bitcoin’s “means of exchange” properties. Yet, despite all such limitations, it is apparent that crypto-shoppers also associate a “means of exchange” property to many cryptocurrencies, including Bitcoin.

A whopping 68.3% suggests that there are good reasons to pay for goods and services with cryptocurrencies, whereas 64.1% claim that crypto-shopping resolves at least one certain problem, which is a significant rate. 67.3% find cryptoshopping as a good way to buy products and services, while only 17% disagree. Those who disagree may give a little hint about the ones who are forced to use cryptocurrencies. Nevertheless, as much as 61.8% already find paying with cryptocurrencies better than other options (e.g., credit cards, transfers, cheques, mail order, etc.), which is quite remarkable.

let the consumers get used to the newer systems, explain why more than 60% of consumers find a payment system that is quite more complex than a simple credit card transaction easy to use. Nevertheless, we still see an opportunity regarding developing easy-to-use payment applications or interfaces to address the needs of the 40% that are having a hard time with cryptopayments, which is not negligible and points out a need for more user-friendly systems.

“Majority of crypto-consumers see cryptocurrencies as a new payment standard.”

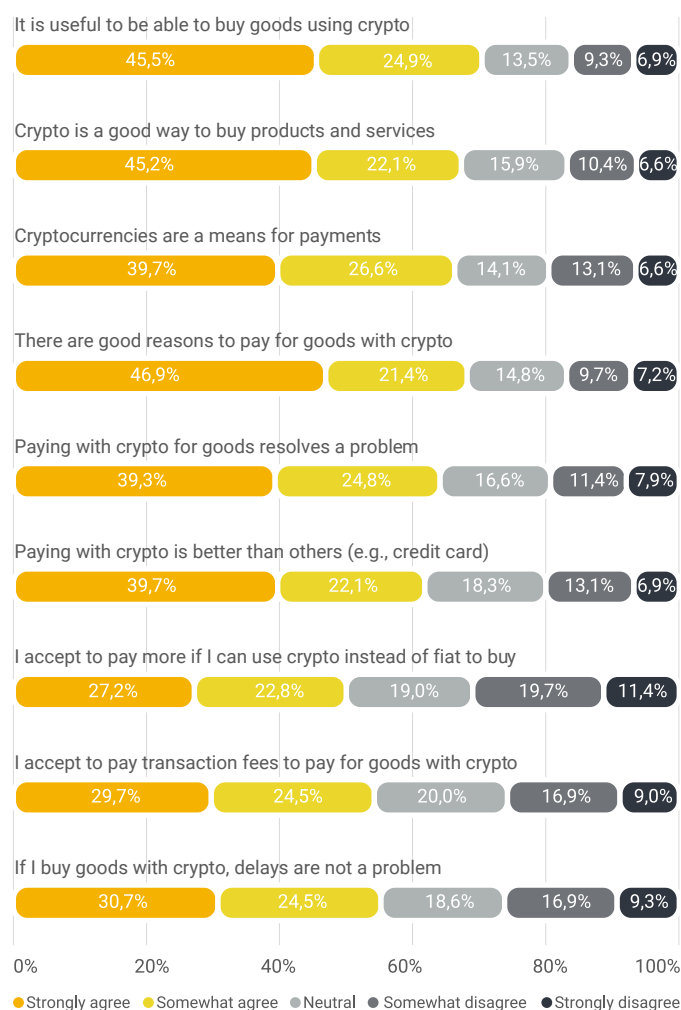


Figure 14: Crypto-consumers' agreement with the statements related to usefulness.

“For 64.1% of crypto-consumers, the option of shopping with cryptocurrencies resolves at least one certain problem.”

Many crypto-consumers get irreplaceable benefits from using cryptocurrencies to buy goods and services so that they even accept facing some inconveniences, including transaction fees, commissions, and processing delays. As in Figure 14, 55.2% of crypto-consumers can tolerate waiting for delays in exchange for paying prices with cryptocurrencies. Likewise, 54.2% accept paying transaction fees when buying goods and services with cryptocurrencies. Exactly half of the crypto-consumers understand that accepting cryptocurrencies can be a burden for stores, and therefore they are willing to pay more for the goods and services when sold in cryptocurrencies. These findings are very optimistic for the crypto-commerce sectors since we reveal that cryptocurrencies mean much more than being just another form of money to the consumers. They help people to bypass some obstacles and get serious benefits.

Furthermore, the combined data suggest something even more interesting. The crypto-consumers find it useful to pay for goods and services with cryptocurrencies, furthermore, they are willing to pay more to do this, and they are willing to be patient about the issues and complexities. So, it can be concluded that we are still in a very early phase of adoption. We have observed that innovative users, in order to satisfy their needs, are willing to overcome hurdles, costs, and complexities.

3.3 Social Norm

Many of people's habits are shaped by their community, either by encouragement or by pressure. Therefore, the social attitude towards crypto-shopping is also as important as the consumers' own opinions. Additionally, some people may necessarily fall back on cryptocurrencies if they are marginalized or excluded from or simply cannot access financial facilities (e.g., unbanked or underbanked).

As charted in Figure 15, 43.1% claim that people using cryptocurrencies to buy goods and services are well or somewhat well respected in society. While a quarter disagrees, and 31.7% are undecided (i.e., neutral) about that, making them the largest group among respondents.

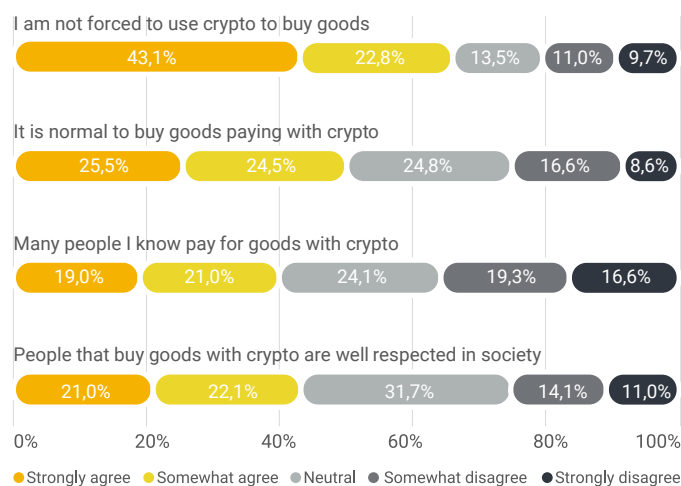


Figure 15: Crypto-consumers' agreement with the statements related to social norms.

“More than half of crypto-consumers are willing to pay fees and wait for delays as long as they can shop with cryptocurrencies.”

The fact that different representatives of important government and financial institutions have often negatively portrayed Bitcoin and other cryptocurrencies and emphasized its use for illegal activities most likely plays a role in creating the perception of some sort of social stigma for shopping (and most likely interacting) with crypto-money for some respondents. Despite such negative perceptions, most crypto-shoppers keep buying stuff with crypto-money. Furthermore, as more large companies, well-known brands, and respected institutions start accepting crypto-payments, social acceptance should increase, which can only be beneficial for the general adoption. Yet, 40% of crypto-shoppers also know many other people who are also crypto-shoppers, while 35.9% do not know anyone else or only a few people who use cryptocurrencies to buy goods and services. Exactly half of the crypto-consumers think that it is normal to buy goods and services by paying with cryptocurrencies, whereas a quarter sees that as abnormal or unusual.

3.4 Confidence

How confident crypto-consumers feel during (and after) crypto-shopping is very important since it is another indicator of how likely they will continue buying goods and services using cryptocurrencies in the future (even if there are conjectural alternatives). As shown in Figure 16, 60.3% feel safe and secure when shopping with their favorite cryptocurrencies, which means that while a majority do not concern about potential frauds, slightly more than one-fifth have some concerns. One possible reason may be the lack of mechanisms for addressing disputes, and another may be the irrecoverability of (mistaken) transactions. What makes cryptocurrencies favorable may also bring some challenges. Since trust is a key element in all trades, such concerns must be addressed for healthy growth in the market.

63.5% of crypto-consumers think that their privacy is protected to a satisfactory extent when buying goods and services with the cryptocurrencies of their choice. While 17.9% suspect that their privacy is under some sort of risk, only 4.8% are certain about its severity. Among all, 60% think that they are in full control of all steps required to purchase goods and services using cryptocurrencies. 22.1% are not sure about that, and another 18% think that they are not in control of parts of the transactions or processes. Overall, we can conclude that a significant majority of crypto-consumers feel confident about doing crypto-shopping, although actions must be taken in order to persuade others.

Last but not least, 65.9% declare that they are not forced to use cryptocurrencies to buy goods and services; among the rest, 20.7% claim that they are forced (for whatever reason) to buy (some) goods and services via crypto-shopping, plus another 13.5% is unsettled, which is a ratio that is worthy of attention.

The results are very informative. However, it is still too early to derive conclusions on several matters. For instance, in an open society (e.g., in a developed country), using cryptocurrencies can be seen as very normal, but there may also be little benefit in using them, while in a more conservative society where cryptocurrencies are seen as a social stigma (or at least inappropriate to some extent) there may be more benefit in appealing them. However, it is clear that some people have to rely on cryptocurrencies to sustain their everyday lives and businesses.

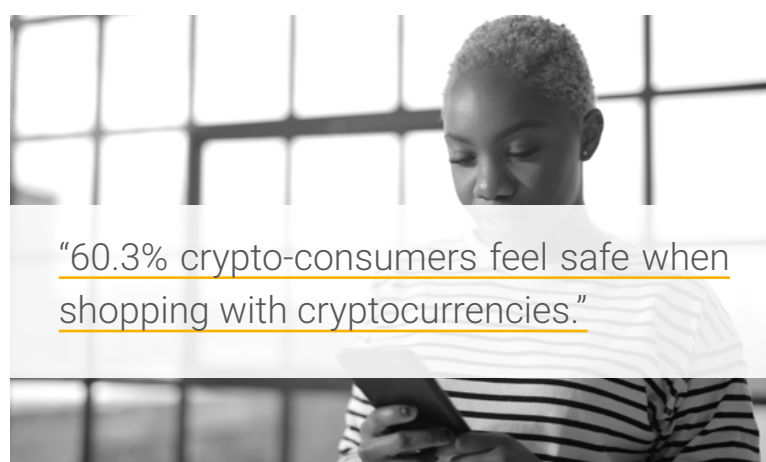


Figure 16: Crypto-consumers' agreement with the statements related to confidence.

4. EXPOSURE & ADOPTION

The popularity and market share of crypto-shopping do not solely depend on the consumers' opinions. Availability of stores or products and adoption by businesses are also complementary factors.

4.1 Personal Adoption

Crypto-consumers are asked when they bought their first-ever crypto-money in order to learn how long they have been directly exposed to cryptocurrency-related matters. Of course, they may also be well aware of cryptocurrencies without buying them, but this is still a great indicator of exposure.

Interpreting the chart in Figure 17, it is easy to see that cryptocurrencies have become more and more popular each year. 2019 and 2020 (the data from 2020 must be considered as incomplete as most of the survey took place in that year) together have the highest share (18.9% for both) of new buyers since cryptocurrencies' (i.e., Bitcoin's) public launch in 2009. The slight decline in 2018 may be due to the large price drops recorded in that year, which is caused by the great recession that happened in that same period. 2017 appears to be a massive mile-

stone for cryptocurrencies since there was a remarkable increase in the share of new buyers when compared to the previous year (from 6.4% in 2016 to 17.3% in 2017).

Interestingly, only slightly less than a third of current crypto-consumers had some cryptocurrency before 2017, and only one-sixth had before 2015. Also considering that one-fifth of crypto-consumers bought their first crypto-money in 2020 and immediately started cryptoshopping, there is surely no need to be a "crypto-veteran" to use cryptocurrencies to shop. On the other hand, 2.8% of crypto-consumers claim that they already had cryptocurrency (in this case, Bitcoin) since its initial launch. In general, the trends in Figure 17 are pretty consistent with the market capitalization of Bitcoin by year [11]. As of the publication of this report, all indications show that this growth trend will continue.

"More than a third of crypto-consumers bought their first coins just within the past two years."

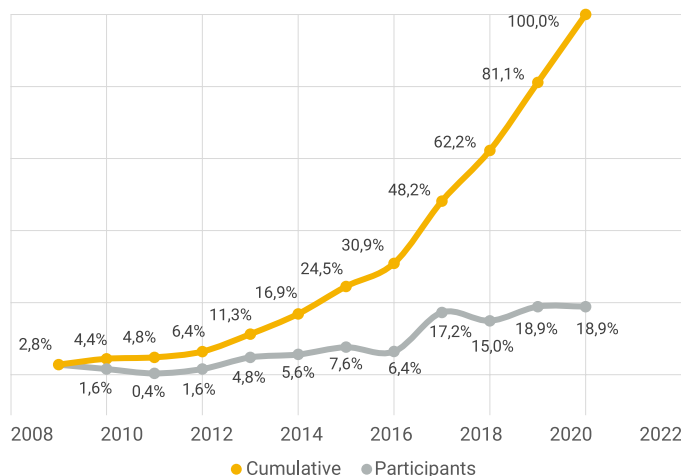


Figure 17: The year of first ever purchase of crypto among crypto-consumers.

4.2 Business Adoption

Exposure to cryptocurrency does not always depend on personal choice; it might also come as a business requirement. As depicted in Figure 18, 54% of the crypto-consumers are exposed to blockchain technologies (by any means including cryptocurrencies) as a part of their work, which is indeed a substantial percentage. Therefore, it can be said that people who are exposed to blockchain technologies for work purposes also have a remarkable tendency to shop with cryptocurrencies. Combining this information with the other data from our report reveals a big share of innovators and entrepreneurs among crypto-consumers and that crypto-shopping can be considered a natural consequence of their lifestyles.



Figure 18: Share of crypto-consumers that are exposed to blockchain as a part of their work.

Please note that the data given in Figure 18 also includes the self-employed (who represent a large percentage of crypto-consumers). If the company or institution crypto-consumers work for (excluding their own businesses) are to some extent involved with cryptocurrencies (e.g., research, investment, payments, etc.), then this provides some mandatory exposure and may inspire individuals to buy crypto on their own behalf. From Figure 19, 16.6% of the crypto-consumers state that their company/institution practices only cryptocurrency trading to some extent, while 20.4% states that their company/institution executes blockchain-based projects (excluding currency trading); whereas another 10.7% state that their company/institution is involved in both. Nearly half of crypto-consumers are exposed to blockchain technologies and cryptocurrency through their work.



