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# Impact of Personality Traits (BFI-2-XS) on Use of Cryptocurrencies

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**Abstract.** Cryptocurrencies are around for less than a decade but their usage steadily increases. There is no doubt that functional, social (cool-factor) and financial (high risk – high reward investment) motives drive its adoption and usage. But it is also worth to investigate whether personality and demographics can play some role in the adoption. The research have focused on impact of personality traits (according to the Big Five Inventory framework) on the usage of cryptocurrencies. The research was conducted in the Czech Republic. Respondents were university students, 478 in total (272 male, 206 female; 20.5 years old on average), of whom 62 respondents indicated that they use cryptocurrencies. Gender, age, and type of student job were used as control variables. With regards to the results, openness to experience, gender, and type of student job influence the adoption. Subjects more open to experience, male, and working full time in the field they study use cryptocurrencies more.

**Keywords:** Personality Traits, Cryptocurrencies, Adoption.

## 1 Introduction

Digital currency, a means of exchange used in on-line environment, is wider than just credit card number used for on-line shopping. The digital currency includes virtual currencies and cryptocurrencies. Because it is a relatively new area, a universal definition that would define individual terms, and in particular their legal personality is very difficult. In 2012, the European Central Bank defined virtual currencies as the type of unregulated digital money that is emitted and usually driven by their developers and their use and acceptance is limited to members of a virtual one communities [3]. An example is the various types of "money" used in online games or other communities where the use of such currency is accepted.

The widely used are cryptocurrencies. By definition, this is a type of digital currency, which uses cryptography to secure transactions and to control the issuance of new units of currency. The common characteristic of cryptocurrencies are mainly its decentralization, which is in contrast to ordinary digital currencies that are centrally controlled by governments or other institutions, as well as normal physical money. Neither the production of units of the respective currency it is not within the

competence of one entity that could influence the price of the currency in this way, as is the case with central bank interventions. In contrast, currency issuance occurs collectively the entire system of the given cryptographic and the rate of issuance of new currency units is defined with the origin of the system and is publicly known. Generally, new coins are created so that their amount decreases over time to the point where they are the circulation of the whole, pre-programmed and publicly known number of coins.

Another feature of cryptocurrencies is their transparency. This is due to the use of public a database called a blockchain. This database records all transactions on the network and the database itself serves as a public accounting book that is under constant public control and in combination with cryptography makes it possible to prevent unauthorized users transactions. Thanks to the blockchain, each user has the ability to view anytime the transaction that took place in the network, and at the same time determine the amount of digital currency to what address. In practice, the technology works like any computer connected to a distributed node network, it has a copy of the blockchain that synchronizes with its copies users and each new transaction that users make is recorded in the string of previous transactions, respectively. a series of transactions creates a so-called block that is then grouped into a string of blocks. Such entry can no longer be changed because of the individual blocks in the string refer to the previous block, and it is also necessary to change the data in the previous blocks.

There are currently more than 1620 different cryptocurrencies with open source codes and everyone can create their own currency with specific parameters, 21 of them exceed the market capitalization of over a billion dollars [2]. The most famous, the most widespread and the oldest decentralized cryptocurrency is Bitcoin, however its main weakness for becoming a really global payment system is its low transaction throughput. Currently, there are some new ideas how to increase the transaction throughput, with different scalability of the system, and new generation of cryptocurrencies have emerged.

## **2 Usage of Cryptocurrencies**

Anonymity is the main characteristics which makes cryptocurrencies popular around the world [8]. Due to the illicit usage of Bitcoins, the degree of anonymity was reduced although its users are still using anonymizers like TOR to keep the anonymity stronger when they connect to the Bitcoin network. The forensic tools could be used to follow the web browser activities, cookies, local drive, hard disk image, downloads and session data related to Bitcoins. The attacker can identify the transaction of the specific users and by even delaying the transactions can control the Bitcoin block. Herrera-Joancomarti and Perez-Sola [5] proposed some scalability solutions for the Bitcoin network and outlined its influence on users' privacy.

Grigaliune et al. presented the analysis of Bitcoin usage opportunities in international settlements, focusing on imperfections of the legal framework that create the barriers to treat cryptocurrency as an alternative to fiat currencies that are employed for settlements all over the world [4]. Germany can be treated as the country, most advanced in the area of Bitcoin usage regulation: meanwhile Russia and China treat

Bitcoin as a criminal currency with poor measures of consumer protection. Grigaliune conclude, that Bitcoin can be treated only as an alternative to traditional measures of settlement, but not as a substitute to them [4].

Other trouble is that cryptocurrencies experience surges in interest and also in price and are vulnerable to experiencing intervals of bubble-like price behavior. Phillips and Gorse confirmed mid-term positive relationships between online factors and price strengthen significantly during bubble-like regimes of the price series and found out that short-term relationships between the chosen factors and price appear to be caused by particular market events (such as hacks / security breaches) and are not consistent from one time interval to another in the effect of the factor [9].

Interesting meta-analysis across many disciplines: technical fields, economics, law, public policy, finance, accounting, and others have been done by Holub and Johnson – providing an review of the current state of the body of literature categorizing 13,507 results and 1,206 papers on Bitcoin across six disciplines [6].

As other network-related technologies, also cryptocurrencies seem to follow Metcalfe's Law, as has been shown for some online social media networks. The Bitcoin, Ethereum, and Dash networks were investigated, proving that value grew in proportion to the square of the number of its nodes, or end users (here number of unique addresses each day that engage in transactions on the network used as proxy). Alabi [1] also determined critical mass and potential for spotting value bubbles that can be identified as deviations in value from the model. Phillips and Gorse [10] also aimed to predict such bubbles using a hidden Markov model for a number of cryptocurrencies.

Generally, implementation of cryptocurrencies can hit a number of barriers. Until today, the cryptocurrency has not surpassed the stage of being just a trendy geek tool, not widely used by general public. Similar psychological aspects and barriers be identified also in other new technology industries [12] and their solution can be addressed through CATWOE analysis [16].

Piotrowska and Piotrowski [11] investigate the main weaknesses limiting the functioning of the bitcoin system, and its use in payments in particular in a survey conducted among Polish bitcoin users. They identified these threats: the speculative nature of bitcoin, the lack of adequate awareness in society which would allow for a widespread use of the innovation, potentially too strict regulation of the cryptocurrencies market or its banning.

Piotrowska and Piotrowski [11] also presented threats to the functioning of the system which, in their opinion, are of biggest importance at the moment: the existence of intermediaries, the lack of systemic incentives addressed to bitcoin merchants, growing costs and payment processing time.

Shehhi [13] investigated factors behind choosing a cryptocurrency, which is to some extent similar to our research, but our sample is much bigger and our analysis includes also personal traits and we have used multivariate and not bivariate testing.

However, there is a lack of literature focused on users of cryptocurrencies, especially on their psychological profile or personality traits – and that is, what our paper aims to deal with.

### 3 Data and Methodology

With regards to data, they were collected using a web-based questionnaire in the period from December 2017 to March 2018. Respondents were university students from the Czech Republic, 478 in total (272 male, 206 female; 20.5 years old on average), of whom 62 respondents indicated that they use cryptocurrencies. With regards to their experience from practice, 12 have a full time within the field of study, 16 have a full time outside the field of study, 164 have a part-time job, 176 have a temporary job (brigade), and 106 only study.

Personality traits were evaluated according to John and Soto's Big Five Inventory-2 [15] using Czech translation by Hřebíčková et al. [7]. For this conference paper, only BFI-2-XS [14], i.e. a 15-item version of the instrument was used. The instrument uses a 1-5 Likert scale where 1 stands for strongly disagree and 5 stands for strongly agree.

The explanatory variable was obtained using the question "Do you use the following services? Cryptocurrency (Bitcoin, ...)" Possible answers were:

- No (coded as 0),
- Yes, sometimes (coded as 1),
- Yes, often (coded as 1).

Also additional questions were included in the questionnaire but they have not been analysed in this paper.