Figure 19: Share of crypto-consumers' companies that are involved in blockchain or cryptocurrency.

44.8% of crypto-consumers declare that their company/institution is already accepting payments in at least one cryptocurrency. Another 29.9% anticipate that their company/institution may accept crypto-payments in the future, although it does not currently. Interestingly, 8% suggest that they do not accept payments in cryptocurrencies anymore, even though they did in the past. The ratio of stating this is quite small but definitely not negligible, and further research is needed to address the problems they possibly have faced. Eventually, 17.4% claim that their company or institution would probably never accept such payments at all.

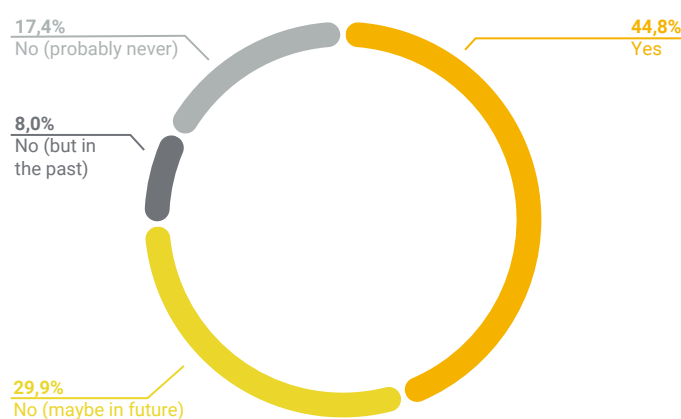


Figure 20: Share of crypto-consumers' companies that accept payments in cryptocurrencies.

5. PREFERENCES & BEHAVIORS

Crypto-consumers have some particular preferences and tendencies regarding their shopping and spending habits. Yet, these habits are subject to change according to gender, age, income, and occupation.

5.1 Currencies

Recent research [12] suggests that, as of February 2021, there are more than 4500 different cryptocurrencies in circulation, whereas only 20 of them represent nearly 90% of the total market cap. This distribution is even more radical when it comes to shopping with crypto. Almost 80% of the crypto-consumers currently own Bitcoin (BTC) in their portfolio. Further, one-fifth of crypto-consumers who own Bitcoin own solely Bitcoin, which represents 16% of all crypto-consumers. This data coincides precisely with our business analysis that suggests that 78.3% of the volume of all transactions are made with Bitcoin. Therefore, Bitcoin is still the most widespread cryptocurrency and the most common means for cryptopayments by far. According to our insider information, we predict that its usage rate in crypto-shopping will decline in time due to cheaper and faster alternatives.

The second most popular cryptocurrency among shoppers is Ethereum (ETH), with an ownership percentage of 54.5%. Its widespread adoption is probably due to the technological advancements it brought, such as smart contracts, or its use in DeFi, or the wide community support. Despite its high percentage of ownership, our transactions data shows that its use is still limited, presumably due to fees and other complexities. With 31.2%, Litecoin (LTC) is the third choice of crypto-consumers, and this is absolutely confirmed by our transaction data, which suggests that Litecoin is the second most used cryptocurrency in crypto-shopping. USD-based stablecoins (e.g., ERC20-based tokens and alike), including Tether (USDT), USD Coin (USDC), and Binance USD (BUSD) come next with 14.5%. They are followed by Bitcoin Cash (BCH) and Ripple (XRP), as shown in Figure 21.

"Bitcoin is still the most popular cryptocurrency among crypto-consumers by far."

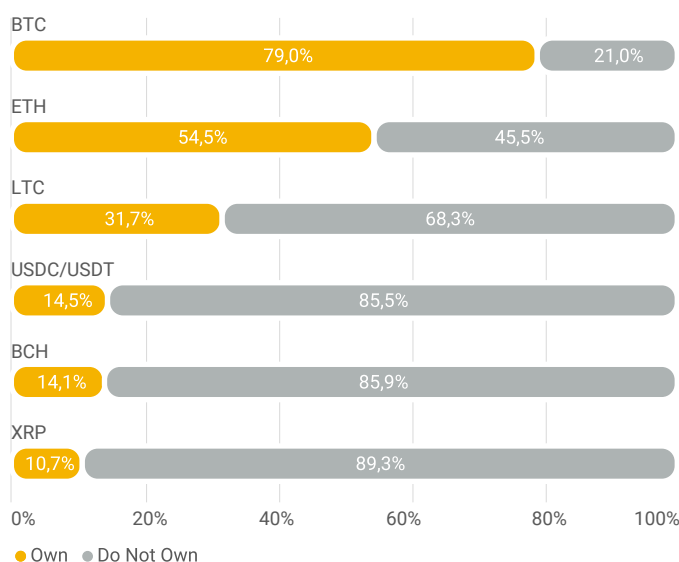


Figure 21: *Most popular cryptocurrencies among crypto-shoppers.*

The ownership ratio of Bitcoin among crypto-consumers is obviously proportional to its leading popularity and to its current share within the crypto-markets and is in line with our transaction data concerning its use in crypto-shopping. Litecoin, is at the time of writing this report, is at the ninth place per market capitalization [13]. However, it ranks the third in terms of crypto-consumers' ownership according to our survey data and ranks the second per our platform's transactions data. Among crypto-consumers, the most common method for obtaining cryptocurrency is apparently buying it (i.e., via direct investment), as 64.8% do buy cryptocurrency. Meanwhile, about half of these crypto-consumers earn some income in cryptocurrencies for small freelance jobs that they find online. Less than a third are getting crypto from affiliation or loyalty programs.

On the other hand, Mining is the fourth most popular means for obtaining crypto, as 29.6% of crypto-consumers mine. 17.1% get payments from their customers in cryptocurrencies within their own businesses, while another 14.8% get their salaries or allowances in a cryptocurrency. Giving crypto-money as a gift is not uncommon either, 9.9% receives some amount of crypto-money as a gift. See Figure 22 for more information.

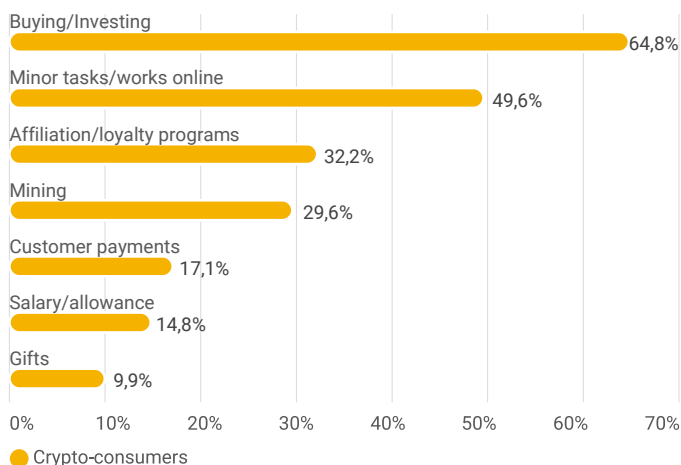


Figure 22: Main methods for obtaining cryptocurrency.

Our research has also revealed the relation between crypto-consumers' income and their preferred methods of obtaining cryptocurrencies. As charted in Figure 23, the means of coin acquisition changes with the income levels, although there are no justifiable linear correlations. For this section, the crypto-consumers are divided into three income groups: low (<\$10,000), middle (\$10,000-\$49,999), and high (>\$50,000). The consumers in the highest income group buy the least (64.8%) but mine the most (31.8%). This may be due to the high costs of setting and running crypto-mining systems so that they are less affordable to lower-income consumers, hence less preferred. The highest income group also gets the most customer payments and salaries in crypto.

The consumers in the middle-income group (74.6%) tend to buy cryptocurrencies significantly more than the other groups. But, they are the lowest in performing minor online tasks (46.3%), affiliation or loyalty programs (26.9%), and salaries or allowances (13.4%), although the latter is nearly the same as the lowest income group. The consumers included in the lowest income group, however, are leading in earning crypto by accomplishing minor online tasks (53.1%).

Lastly, affiliation and loyalty programs are also viable options for them. Compared to other groups, the crypto-consumers with the lowest income refer to such programs the most, as more than a third (35.8%) of low-income crypto-shoppers obtain their crypto through these programs (most probably along with other methods).

More than a third of all crypto-consumers do not buy or invest in crypto-money at all. So, in a nutshell, cryptocurrencies used by crypto-shoppers are not necessarily obtained by purchasing or by investing, but as some form of remuneration either for work and activities or for loyalty promotion, etc. This means that for a majority of crypto-shoppers, cryptocurrencies are already a part of a circular economic process, where it is in some way earned and spent, making it for these users a proper medium of exchange.

"Cryptocurrencies are mainly used for purchasing digital goods and services."

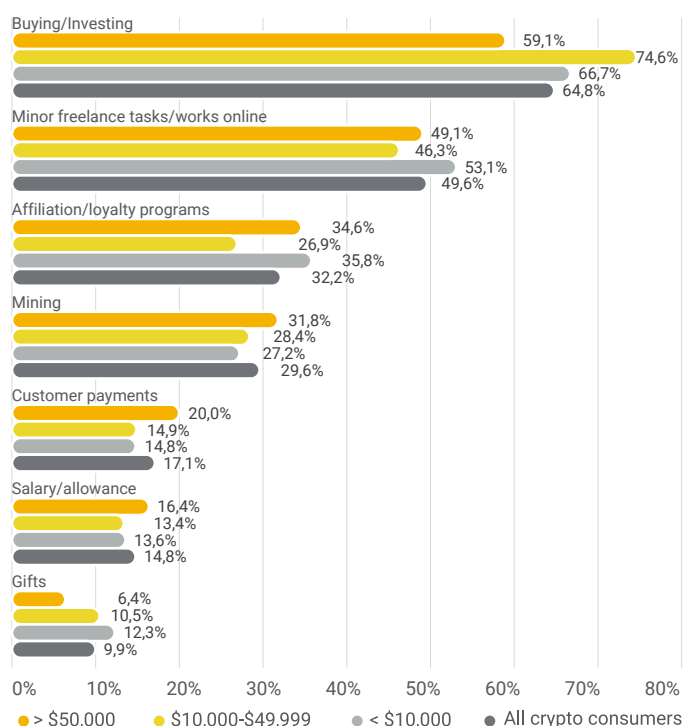


Figure 23: Main methods for obtaining cryptocurrencies by income level.

5.2 Goods & Services

Goods and services bought by crypto-consumers are naturally limited by the ones offered by the businesses. Nevertheless, our data suggest that crypto-consumers purchase a wide variety of products and services. However, certain categories seem to draw more interest than others. First of all, digital goods and services are preferred clearly more than physical products and services. Mobile network top-ups (incl. data and airtime) are the most popular category since 55.2% of crypto-consumers buy them. Game credits, items, and bonus content (e.g., from online game stores, platform portals, and company websites, etc.) is the second most popular choice with a vast 52.3%. Mobile apps (e.g., from application stores) stand in third place with 34.7%. The top three are followed by digital entertainment (e.g., video-on-demand sites, web portals, movie, and music providers, etc., by 28.5%), computer software (excl. mobile apps, by 22.2%), cloud and internet services (e.g., hosting, domain, VPN, etc., by 21.8%), hardware and electronics (e.g., laptop, TV, computer parts, etc., by 15.1%), online gambling (incl. betting, by 15.1%), online or printed publications and paid content (e.g., books, e-books, magazines, newspapers, library/content subscriptions, etc., by 13.8%), fashion (e.g., clothing, apparel, accessories, etc., by 13.4%), foods (incl. delivery, by 11.3%), travel (e.g., tours, hotels, etc., by 9.2%), pharmacy (e.g., health, cosmetics, beauty, supplements, etc., by 4.2%), and a few others (e.g., cash-out, donations

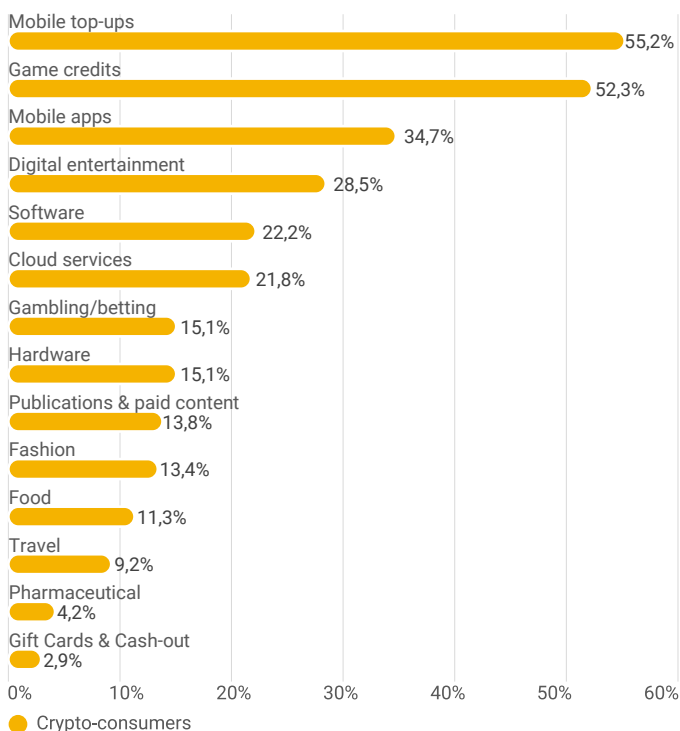


Figure 24: Top goods and services preferred by crypto-consumers.

to charity, open-source/crowdfunding projects, etc.). The list is provided in Figure 24. On the other hand, preferences for purchased goods and services differ per gender, income level, and occupation type of consumers, as revealed from our data.

What men do buy significantly more than women include digital entertainment, cloud services, and software, whereas women tend to buy more fashion and foods. Men also tend to spend more on hardware, publications, and gambling; while women purchase more mobile apps than men. The rankings and ratios are given in Figure 25. Although we do not see any value that does not make sense, we have to note that currently, just less than one-tenth of crypto-consumers are women; therefore, when the number of female crypto-consumers increases, the ratios may change.

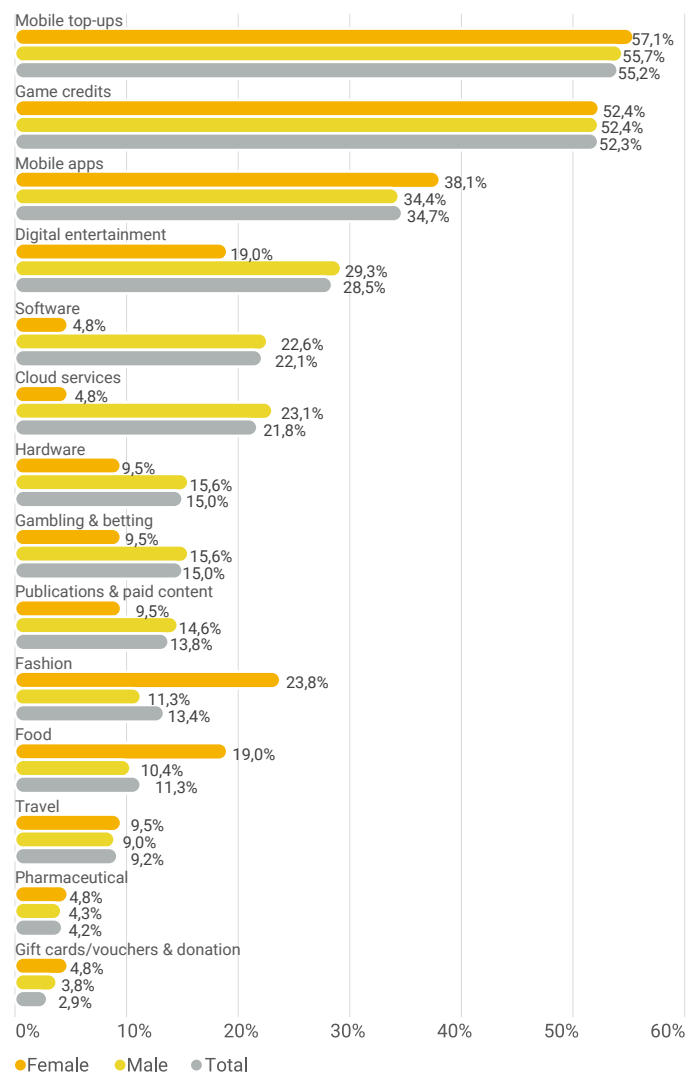


Figure 25: Top goods and services per crypto-consumers' gender.

Income is another factor that determines shopping tendencies. The shopping frequency of some items directly correlates with the consumers' annual income, as shown in Figure 26. The high-income (>\$50,000) consumers' top 3 purchases are game credits (52.6%), mobile top-ups (47.4%), and digital entertainment (31.6%). Besides, they tend to buy more digital entertainment, hardware, fashion, travel, and pharmacy when compared to the other income groups. The difference is very sharp, especially in travel and fashion. From another perspective, they buy more physical goods and services than the others (especially the low-income).

The middle-income (\$10,000-\$50,000) consumers' top 3 consists of mobile top-ups (45.1%), game credits (43.7%), and mobile apps (32.4%). Interestingly, they do not lead any of the categories except for the foods (and the "others"). They have a mixed product range containing both digital and physical goods (although digital goods are more dominant). The low-income consumers' top 3 includes game credits (59.5%), mobile top-ups (56.8%), and mobile apps (36.5%), adherent to the overall average choices. They clearly spend their crypto more on digital goods and services. We put forward three highly probable reasons for that tendency. First, many physical goods and services (e.g., hardware, travel, etc.) have higher prices than many digital goods so that they may be less affordable for low-income consumers. Second, most physical goods are indivisible (or have a minimum amount) in terms of quantity, so that, while it is possible to buy vary-

ing amounts of game credits or mobile top-ups, it is not possible to order half hardware. Last but not least, most physical goods and services either require shipping of goods to the physical presence of the consumer or require the consumer to go and get the goods or services; hence, these options may not be available to the locations where low-income consumers densely reside (i.e., low-income countries).

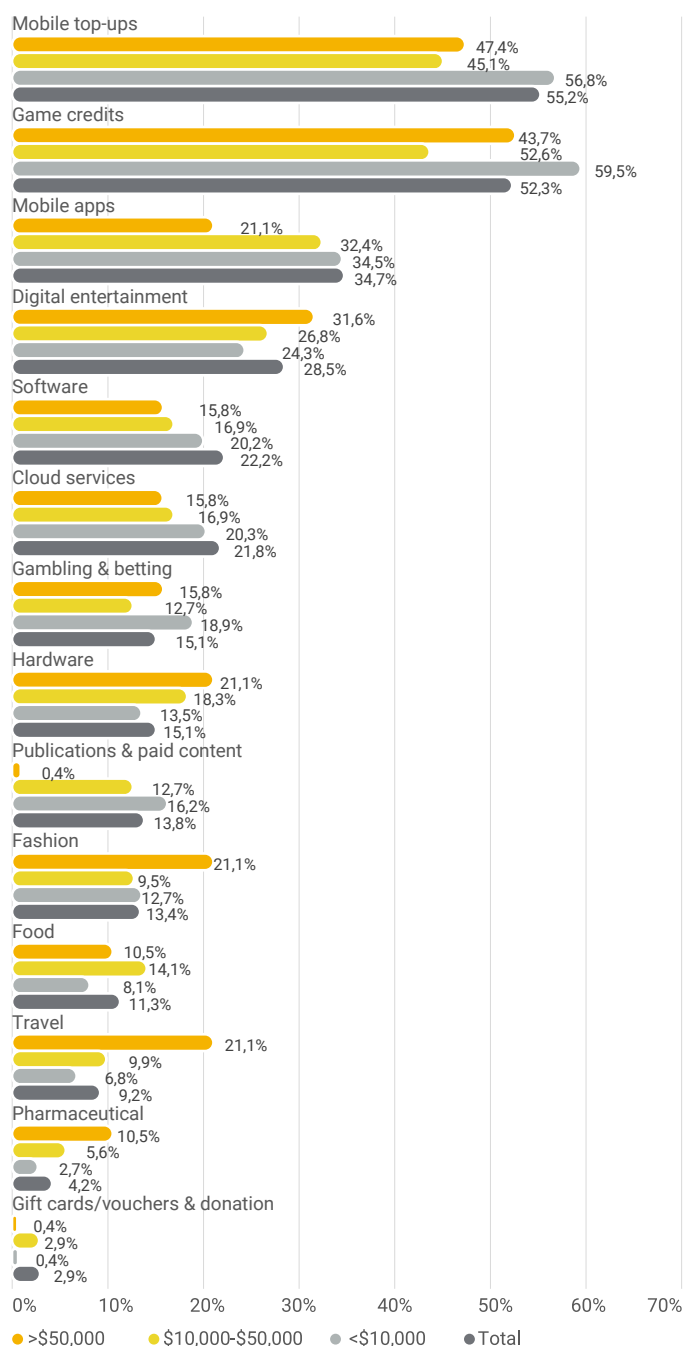
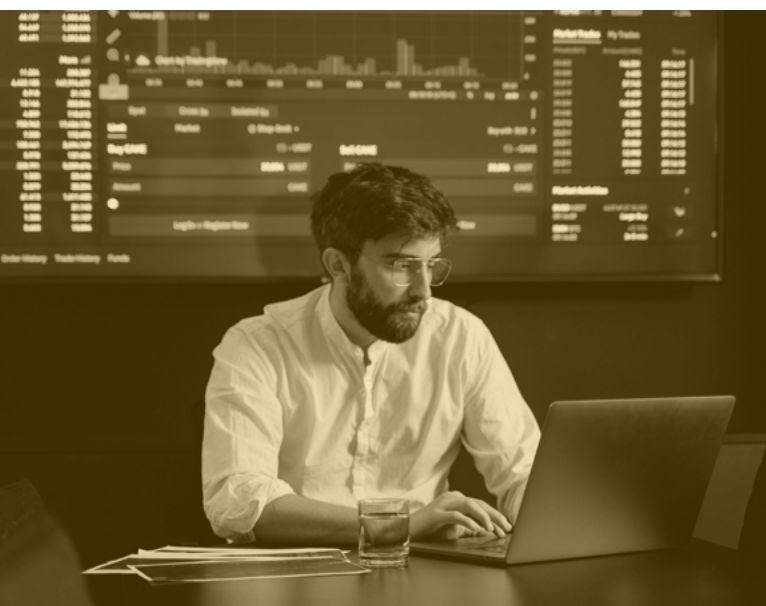


Figure 26: Top goods and services per crypto-consumers' income.



The popularity of purchased goods is also subject to change according to the occupation of consumers, as in 27. Self-employed, entrepreneurs and investors have the widest range of purchased products and services. Among different items they buy, mobile top-ups (69.4%), game credits (58.8%), and mobile apps (45.9%) constitute their top 3 choices. They even buy almost everything more than the other groups. The employed and retired consumers' top 3 items are game credits (51.8%), mobile top-ups (43.5%), and mobile apps (23.5%). Although in the top 3, their interest in mobile top-ups and mobile apps are significantly lower than the other groups. The students and unemployed spend remarkably less on physical goods and services, and they make purchases within a narrower range of goods. Moreover, they do not lead any of the categories. Yet, the top 3 remains similar with mobile top-ups (50%), game credits (41.9%), mobile apps (32.4%).

Among the goods and services that are bought by paying in crypto, only 59.6% of them are directly bought from the store selling them. The remaining 40.6% of the purchases are indirect so that consumers first buy gift cards or vouchers with their crypto-money, and then they spend their credit in the stores where they want to shop. As also shown in Figure 28, direct purchases are more common among crypto-consumers. This may be to avoid commissions and implicit costs that appear when buying gift cards first.



Figure 28: Share of purchases made either direct or indirect (i.e., via gift cards or vouchers).

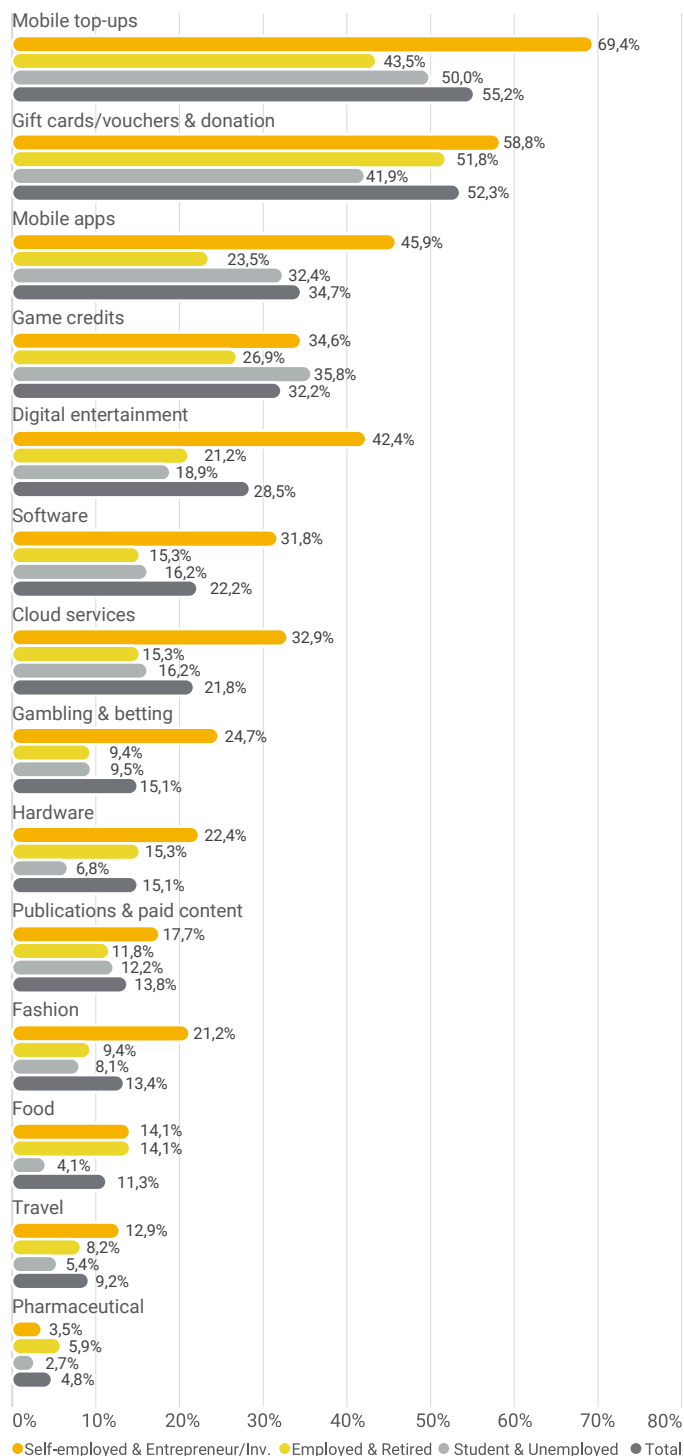


Figure 27: Top goods and services per crypto-consumers' occupation.

5.3 Lightning Network

The Lightning Network is a "layer-2" payment protocol. It is designed to be layered on top of a blockchain as a scalability solution to enable fast and cheap transactions. Lightning Network can be thought of as a peer-to-peer system for making micro-payments of cryptocurrency. Transactions occurring on the Lightning Network are processed "off-chain" through a network of bidirectional payment channels. Users wishing to pay with Lightning Network must first open a payment channel by committing a transaction to the underlying (Layer 1) blockchain. Once a channel is open, users can make and or receive any number of payments. Every transaction on the Lightning Network updates the distribution of funds on the channels (but not on the underlying blockchain, therefore "off-chain"). Only the final settlement transaction, which is made by closing the channel, will redistribute the funds to the underlying blockchain according to the transactions that occurred on the Lightning Network.

Although available for Litecoin and technically for other blockchains, Lightning Network's use today is prevalent in (if not exclusive to) Bitcoin. Therefore, for the purpose of this report, when we refer to Lightning Network, we are referring to this technology applied to the Bitcoin network and the transfer of Bitcoin cryptocurrency. For a crypto-consumer to be able to pay with Bitcoin via Lightning, such user must:

1. Obtain a "Lightning-enabled" Bitcoin wallet,
2. Connect the wallet to a "Lightning node" (this is automatic in the newer generation of Lightning wallets)
3. Open and fund a Lightning channel (the store's channel or a well-connected channel that can reach the store).

So, despite being immediate, the complexity of crypto-shopping (which is already found too much by some crypto-consumers) further increases with Lightning Network.