Binomial logistic regression will be used to test influence of gender, age, job type and five personality traits on use of cryptocurrencies. A multivariate approach was used. To be more specific, the ordinal logistic regression procedure in SPSS was used for the calculation because of its front-end that allows to enter also factors (discrete independent variables, such gender and job type), not only covariates (continuous independent variables) like the binomial logistic regression procedure in SPSS.

### 4 Results

The research question is if/what five personality traits influence propensity to use cryptocurrencies, while controlling for age, gender, and job type. Ordinal logistic regression estimates for the full model are in Table 1. The model per se is significant,  $p$ -value  $< .001$ , Cox and Snell pseudo  $R^2$  is .073, Nagelkerke pseudo  $R^2$  is .136, and McFadden pseudo  $R^2$  is .099.

**Table 1.** Ordinal regression for the full model.

	Estimate	Std. Error	Wald	df	Sig.
Cryptocurrency use = 0	2.035	1.953	1.086	1	.297
Extraversion	.283	.192	2.166	1	.141
Agreeableness	-.205	.200	1.048	1	.306
Conscientiousness	-.259	.222	1.371	1	.242

Neuroticism	.068	.166	.171	1	.680
Openness to experience	.426	.197	4.704	1	.030
Age	-.029	.059	.239	1	.625
Job type = part-time job	-1.047	.654	2.567	1	.109
Job type = only study	-1.402	.707	3.934	1	.047
Job type = temporary job	-1.469	.670	4.810	1	.028
Job type = full time outside the field of study	-1.247	.910	1.878	1	.171
Job type = full time within the field of study	0 <sup>a</sup>	.	.	0	.
Gender = male	1.286	.359	12.799	1	.000
Gender = female	0 <sup>a</sup>	.	.	0	.

Legend: a. This parameter is set to zero because it is redundant.

Considering all variables, openness to experience, job type, and gender are significant at .05 level. Ordinal logistic regression estimates for the streamlined model are in Table 2.

**Table 2.** Ordinal logistic regression estimates for the streamlined model.

	Estimate	Std. Error	Wald	df	Sig.
Cryptocurrency use = 0	3.036	1.002	9.177	1	.002
Openness to experience	.451	.192	5.541	1	.019
Job type = part-time job	-1.144	.648	3.117	1	.077
Job type = only study	-1.457	.685	4.524	1	.033
Job type = temporary job	-1.591	.663	5.761	1	.016
Job type = full time outside the field of study	-1.267	.892	2.016	1	.156
Job type = full time within the field of study	0 <sup>a</sup>	.	.	0	.
Gender = male	1.300	.343	14.408	1	.000
Gender = female	0 <sup>a</sup>	.	.	0	.

Legend: a. This parameter is set to zero because it is redundant.

The streamlined model per se is significant,  $p$ -value < .001, Cox and Snell pseudo  $R^2$  is .063, Nagelkerke pseudo  $R^2$  is .118, and McFadden pseudo  $R^2$  is .085. Openness to experience positively influences propensity to use cryptocurrencies, so does being a man, and having a full time job within the field of study.

## 5 Conclusions

The goal of this conference paper was to analyze influence of personality traits and demographics on usage of cryptocurrencies. This new technology has so far not been

explored in terms of user motivation and we have (rightly) considered that personality traits and demographics could be a very interesting explanatory variable.

With regards to the results, openness to experience, gender, and job type impact the use. Openness to experience has a positive influence, being male has a positive influence and having a full-time job within the field of study has a positive influence.

It makes sense that people who are more open to new things would use cryptocurrencies more. As a new technology, it is clearly interesting for “early adopters”, since it demonstrates their open mind and technological skills. Cryptocurrencies are following the same path towards mass adoption as other technologies (mobile phones, social media, internet), which have been also firstly adopted by geeks.

When it comes to technology use, in majority studies where gender is significant, it is men adopting it more, which confirm also our results. And the last finding can be interpreted as people with more money adopt cryptocurrencies more. Easy explanation can be, that cryptocurrencies are considered by many as interesting (though due to high volatility quite risky) investment tool, so people with regular income could be more interested in them.

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