From Figure 29, 38.3% of the crypto-consumers are already knowledgeable about the Lightning Network to a remarkable extent. Almost half of the crypto-consumers claim to have sent or received cryptocurrency through the Lightning Network at least once, and most of them (46.9%) have done it for shopping purposes. The share of consumers who tried Lightning Network is larger than those who are knowledgeable about it, so crypto-consumers are indeed open to trying new technologies that promise some benefits, even without understanding the technology "under the hood" they are using in detail.

"Crypto-consumers who are well-aware of the Lightning Network claim to prefer it whenever it is offered by the stores."

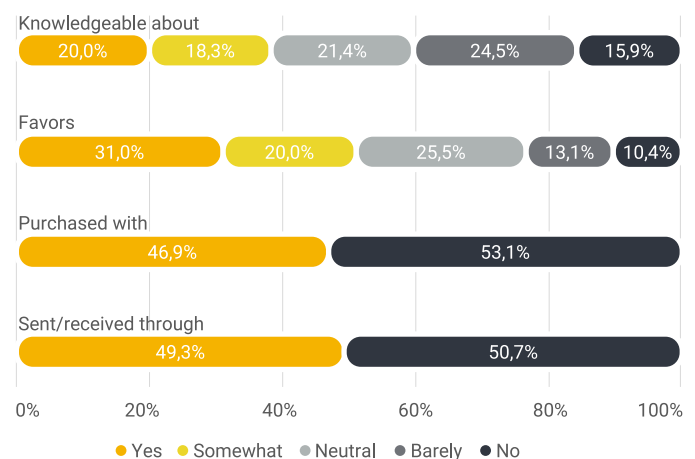


Figure 29: Crypto-consumers' attitude towards the Lightning Network. Share of crypto-consumers who are...

All other things being equal, as many as 51% of crypto-consumers stated that they would favor one store over another if it accepts payments via the Lightning Network. Even more significant is the fact that this percentage is as high as 73.9% among the ones who are knowledgeable about the Lightning Network, whereas only one-tenth intentionally avoid using it. Despite the information mentioned above, we must note that according to our data (and the data made publicly available by our competitors) shows that Lightning Network transactions are still a small minority, even in the stores which support it. So, there may be demotivating factors and/or barriers to access that inhibit adoption. These may include technical issues such as not having the skills nor the know-how to set up Lightning wallets and channels correctly, but also economic reasons such as committing (prepaying) funds on a Lightning channel. Nevertheless, we have already traced an increase in the adoption of the Lightning Network for payments as depicted in Figure 30.

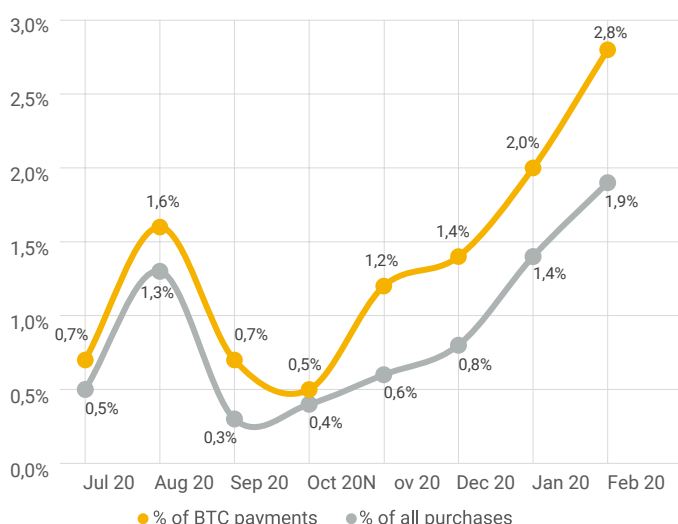


Figure 30: Payments made via Lightning Network as a share of all orders and BTC payments.

According to our analytics, payments made over Lightning Network constituted as little as 0.5% of all purchases and 0.7% among Bitcoin payments (by the number of orders) within the entire month of July 2020. However, the rate has significantly increased to 1.9% of all purchases and to 2.8% among Bitcoin payments in February 2021. While this is a huge leap, its use is still very little considering its benefits (i.e., faster and cheaper transfers). As we will see, the growth was driven likely by the costs and timing issues for regular (i.e., on-chain) Bitcoin transactions, but maybe also by the introduction of next generation Lightning wallets, which might facilitate things for users and provide ease of use to some extent.

5.4 Recurrence

From the stores' and providers' perspective, recurrence and frequency of shopping activities are vital for the revenue streams since they indicate the customers' loyalty. Fortunately, periodic purchases are common among crypto-consumers. As shown in Figure 31, 15.5% of crypto-consumers make daily purchases using cryptocurrencies, and 25% make weekly purchases. Hence, 40.5% of all crypto-consumers shop at least once a week by paying in crypto. Additionally, another 34.1% buy goods and services every month. A quarter of crypto-consumers cannot really be considered "loyal" crypto-shoppers since they make purchases once a year or even less. Yet, this is a substantial outcome since it shows that crypto-shopping, for 75% of those who have made a purchase with crypto-money, becomes a habit (if not the norm) rather than staying as a rare occasion. Therefore, it is also interesting to elaborate on what periodical buyers purchase. Data suggests that crypto-consumers who shop frequently (i.e., daily or weekly) prefer digital goods and services over physical ones slightly more (up to 7% depending on the category). The frequency of cryptocurrency transfers (non-shopping send, receive, or exchanges) is higher than that of purchases, which can be expected, due to the high interest in using crypto-assets for investment and financial purposes.

"About 40% of crypto-consumers make periodic purchases at least once in a week."

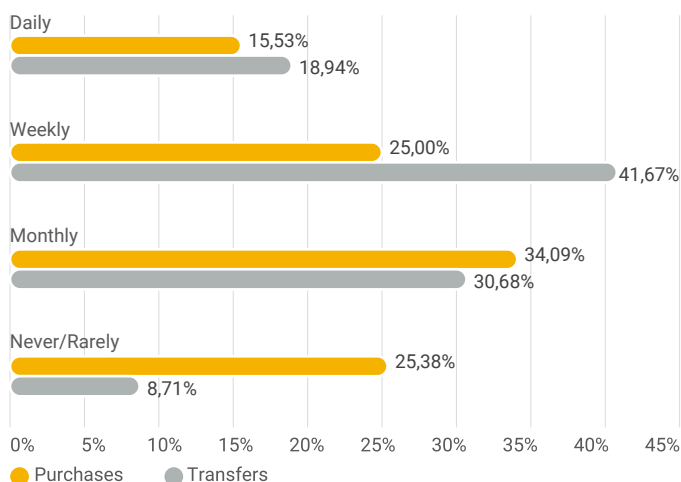


Figure 31: Crypto-consumers' frequency of making purchases and transfers (incl. exchanges) with cryptocurrencies.

The crypto-consumers who have used the Lightning Network at least once, including the ones who use it occasionally or whenever available, have a much higher crypto-shopping frequency when compared to the consumers who have not yet tried the Lightning Network. As shown in Figure 32, 55.5% of the crypto-consumers who use Lightning Network do cryptoshopping on a daily or weekly basis, whereas this rate is only 26.5% among the ones who do not use Lightning Network and 40% among the general crypto-consumer population. The shopping frequency of the Lightning Network users (and the gap between the non-users) is quite impressive. Broadly speaking, the users have more expertise in the field and have more exposure due to their work. Moreover, there are more innovators among them. What we found even more noteworthy is that the better user experience (i.e., higher speeds and lower costs) that the Lightning Network provides may have been playing a significant role for its users in making a habit out of crypto-shopping.

"Crypto-consumers using Lightning Network have a higher shopping frequency than non-users."

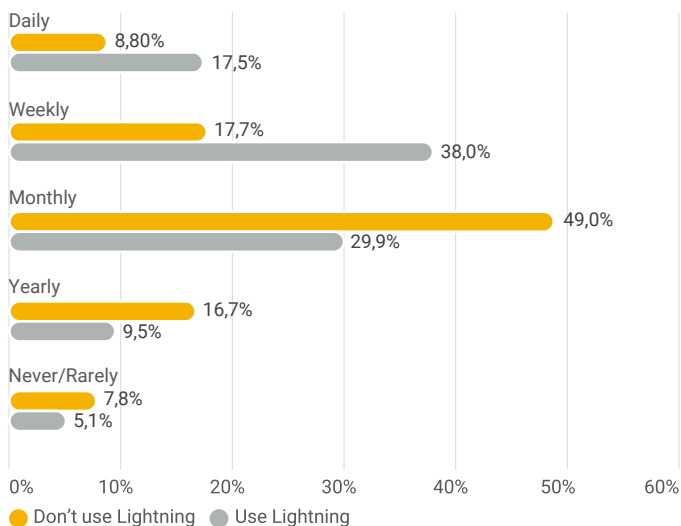


Figure 32: *Crypto-shopping frequencies of Lightning Network users and non-users.*



6. EXPERIENCE

To understand the market's need for future actions, businesses should evaluate the crypto-consumers' past and current experiences. There are many factors related to crypto-shopping that make them happy; however, there are some annoying issues as well.

6.1 Satisfaction

The crypto-consumers are satisfied with their crypto-shopping experience, on average. Nevertheless, the satisfaction rates drop dramatically as order confirmation delays and transaction fees increase so that they are found to be the primary factors related to satisfaction from a crypto-shopping experience. Although there is a tight bond between fees and delays in blockchain ecosystems, delays occasionally happen after an order is already placed, whereas fees are agreed upon before an order is submitted. Hence, we elaborate on delays here and fees in the next subsection.

"More than half of the orders are confirmed within the first 5 minutes, and 80% of the orders are confirmed within 20 minutes."

There are two reasons for delays: the intentional processes of the stores (e.g., payment handling, billing procedures, the supply-chain matters, etc.) or the waiting queue (e.g., the memory pool, otherwise known as the mempool) of a particular cryptocurrency platform. Since most modern e-commerce systems can handle orders within minutes (even in seconds), when longer delays are mentioned, the readers should think of the latter case. It is important to understand that such delays vary a lot from one cryptocurrency to another; and even for the same currency, it can differ from time to time (the mempool paradigm and its effects on the user experience are further elaborated in Section 6.2).

Slightly more than one-fifth of all orders placed and paid in cryptocurrencies were confirmed by the stores immediately. Another one-third are confirmed within only 5 minutes, if not instantly. This means that more than half of the orders are confirmed within 5 minutes. This is a very good result since more than a quarter of all orders are completed within 5 to 20 minutes, and (cumulatively) more than 80% of purchases within the first 20 minutes. On the other hand, it is not very good that one-tenth of the orders are confirmed within 20 to 60 minutes, 4.6% are confirmed within 1 to 6 hours, and it takes even more than 6 hours for 3.4% of the orders to be confirmed, which is not that good. The breakdown is provided in Figure 33.



Figure 33: How long it takes for an order to be confirmed.

Figure 34 shows how transaction delays affect overall consumer satisfaction. The satisfaction rates are produced over a Likert scale, where five stands for the best satisfaction and one stands for the worst (on the right Y-axis). Yet, the bars show the share of crypto-consumers who complain about the delays per duration of transaction delay (on the left Y-axis). It is clear from the chart that, as long as they do not exceed one hour, the confirmation delays are found to be acceptable by crypto-consumers. However, delays longer than 1 hour decrease the satisfaction rates significantly. So, we can say that the delay that crypto-consumers can comfortably tolerate is at most 1 hour, after which the satisfaction rates start to decrease. From a business perspective, this scale could be adopted as a customer experience goal and must be a base minimum.

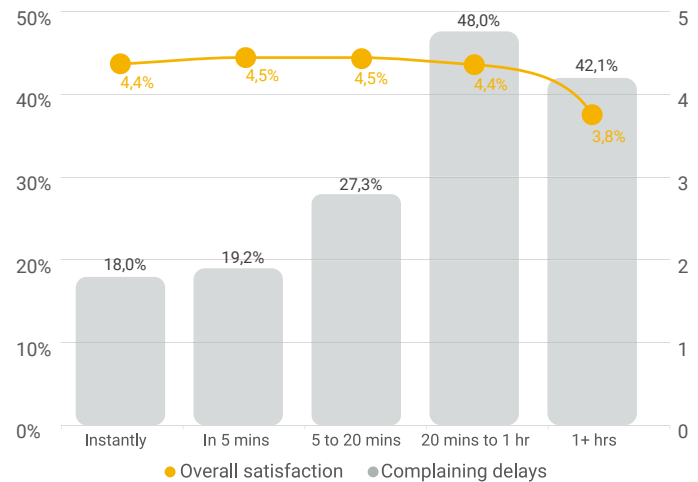


Figure 34: Breakdown of crypto-consumers complaining about delays and their satisfaction per delay length.

Among all other age groups, young people of Gen-Z are the happiest with their purchase experiences with crypto."

There is only a minor correlation observed between the income levels of crypto-consumers and their crypto-shopping satisfaction rates. The share of satisfied ('5' and '4' points in the Likert scale) consumers is nearly the same among all income groups (low: <\$10,000, middle: \$10,000-\$50,000, high: >\$50,000). But, when looking at the dissatisfaction rates ('1' and '2' points in the Likert scale), although the percentages are very low, it is found that low-income crypto-consumers are dissatisfied the most (6.6%). Since the middle-income (4.9%) and high-income (3.6%) groups have even lower rates, the dissatisfaction rate decreases as income increases. It is most likely caused by the unbalanced transaction fees that are not proportional to the value of the purchases. This phenomenon affects most of the consumers who buy cheaper goods in each individual order, which is more frequent among low-income consumers. What affects the satisfaction rates more is the crypto-consumers' age. Younger consumers of Generations Y and Z have higher satisfaction, whereas the rates drop as age gets older. This might be a result of the complexity of crypto-shopping and related technologies, which the younger generations can likely learn and adapt faster. Furthermore, the adoption of Lightning Network is also found to have a correlation with positive experiences.

"Crypto-consumers using Lightning Network are happier with their purchase experiences."

6.2 Issues

The issues that discomfort the crypto-consumers most are analyzed thoroughly. Since we realized that there are slight differences between different population groups, we also added demographic breakdowns.

6.2.1 Overview

High transaction fees and long processing delays are among the most annoying issues faced during crypto-shopping. As previously revealed, most crypto-consumers already accept paying some fees and waiting for some delays, but in practice, such costs seem to exceed what they can put up with. Nevertheless, the issues faced by crypto-consumers are not limited to delays and fees. Figure 35 presents a comprehensive list of related problems. The top reported issue is, by far, the fees. Nearly half of crypto-consumers complain about the high transaction fees occurring during shopping transactions. The transaction fees are the amount of crypto-money that will be “gifted” to the blockchain nodes that process the pending transactions. As there is no tariff for such handling,

the fees fluctuate depending on the length of the queue of the pending transactions, commonly called the mempool. When there are too many pending orders for the processing nodes to handle within a reasonable time, only those orders pledging the highest fees are processed. In such a situation, transactions offering very low fees cannot even be processed at all, resulting in the cancellation of the transactions due to timeouts. This undermines the usability of crypto-shopping. Related to the problem of the fee is the “waiting problem” since this also depends on the blockchain being used and its current mempool status. Specifically, transaction delays rank the third in terms of crypto-consumer complaints.

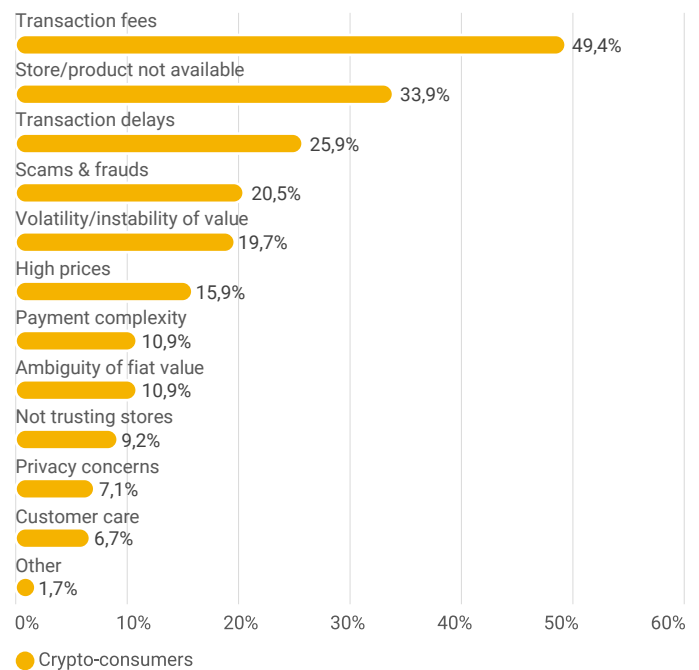


Figure 35: Issues that crypto-consumers face during shopping.

6.2.2 Fees

To get a deeper understanding of the fees and waiting issues, it is important to know that the mempool states are subject to frequent change, and this may have profound consequences for the perceived shopping experience and may also drive certain behaviors and preferences of crypto-consumers. Specifically, when the estimated transaction fees start to feel overpriced (due to the mempool), it may work to wait, but there is no guarantee that the fees to drop anytime soon. Another option could be to change the currency being used to pay. To clarify how the cryptocurrency preferences affect the fees to be paid per transaction, we present an example comparison using the real statistics of Bitcoin, Litecoin, Ethereum, and Dash mempools. Throughout the time period in which the research was being conducted, January 12, 2021, hosted the moment when the highest peak of median transaction fees was observed - particularly for the Bitcoin network. The median fee was as high as \$9.27 for this date's rates. In the exact meantime, it was \$3.2 for Ethereum. On the other hand, the median fees for Litecoin and Dash were even much lower, being around \$0.001. We would like to remark that the mempools also contain many unprocessed transactions that fell short on the pledged fees; hence the fees issued on transactions that were completed are expected to be even higher than the ones presented in the table. All in all, the difference between the fee rates is huge.

The amount of fees to be paid per transaction does not linearly correlate with the value of the transaction; rather, it changes as the size of the transaction in bytes or virtual bytes changes - assuming the stake for the fees is constant (which normally it is not). Therefore, the smaller the transaction value, the bigger the impact of the fees. This creates a major drawback in crypto-shopping for people who want to spend smaller amounts as the fees may reach up (or even surpass) the nominal price of the products or services they intend to buy (which are called dust

transactions). As a reference, on October 9, 2020, the date when the median Bitcoin fees were observed, the median transaction values (incl. exchange transfers, DeFi, and all others) were \$979.08 for Bitcoin, \$9000.26 for Ethereum, \$68.49 for Litecoin, and \$13.75 for Dash. So, it is clear that Litecoin and Dash are being used in smaller-valued transactions. Likewise, the data from our business analytics suggests a well-matched pattern on how crypto-consumers tend to adjust their blockchain and cryptocurrency preferences also based on the fees and on how these relate to the overall value of the transaction they are making. In fact, we provide a report of the median fees paid (as a percentage of the total transaction) by our customers per the cryptocurrency they used for their orders on January 12th 2021 when the Bitcoin fees were the highest, July 5th 2020 when the Bitcoin fees were the lowest, and October 9th 2020 when the median fees were observed. The values given are the median value of delivered orders per day per the cryptocurrency used for payments (i.e., Bitcoin, Litecoin, and Dash. Ethereum is excluded due to limited support within the study's time period). According to the analysis results presented in Table 1, the maximum transaction fees paid for an order had reached up to 121.31% of the original price of the item purchased.

This is obviously an extreme yet real case on the day with the highest fees. A crazy bargain where consumers pay two and get one! Although significantly lower than this, the median fee paid on that day was also very high as it was more than a quarter of the purchased item's price. Even in the median day, fees range from 1.55% up to the highest 114.6% of the orders' value, with a median of 8.74%. The lowest day showed slightly more acceptable fees, but the readers should pay attention to the incremental pattern as the date progresses. Hence, no optimism here.

Coin	Highest Day			Median Day			Lowest Day		
	Lowest	Median	Highest	Lowest	Median	Highest	Lowest	Median	Highest
BTC	3.65%	26.87%	121.31%	1.55%	8.74%	114.60%	0.09%	1.58%	29.04%
LTC	< 0.01%	< 0.01%	0.26%	< 0.01%	0.06%	0.06%	< 0.01%	< 0.01%	0.10%
DASH	< 0.01%	< 0.01%	< 0.01%	< 0.01%	< 0.01%	0.23%	< 0.01%	< 0.01%	< 0.01%

Table 1: The highest, median, and lowest transaction fees as a percentage of the total value of purchased items per the cryptocurrency; when the highest, median and lowest (median) BTC fees were observed.

On the other hand, Litecoin and Dash offer very cheap transaction fees, around a few cents or sometimes even below ¢1, if not completely free. When they are used to purchase goods and services, the fees typically do not exceed five per thousand, and not rarely they become lower than one per ten thousand. Apparently, from a consumer perspective, it might be wise to consider either using more efficient currencies, such as Litecoin and Dash, or a scalability solution like Lightning Network for crypto-shopping purposes. Lightning Network is not the only scalability solution available. Fast transactions and low fees are possible for Ethereum-compatible currencies

(ERC20 tokens, incl. stablecoins) via a plethora of different blockchains (e.g., Binance Chain, Avalanche, etc.) and Ethereum layer-2 solutions (e.g., Polygon, OMG, XDai, etc.). Crypto-consumers who want to, or are obliged to, use Bitcoin, Ethereum, and ERC20 tokens (incl. stablecoins) for payments should consider making the transactions via more efficient networks, sidechains, or other scalability solutions (when made available by businesses). We are pointing out an opportunity to be taken in order to avoid high transaction fees and long delays caused by the overcrowded mempools during crypto-shopping.



"Even 45.5% of crypto-consumers who are (certainly or somewhat) willing to pay some transaction fees do find the current transaction fees too high."

As the second-most common issue, slightly more than one-third complain about the unavailability of the stores they would like to shop from or the absence of goods and services they would like to buy. That is to say, crypto-commerce covers only a limited subset of the overall retail sectors, at least for now. About a quarter reported longer than acceptable transaction (or order confirmation) delays. Nearly one-fifth face serious issues with scams and frauds. This is a crucial problem throughout the entire crypto-commerce world.

Decentralized user-experience databases may help build trust within the community since 9.2% do not trust the stores that sell goods and services by cryptocurrencies, even including those that are not blatantly scams. Besides, 7.1% have some privacy concerns, so they are worried that their personal information can leak to distrusted third parties during or after crypto-shopping.

As reported by one-fifth, another major issue is the high volatility and instability of the fiat values of (many) cryptocurrencies. Drastic and sudden changes in the conversion rates can make the consumers feel like they are paying more (or less) than they should. Plus, they may worry that by spending their cryptocurrency now, they might be missing an opportunity to earn money on it if its value increases after they have already spent it. Consequently, one-tenth are complaining about the ambiguity of the fiat value of the goods and services they are about to buy,

probably because of complex and volatile conversion rates. Provision and acceptance of stablecoins provide a solution to this volatility issue, but they come with their own issues, which again include the fees. The most widely accepted stablecoins are generally ERC20 tokens (e.g., USDT, USDC, etc.), thus require an even higher amount of "gas" (i.e., fees) than a typical Ethereum transaction. Nevertheless, more efficient and cheaper blockchains (e.g., Binance) or layer-2 scalability networks (e.g., Polygon/Matic, OMG, etc.) could be a solution provided that they are easy enough to be used within a shopping context. All in all, it can sometimes be more complicated than it looks. 15.9% of crypto-consumers find the prices of goods and services higher than they expected. This can either be pointing out a comparison to the prices in conventional shops (so that the goods and services are more expensive when sold in cryptocurrencies) or the level of prices in general (e.g., due to the phenomenon of low purchasing power or high inflation in some countries).

It should be noted that 10.9% of crypto-consumers find the crypto-payment processes to be annoyingly complex and would prefer crypto-shopping to be a simpler procedure. In relation to that, 6.7% complain about the lack of customer care services. Stores that aim to be long-lasting in the crypto-market must pay special attention to providing such services to guide consumers who have difficulties.

6.2.3 Demographic Breakdowns

Issue perception is, in fact, different among different age groups, although the list of top 3 problems is similar. From Figure 36, high transaction fees are the biggest issue for all age groups, but its prevalence is much more significant among ages 25 to 34 (58.3%), whereas consumers at ages 15 to 24 care about fees the least (38.9%). Store and product unavailability affects the youngest the most (37.5%), while it decreases as age increases. Transaction delays have comparable importance for all age groups except 45 and older, who are seemingly (more) okay with waiting for longer delays. Scams and frauds are a primary concern only for 15 to 24. This issue loses its importance as age increases. For 45 and older, it is only an infrequent concern (7.7%).

Interestingly, the volatility and instability of fiat values of cryptocurrencies annoy the youngest and the oldest groups more than the others. Compared to other groups, crypto-consumers at ages 25 to 34 care about high prices the most (19.8%), and the ones at ages 35 to 44 care about payment complexity the most (13.3%). As a catchy fact, the oldest group complains about the payment complexity the least (7.7%). Yet, the ambiguity of the fiat value of goods and services sold in cryptocurrencies becomes a problem for them (15.4%) and the age group 35 to 44 (15.6%), while this is rare among Generation Z (6.9%). Generation Z is also the most skeptical group about the stores (13.9%); this is totally consistent since they are afraid of scams and frauds a lot. However, crypto-consumers aged 45 and older worry about their privacy the most (11.5%). They also complain about a lack of customer care (11.5%).

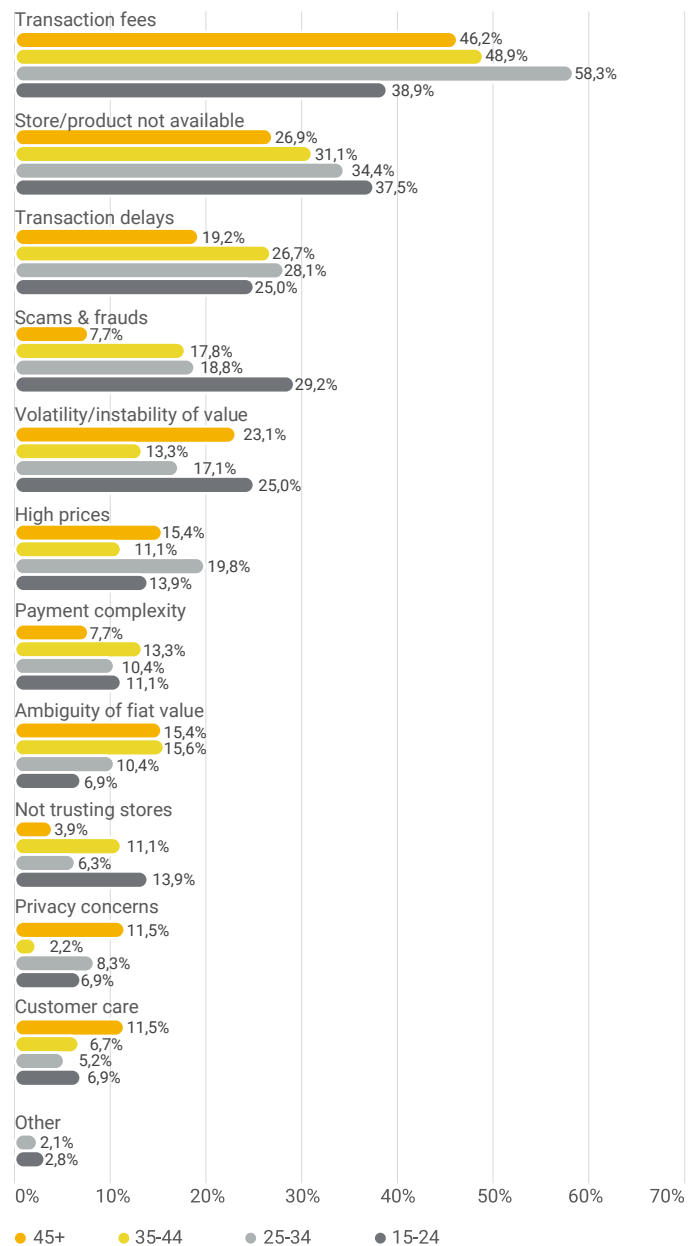


Figure 36: Issue perception per crypto-consumer age.

Another determinant factor on the "issue perception" is the income level, which is shown in Figure 37. The difference is not huge, but still, rich and poor may have different concerns. Transaction fees have the biggest impact on the lowest income group (<\$10,000), with no surprise. However, there is no linear correlation since the high-income group (>\$50,000) is in second place. This may be due to the snowball effect of the percentage-based fees charged when buying expensive stuff. Store and product unavailability affect all groups a lot, but the middle-income group (\$10,000-\$50,000) suffers slightly more than the others (37.7%), which may point out a wider product range for them. Transaction delays are equally annoying for the low (30.6%) and middle income (31.2%) groups but seem more tolerable for the high-income group (20.6%). Scams and frauds are another solid concern of more than one-fifth of all groups.

The volatility of fiat prices of cryptocurrencies (and the re-

sulting instability of their value) is a major concern for the low-income consumers (25.3%) since a quarter of them complain about it, but this is less problematic for the middle and high-income groups. The same situation is also valid for the price levels of goods and services sold in cryptocurrencies. Low-income crypto-consumers find general price levels higher in crypto-shopping (compared to non-crypto-shopping) and care about it much more (22.7%) than the others. Payment complexity is a problem almost exclusively for high-income consumers (14.4%). That may be related to their ages also being older. Another such issue is privacy concerns. This concern decreases as income decreases. However, when compared to other groups, high-income consumers find the fiat value of goods and services less ambiguous when sold in cryptocurrencies as only 7.2% see it as a problem. The issues of not trusting the stores and lack of customer care services affect the middle-income consumers the most (11.5% and 9.8%, consecutively).

"High transaction fees, the volatility of cryptocurrency prices, and expensiveness of goods and services affect the low-income crypto-consumers the most."

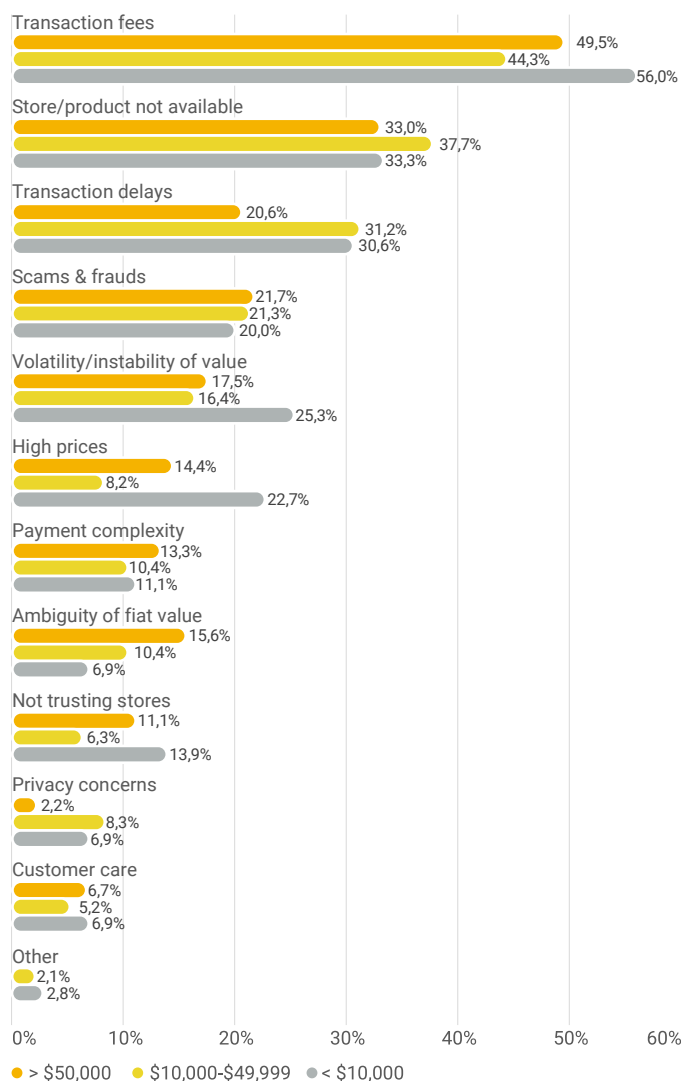


Figure 37: Issue perception per crypto-consumer income.

6.3 Future Use

Despite the prevalent issues, crypto-consumers are rather optimistic about (their) future usage of cryptocurrencies in shopping, as depicted in Figure 38. More than two-thirds of the crypto-consumers plan (or predict) to do crypto-shopping at least one more time within as short as one month, while 14.8% would likely not. A whopping 81.2% will buy goods and services by paying cryptocurrencies within the next six months. The percentage of those who would not is just below 6.3%, which is just a tiny fraction. The crypto-consumers who will do crypto-shopping within the next year reach as high as 82.6%. We can conclude that crypto-consumers get some essential benefits from using cryptocurrencies in shopping and would like to continue since they can tolerate the costs and issues to some extent. It can be said that they are hopeful that the issues will be at least partially mitigated in the future.

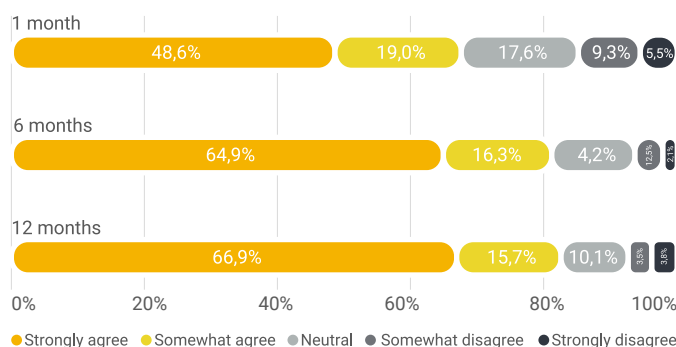


Figure 38: Share of crypto-consumers that will shop using crypto within the next...

Figure 39 reveals the crypto-consumers' predictions about Bitcoin prices by the end of 2021. A quarter of crypto-consumers expect that the prices will be between \$20,000 and \$50,000, and another quarter predicts a price range between \$50,000 and \$100,000. So, half of the crypto-consumers come up with an estimated range of \$20,000 to \$100,000, which is a rough estimate. Nevertheless, 36.6% predicts a price lower than \$20,000, whereas 13.4% predicted a price higher than \$100,000. Cryptocurrencies become more and more popular as prices increase. This makes some people see them as a viable investment option to some extent. However, the expectation of a significant increase in cryptocurrency prices makes crypto-consumers refrain from spending the crypto-money in their portfolio due to the fear of missing a future gain.

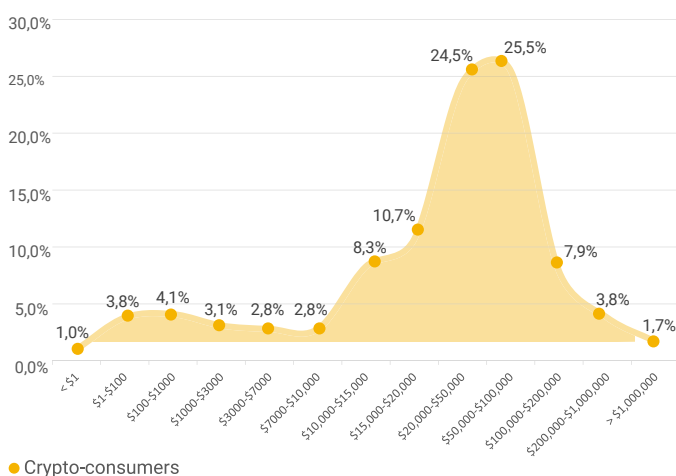


Figure 39: Crypto-consumers' BTC/USD ratio predictions by the end of 2021.

"Within the next month, two-thirds of existing crypto-consumers will do crypto-shopping at least one more time."

6.4 Expertise

Crypto-consumers' level of knowledge regarding blockchain technologies and cryptocurrencies may limit or boost their crypto-shopping experiences, as well as their benefits and concerns, depending on the depth of information they have. Lack of knowledge increases the difficulty perception and causes some unrealistic expectations, whereas expertise increases the satisfaction rates although it increases some concerns (e.g., privacy), and vice versa.

Most crypto-consumers are knowledgeable about at least the basics of blockchain technologies and cryptocurrency concepts. Some are even (self-proclaimed) experts, but the ones with very limited knowledge are not negligible either. From Figure 40, more than a third already have a general understanding of what a blockchain is and how it works, while nearly one-fifth do not even know the fundamentals. Crypto-consumers seem to be more familiar with Bitcoin and other cryptocurrencies rather than the underlying blockchain technology, in general. 71.7% know what Bitcoin is and how it works. Likewise, 70.7% know how to obtain (e.g., buy, earn, etc.) Bitcoin. When the same question is asked for other cryptocurrencies, the

"About one-fifth of crypto-consumers still do not know how to obtain Bitcoin or other cryptocurrencies."

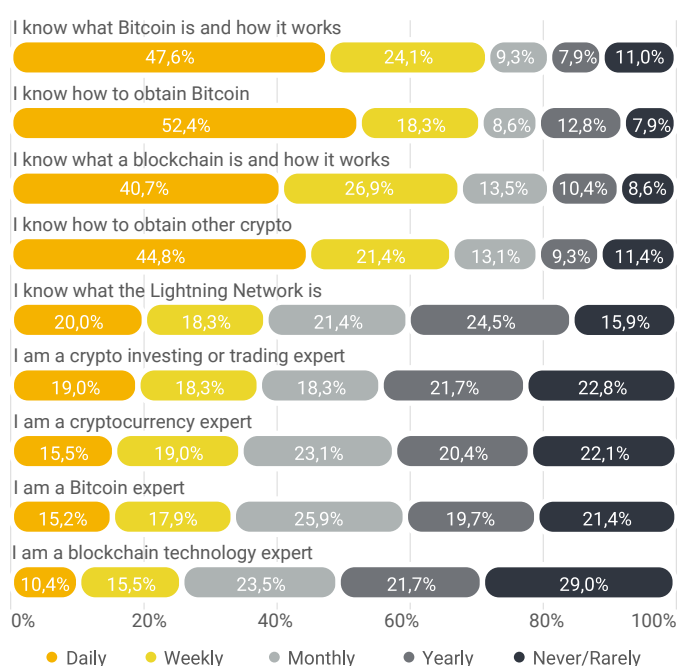


Figure 40: Knowledge base and expertise level of crypto-consumers.

rate drops to 66.2%. This is quite understandable since Bitcoin is the first and still the most dominant currency. The ones with some good awareness regarding the Lightning Network are much less frequent in the community as 38.3% are confident about it, while 40.4% have limited knowledge or no knowledge at all. So, the Lightning Network seems to be limited to experts. When it comes to being (or feeling like) an expert, the shares change significantly. Slightly more than a quarter define themselves as blockchain technology experts (among which only 10.5% strongly agrees), whereas approximately half of all the crypto-consumers claim no expertise in blockchain. The ones with expertise in Bitcoin are a bit higher, as declared by one-third of crypto-consumers.

Data presented in Figure 41 suggest a strong correlation between the crypto-consumers' shopping frequencies and their degree of expertise in cryptocurrency trading and investments. The higher the level of expertise, the higher the crypto-shopping frequency. Three-fourths of experts do crypto-shopping at least once a week (on average).

This is a tremendous rate that clearly shows the interest of knowledgeable consumers. When people get to know more about cryptocurrencies, they tend to shop more with them. Potential reasons include higher work exposure to cryptocurrencies, better trust in the technology, and more benefit anticipation that the experts may have. Likewise, 45% of crypto-consumers with some expertise do crypto-shopping at least once a week, and another one-third of them do so once a month. Crypto-consumers who do not claim expertise in cryptocurrency trading and investing have significantly lower shopping frequencies. Nevertheless, the mode of their answers demonstrates a monthly shopping pattern, which is still of interest from a business perspective.

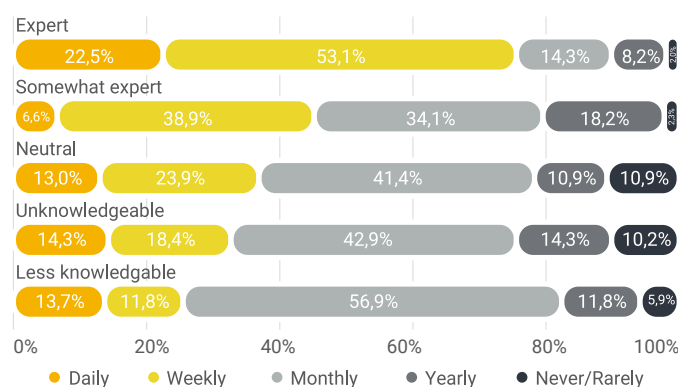


Figure 41: Crypto-consumers' shopping frequency per their degree of expertise.

7. MOTIVATIONS

Crypto-shopping exists because using cryptocurrencies in shopping addresses some needs of both customers and businesses. In order to achieve a global market that is more profitable to all parties, it is important to determine how valuable using cryptocurrencies in shopping is to crypto-consumers, as well as which problems they struggle with most.

7.1 Drivers

Crypto-consumers' self-declared reasons for preferring cryptoshopping are provided in Figure 42. Apparent from the chart, nearly one-third of crypto-consumers are eager to test new technologies, and more than half of them see themselves as innovators. In the meantime, an overwhelming 72.4% thinks cryptocurrencies are the future (i.e., will be customary in the foreseeable future). Besides, as a pragmatic opinion, 70.7% think that using cryptocurrencies in shopping will increase its worldwide adoption, while 64.5% believe that using crypto in shopping will increase its (fiat) value.

Security and privacy also appear to be major drivers in favoring crypto-shopping. Nearly two-thirds of crypto-consumers find crypto-shopping as a safer option. 57.9% do not trust banks, payment system providers, or other financial institutions, which is a spectacular percentage. Likewise, 56.9% are against the monetary control (e.g., regulations, emissions, etc.) by governments and/or banks.

In some cases, crypto-shopping even becomes a necessity rather than a fair choice, especially in struggling economies. Although most cryptocurrencies are famous for their highly volatile prices, a remarkable 46.9% of crypto-consumers claim that their local currency is even less stable than a cryptocurrency. What is more dramatic is, 43.1% of crypto-consumers are either unbanked or underbanked, so that they have limited access (or no access at all) to conventional payment methods, including credit cards and online banking. Hence, they are forced to use cryptocurrencies in trade. While more than a quarter earn a type of income paid in crypto, 45.9% of them cannot even cash out the cryptomoney they keep.

"43.1% of crypto-consumers do not have or have limited access to credit cards and online banking systems."

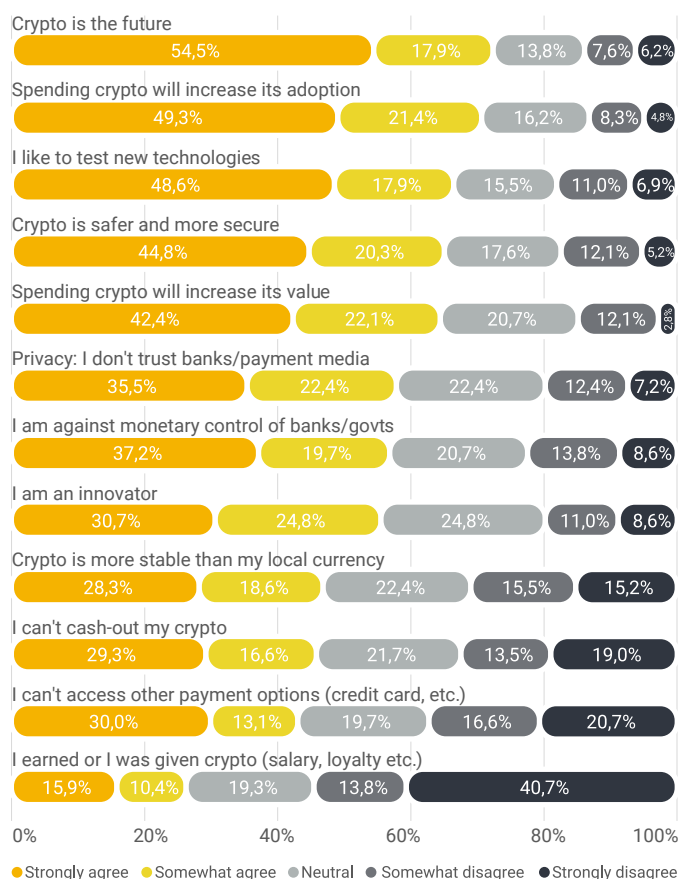


Figure 42: Main reasons for using cryptocurrencies in shopping.

Figure 43 shows the breakdown of crypto-consumers who cannot access conventional payment methods according to their countries' income levels. As seen from the chart, this is a more common issue in low-income countries and less common in high-income ones, as can be expected. Two-thirds of crypto-consumers from low-income countries stated that they do not have access to other payment options, which is an exorbitant percentage.

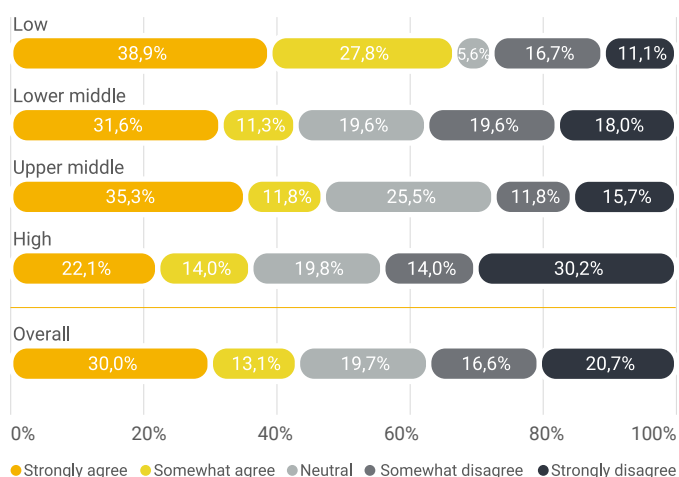


Figure 43: Share of crypto-consumers who cannot access other payment options, breakdown per country income.

"Nearly half of crypto-consumers have difficulties in finding the stores or products they are looking for."

7.2 Barriers

Despite all the benefits, there are also some important (and less important) issues that worry crypto-consumers and even make them think twice before shopping with crypto. Figure 44 shows the distribution of reasons that make crypto-consumers refrain from spending their crypto on purchases or at least slow down their pace. The largest barrier to the widespread adoption of crypto-shopping is again the perception of very high transaction fees, as half of the crypto-consumers reported. This is not directly related to the stores but a quasi-natural phenomenon regarding how the cryptocurrency of interest works. Bitcoin, the most preferred cryptocurrency, has relatively higher transaction fees caused by the high demand as well as the underlying blockchain technology. Stablecoins also have higher transaction fees.

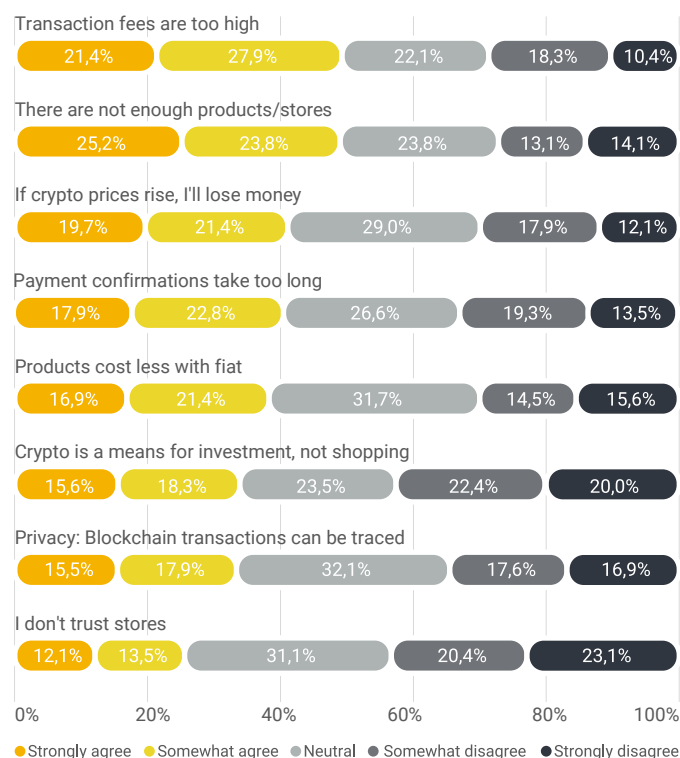
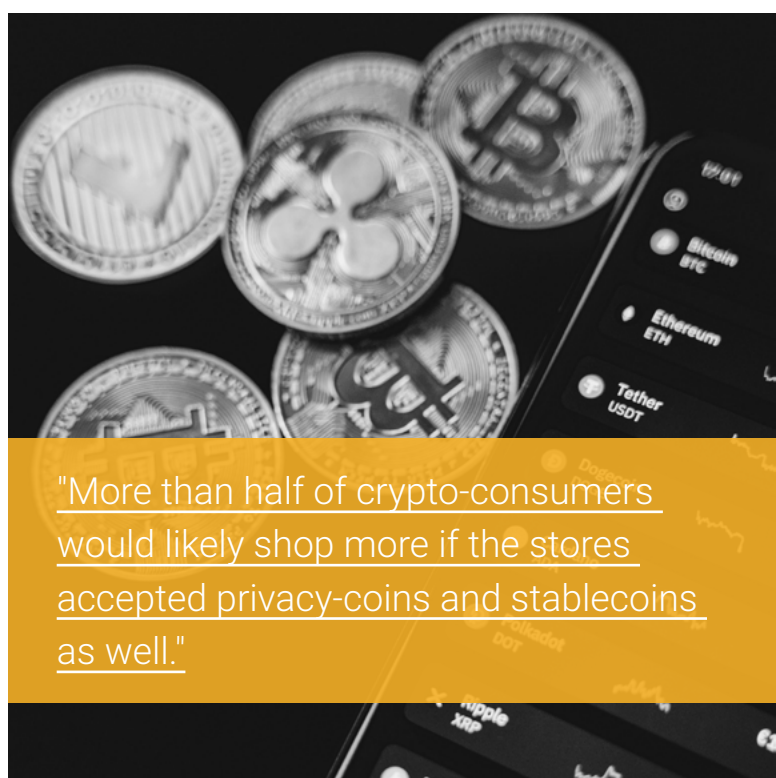


Figure 44: Main reasons for not using cryptocurrencies in shopping.

Nearly half of crypto-consumers cannot find what they are looking for. The unavailability of specific stores, brands, and goods within the crypto-markets is the second-biggest barrier by a slight difference. This is likely explained by lack of understanding of the sector, more conservative marketing plans and company policies, or lack of technical know-how by businesses and stores. Since there are countless stores and products in numerous sectors, this problem looks insoluble, but it is not. Gift cards (and derivatives like vouchers, coupons, promo codes, etc.) are a solution to be provided for the underserved demand of crypto-consumers.

Price volatility appears again as a major limiting factor, as 40.1% of consumers do not want to lose money if the value of their cryptocurrency rises after they already spent it, and thus, they prefer to hold (i.e., hodl). This is usually unavoidable due to the nature of cryptocurrencies, but the opposite case may also happen. Nevertheless, about one-third do not see cryptocurrency as a means for shopping but merely tools for investment. Apart from the price volatility, cryptocurrency owners' price expectations regarding the future may lead them to hold in the long positions. 40.7% of crypto-consumers avoid crypto-shopping when there is another viable option due to the long delays on order confirmations. Hence, widespread adoption of Lightning Network will also boost crypto-shopping statistics. 38.3% report that the expensiveness of products in crypto-markets make them abstain from crypto-shopping to some extent, while privacy and trust concerns are apparently less demotivating when compared to the aforementioned.

As documented in Figure 45, crypto-consumers have stated that they would do crypto-shopping more often if some existing issues were addressed. Apart from stating the obvious (i.e., faster and cheaper shopping), crypto-consumers want to learn more about the existing crypto-shopping possibilities and want to access more stores or products (especially to well-known and trusted brands), as more than 60% reported. There is also a great demand for privacy-coins (e.g., Monero, etc., by 48%), stablecoins (e.g., USDT, USDC, BUSD, etc., by 51.4%), and the Lightning Network (51%). If the cryptostores and associated businesses can satisfy these demands on time, the growth in the crypto-markets may gear up.



"More than half of crypto-consumers would likely shop more if the stores accepted privacy-coins and stablecoins as well."

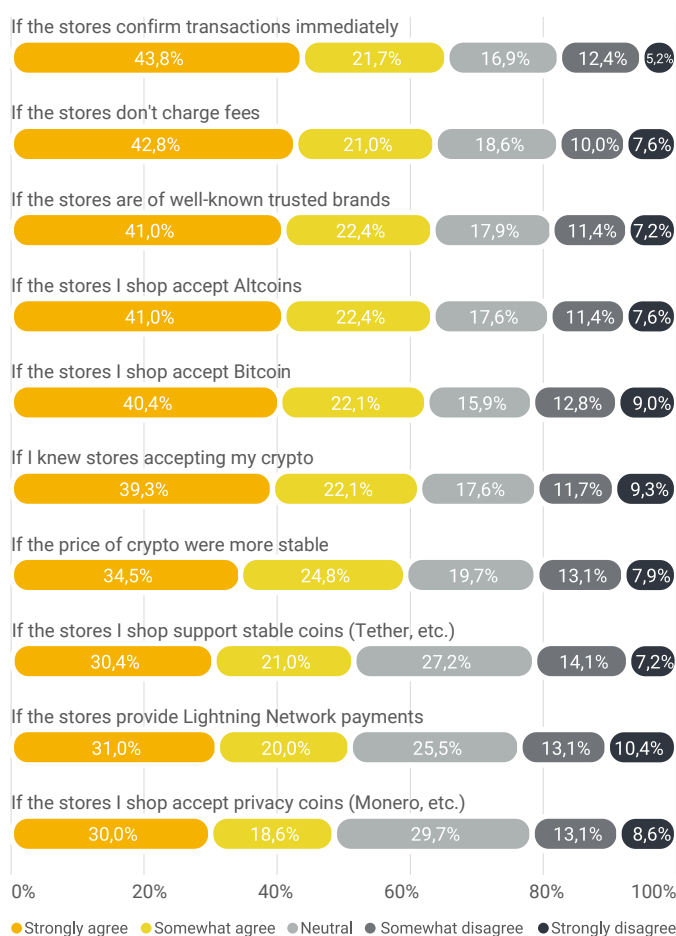


Figure 45: I would likely to shop more...

8. CONCLUSION

As a concluding result of our comprehensive research, we have come up with a number of concise theories regarding the current and future use of cryptocurrencies for shopping and payments.

8.1 Bridging Markets

Our research reveals the universal demand for the possibility of buying goods and services by paying in cryptocurrencies. However, the availability of stores, brands, products, and services in the crypto-markets is far from being sufficient. There may be different reasons for that, including but not limited to restricting legal regulations, branding decisions, exclusive business plans, lack of sources or vision, etc. These may prevent the desired stores or products from existing in the crypto-markets. This is precisely where gift cards, vouchers, and coupons come in handy since most stores and e-commerce platforms already issue one or another.

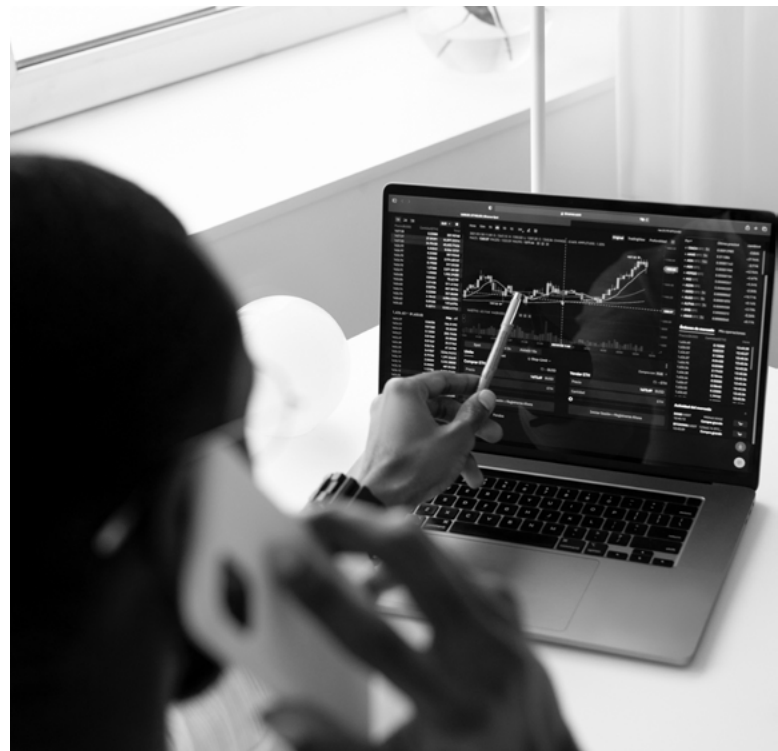
Intermediary companies that sell fiat-valued gift cards (etc.) that the contracted stores issue in exchange for a quasi-equivalent amount of crypto-money are playing a significant role in bridging the conventional online markets with the crypto-markets. In this way, the crypto-consumers find the opportunity to shop at their favorite online stores even though they do not directly accept payments in cryptocurrencies. As 40% of crypto-consumers already rely on indirect payments via gift cards, this is clearly a key enabler of the cryptoshopping concept. Such methods may occasionally come at a cost (e.g., commissions), yet they create a win-win condition for everyone. The unavailability of a crypto-payments option for most renowned brands and stores likely explains why crypto-consumers consolidate their crypto-shopping activities at one-stop shops (such as CryptoRefills) that can satisfy a variety of the customers' needs via gift cards.



8.2 Financial Inclusion

There are crypto-consumers from all around the globe and from a wide variety of socioeconomic backgrounds. However, there are also some easily discernible patterns. The financial inclusion theory suggests that many unbanked or underbanked people, or people with limited access to online banking systems, predominantly from less-developed countries (e.g., in Sub-Saharan Africa, etc.), keep their (usually personal or small-scale) businesses up and running by accepting crypto-payments. Therefore, it makes perfect sense for them to be able to do shopping with crypto-money. As these people constitute about one-fifth of all crypto-consumers, apparently, crypto-shopping is a matter of survival for many.

For a majority of crypto-shoppers, the cryptocurrencies are already a part of a circular economic process, where it is in some way earned (by performing small tasks online, digital freelancing, etc.), and then spent in the form of crypto-shopping. This means, for certain unbanked or underbanked people, cryptocurrency is perhaps their only chance to participate in the digital economy, both on the demand and the offer sides.



8.3 A Better Way of Payments

Okay, this may sound a bit too pretentious. But, technological advances force numerous permanent changes in the shopping habits of consumers. Like online banking, credit cards, and digital money, cryptocurrencies are also becoming an integral part of the modern economy and finance. Of course, we do not foresee a complete replacement of conventional money in either the short or medium terms. However, cryptocurrencies already have their own rewarding use cases and will increasingly be more common within the near future, as more than 70% of crypto-consumers are reportedly agreeing with that. Our research shows that cryptocurrency owners see them as both a means for investments and a means for payments. Moreover, using cryptocurrencies address some specific needs that cannot be better addressed by conventional

alternatives. We definitely cannot say today if any of today's promising technologies, such as Lightning Network, are here to stay long or if it is "overhyped" already, or which technologies and currencies will emerge as clear leaders in the consumer shopping payments domain. From our data, it seems that the top currencies by market cap and the stablecoins have the biggest chances of succeeding, provided that they can offer easy, scalable, and cost-efficient solutions to both consumers and businesses. Such scalable solutions may pass through other blockchain networks, sidechains, and scalability networks, as long as they are found feasible and usable by both merchants and consumers. The liquidity will also play a role, likely driving the shopper consolidation around such solutions.

9. METHODOLOGY

This Consumer Analytics Report is a result of various academic and theoretic research approaches, as well as some best practices in qualitative and quantitative market research methodologies. To avoid potential bias within the study outcomes, our research team is supported by independent researchers. Privacy of our users and the participants are of critical importance to maintain the trust of our users and our business. All data collected from the surveys were immediately anonymized using "aliases" and studied in aggregated forms. This publication has full compliance with the latest GDPR requirements.

9.1 Survey & Data Collection

The core of the report is based on a customized version of the Technology Acceptance Model 2 (TAM2), adapted from the work of Venkatesh and Davis [14]. The data is collected through a comprehensive questionnaire with more than 100 questions to be answered on a voluntary basis. By using the TAM2 model, we covered the experience of users regarding purchasing goods and services using blockchain-based currencies to a great extent. We specifically learned about numerous aspects related to the ease of use, usefulness, confidence, and social aspects related to the use of these currencies in shopping. The data collection phase of the survey took place from the start of July 2020 to the end of January 2021. The market-related data is up-to-date as of the end of February 2021. The data we collected is elaborated for validity through cross-check of key (e.g., contradictory) questions. Furthermore, in-depth verification of the insights obtained from the adapted TAM2 questionnaire is made by comparison to our aggregated user spending statistics. The study can be best described as a quantitative analysis with some qualitative aspects. In many of the questions, the participants were asked to define their agreement with some given statements using a 5-point Likert scale where the options are "strongly agree", "somewhat agree", "neutral", "somewhat disagree", and "strongly disagree". Occasionally these can also be interpreted as "yes", "somewhat", "neutral", "barely", and "no". The rest of the questionnaire includes multiple-choice questions, free-response questions, and multiple-choice questions with the possibility of manual entries.



9.2 Population & Sample Size

The entire population of the survey exclusively consists of the registered users of the CryptoRefills website (www.cryptorefills.com). The population presumably consists of crypto-consumers, who are (i) actively using cryptocurrencies in shopping, (ii) have quit using cryptocurrencies in shopping for a while for any reason, or (iii) never tried but are eager to use cryptocurrencies in shopping in the future. The overall population size (N) is confirmed to be 4405 unique individuals. Repeating entries are eliminated carefully. The number of participants, namely the sample size (i.e., the base) of the study, is 290 for all questions in the questionnaire. As a side note, the participants were allowed not to disclose their answers for only a few questions due to privacy concerns; even so, the base is not

lower than 150 for any of the survey questions.

The confidence interval is customarily chosen as 95%. The worst-case error margin (i.e., in a binary question with two options, where both options have a selection rate of 50%) is calculated as $\pm 5.56\%$. As this is a rare case, the mean error margin would be lower. For instance, for a binary question with selection rates 10% and 90%, the margin becomes $\pm 3.34\%$. This approach can be generalized to the multiple-choice questions since the option with the most votes can be compared to the rest of the answers. The standard error can be calculated separately for every question using the option selection rates and the sample size.

9.3 Criticism

Throughout this study, we have followed a scientific approach to increase precision and eliminate biases. But, there is still some discussion worth mentioning. First of all, the survey is conducted with people who are currently (active) crypto-consumers. Therefore, the survey's extent does not cover former crypto-consumers (i.e., people who quit crypto-shopping for whatever reason). So, it was not possible to discover their motivations. Second, the survey does not contain questions directly revealing the amount or volume of the crypto-money that the crypto-consumers earn, buy, own, or spend. Hence, there may be cases where quantities do not match the volumes in practice. Lastly, the survey was carried out online, on a voluntary basis, so the crypto-consumers who were eager to attend may be the ones who are less busy, or who are more helpful, or even who have higher exposure to the survey.



REFERENCES

- [1] United Nations International Organization for Migration. 2020. *"World Migration Report 2020"*. Geneva, Switzerland: International Organization for Migration. https://www.un.org/sites/un2.un.org/files/wmr_2020.pdf
- [2] The World Bank. 2021. *"World Bank Country And Lending Groups"*. Data. The World Bank Group. <https://datahelpdesk.worldbank.org/knowledgebase/articles/906519-world-bank-country-and-lending-groups>
- [3] United Nations Dept. of Economic and Social Affairs. 2019. *"World Population Prospects 2019"*. United Nations. <https://population.un.org/wpp/DataQuery/>
- [4] Statista Research Department. 2020. *"World Population By Age And Region 2020"*. Statista. <https://www.statista.com/statistics/265759/world-population-by-age-and-region/>
- [5] Verto Analytics. 2018. *"The E-Commerce Ecosystem: The State Of Cross-Device Digital Shopping"*. Helsinki, Finland: Verto Analytics Inc. <https://insights.vertoanalytics.com/the-e-commerce-ecosystem-the-state-of-cross-device-digital-shopping>
- [6] Akademetre. 2020. *"Kripto Para Bilinirlik ve Algi Arastirmasi"* (in Turkish). Paribu. <https://www.akademetre.com/Slider/PARIBU-AKADEMETRE-KRIPTO-PARA-BILINIRLIK-VE-ALGI-ARASTIRMASI.pdf>
- [7] UNESCO. Director-General, 2009-2017 (Bokova, I.G.). writer of foreword. *Cracking the Code: Girls' and Women's Education in Science, Technology, Engineering and Mathematics (STEM)*. Revised ed. Paris: UNESCO, 2017.
- [8] Our World in Data. 2016. *"Projection Of The World Population By Level Of Education"*. Global Change Data Lab. <https://ourworldindata.org/projection-of-the-world-population-by-level-of-education>
- [9] Buchholz, Katharina. 2021. *"Where People Are Self-Employed Around The World"*. Labor Market. Statista. <https://www.statista.com/chart/18908/self-employed-workers-by-country/>
- [10] Szmigiera, M. 2021. *"Worldwide Wealth Distribution By Net Worth Of Individuals 2019"*. Economy & Politics. Statista. <https://www.statista.com/statistics/203930/global-wealth-distribution-by-net-worth/>
- [11] de Best, Raynor. 2021. *"Market Capitalization Of Bitcoin From April 2013 To February 22, 2021"*. Finance & Insurance. Statista. <https://www.statista.com/statistics/377382/Bitcoin-market-capitalization/>
- [12] de Best, Raynor. 2021. *"Number Of Cryptocurrencies Worldwide From 2013 To 2021"*. Finance & Insurance. Statista. <https://www.statista.com/statistics/863917/number-crypto-coins-tokens/>
- [13] CoinMarketCap. 2021 *"All Cryptocurrencies"*. <https://coinmarketcap.com/all/views/all/> Accessed: 26 March 2021.
- [14] Venkatesh, Viswanath, and Fred D. Davis. 2000. *"A Theoretical Extension Of The Technology Acceptance Model: Four Longitudinal Field Studies"*. Management Science 46 (2): 186-204. doi:10.1287/mnsc.46.2.186.11926.

About The Authors

Umut Can Çabuk is a researcher at Ege University. He received his B.Sc. degree in electronical engineering from Uludag University (Bursa, Turkey) in 2012 and his M.Sc. degree in information technology engineering from Aarhus University (Aarhus, Denmark) in 2015. He is currently conducting his Ph.D. thesis studies at the International Computer Institute of Ege University (Izmir, Turkey), where he also works as a research assistant. Umut's research interests include blockchain technologies, mobile and wireless networks, the Internet of things, computer security, and graph theory. He has co-authored over 30 scholarly publications and issued three patent applications.

Massimiliano Silenzi is the CEO and co-founder of CryptoRefills. He is an entrepreneur and executive with 20 years of international experience in web, mobile and financial technologies. He is passionate about new payment technologies and their impact on commerce and society. He built his career on this passion, starting in the telco sector in TIM, following different country and regional director positions in mobile commerce businesses in Europe and MENA. He served as CEO in Onebip (mobile payments) between 2011 and 2015 and, as of 2016, is an entrepreneur in the telco, payments, and blockchain space. Massimiliano earned his Ph.D. in business and finance from the University "La Sapienza" in Rome with a thesis on mobile payments. He also holds an M.A. in marketing management from the University "La Sapienza" and a B.A. in international business administration from the University of Nottingham Trent.

About Cryptorefills

CryptoRefills, incorporated as Big Dream Ventures BV, is a fast-growing fintech company headquartered in Amsterdam. CryptoRefills (www.cryptorefills.com) today is one of the world's leading cryptocommerce platforms and brands, offering users in over 235 countries and territories the possibility to use their Bitcoin and crypto to make everyday purchases.

With CryptoRefills, users use various cryptocurrencies to top up their phone credits across 600 Mobile Operators, pay their utility bills, subscribe to their favorite entertainment services, make purchases from top e-commerce brands and even shop at retail stores.

As the first company in the world to launch Ethereum layer-2 payments for e-commerce (via Polygon Matic) and to create a direct bridge between DeFi and real-world goods and services (via Avalanche), CryptoRefills is leading innovation in applied decentralized payments and developing new technologies for the gift card industry.

Download Our Apps



Acknowledgements

The Authors would like to offer special thanks to Mats Veenman (Marketing Manager at CryptoRefills), Simonluca Landi (CTO at CryptoRefills), Demelza Hays (Research Director at Cointelegraph) for all the effort provided.

The authors would also like to thank Meryem Matur for the design and layout of this report, Linda Carol Boren for the editing support, Gabriele Pippo (Holland Fintech) for the Association's partnership, and Margherita Lanza de Cristoforis (Holland Fintech) for the Amsterdam Fintech Week 2021 session where the results of this research were first presented.

Research Partners and Sponsors



Media Partner



LICENSE

This Report is offered under Creative Commons License: Attribution-NonCommercial-NoDerivs CC BY-NC-ND. "If you need a commercial license or if you are not sure that you need one, please contact us!"



DISCLAIMER

This publication contains general information only and Big Dream Ventures BV (the company that operates and owns CryptoRefills) is not, by means of this publication, rendering accounting, business, financial, investment, legal, tax, or other professional advice or services. This publication is not a substitute for such professional advice or services, nor should it be used as a basis for any decision or action that may affect your business. Big Dream Ventures BV cannot guarantee the accuracy of the data included in this study. Before making any decision or taking any action that may affect you or your business, you should consult a qualified professional advisor. Big Dream Ventures BV and the authors of this publication shall not be responsible for any loss sustained by any person or organization who relies on this publication. The information and views set out in this publication are those of the authors only. Sponsors, Research Partners and other Third Parties or companies mentioned in this publication have no say in the findings of this study and as such this research does not in any way necessarily reflect their point of view.

All product and company names, as well as their logos and other graphical features, are properties, trademarks™ or registered® trademarks of their respective holders. Use of them does not imply any affiliation with or endorsement by them.

Contacts



CryptoRefills Labs and Research partnerships:

<https://labs.cryptorefills.com/#contact>



Questions about this report or to purchase a commercial license:

<https://labs.cryptorefills.com/#contact>



Business partnerships and product distribution:

biz.dev@cryptorefills.com



Corporate development / M&A:

corp.dev@cryptorefills.com



Media & Press:

media@cryptorefills.com



Website:

labs.cryptorefills.com



Cryptorefills by

Big Dream Ventures BV

Keizersgracht 482, 1017 EG,
Amsterdam, NL