

Greek consumers and the use of Bitcoin

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Keywords

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Abstract

Bitcoin the online virtual currency relies on a combination of cryptographic protection and a peer-to-peer protocol for witnessing settlements. Although the Bitcoin was first deployed in 2009, it has a market capitalization of 2,588,095,493 USD in January 2015. In spite of this burgeoning usage, research on users' attitudes towards Bitcoin is very limited. The paper aims to fill this gap by investigating consumers' attitudes towards online payments and adoption of Bitcoin in Greece. Greece is among the countries with the lowest internet usage in the EU. An empirical study was conducted via an online survey tool. Internet users have been chosen to be surveyed as non-users haven't favorable attitudes towards the use of Bitcoin. Findings indicate that there is a small group of active users that trust Bitcoin and use it as a payment method and for investments. However the majority of the responders stand rather 'defensive'. Bitcoin basic operations and regularities along with possible benefits should be communicated to potential users in order to increase awareness and adoption levels.

1. Introduction

Bitcoins are alternative currencies that went live on the web in 2009. They are digital coins that are not issued by any central bank, government, or organization (Ron & Shamir, 2013). This distributed electronic cash system, designed and developed by Satoshi Nakamoto, relies on cryptographic protocols and a network of users who mint, exchange, store, and transfer Bitcoins (Barber et al., 2012; Nakamoto, 2008). All transactions are publicly accessible in an anonymous way (Ron & Shamir, 2013).

Use of Bitcoins is a smart way to make payments on the Internet. A Bitcoin owner may have a 'wallet file' or may use a service of 'wallet' belonging to a third party in order to store Bitcoins. Bitcoins can be sent via the Internet to anyone with a Bitcoin address (Rogojanu & Badea, 2014), thus the whole system is peer-to-peer and Bitcoin users transact directly without the need an intermediary.

The value of a Bitcoin fluctuates greatly, from 0.00076\$ in the early days of its existence to \$1242 at the peak on November 2013 (Bitcoinhelp, 2014). However, Bitcoin economy is larger than the economies of some of the world's smaller nations (Brito & Castillo, 2013) and on 14/1/2015 has a market capitalization of 2,588,095,493 USD (Bitcoinwatch, 2015).

Bitcoin has spread quite quickly, have attracted a large number of users and a lot of media attention. Nowadays it is recognized and carrying out transactions in many different countries (Babaioff et al., 2012; Ron & Shamir, 2013; Rogojanu & Badea, 2014). However Bitcoin awareness is still low. Lomas (2013) wrote characteristically: 'if you're the average man on the street, it's probably something you've never heard of'. Greece is among the countries with the lowest internet usage in the EU (European Commission, 2013). So, what does Greek consumer thinks about Bitcoin right now? Thus, the paper aims at investigating Greek consumers' Bitcoin awareness, use and levels of trust.

Bitcoin adoption

Bitcoin is appealing, primary for the lower transaction fees compared to credit cards and its use in cross-border transactions. However, the currency's volatility has slowed broader acceptance (Chavez-Dreyfuss & Connor, 2014). Silbert, the founder of the Bitcoin Investment Trust, claims that Bitcoin adoption follows five general phases:

- The experimentation Phase (2009–2010): No real value associated with Bitcoin. Hackers and developers playing around with the source code. Experimenting with Bitcoin as a medium of exchange.
- The Early Adopters Phase (2011–2013): Interest from investors and entrepreneurs started to grow with substantial press coverage in the wake of the Silk Road bust. First generation of Bitcoin-related companies (exchanges, merchant processors, wallet providers, etc.) started. Potential began to shine through poor management.
- The Venture Capital Phase (2013–Present): World-class VCs started investing in Bitcoin companies and rapid ramp-up is already outpacing the early days of the Internet. VCs poured more than \$90 million into Bitcoin-related businesses in 2013 and more than \$300 million in 2014 (compared to \$250 million invested in Internet-related businesses in 1995).
- Wall Street Phase (2015?): Institutional investors, banks, and broker-dealers begin moving money into Bitcoin. Rising price and volume (in addition to development of derivatives) become the catalyst for mass adoption as retail investment follows.
- The Global Consumer Adoption Phase (?) Only happens if (i) companies continue to innovate and make it easier for consumers to buy, hold, and spend Bitcoin, (ii) volume expands dramatically so that large merchants can start accepting payment in Bitcoin, and (iii) Bitcoin awareness continues to rise with these developments (Maudlin, 2014).

The Diffusion of Innovations (DOI) theory was developed in order to explain how an innovation diffuses through a society (Rogers, 1995). 'An innovation is an idea, practice, or a phenomenon perceived to be novel by an individual or a community' (Singh, 2008, p.1227) and diffusion is defined 'as the process by which an innovation is communicated through certain channels over time among the members of a social system' (Rogers, 1995, p.10). Bitcoin is an innovation in payment systems. Thus Diffusion of Innovation Theory (Rogers, 1995) has been used in order to investigate adoption of Bitcoin. Rogers (1995) adopted classification of individuals within a social system on the basis of innovativeness initially proposed by Ryan & Gross (1943). The adoption of an innovation follows an S curve when plotted over a length of time (Fisher, 1971). The categories of adopters are: innovators, early adopters, early majority, late majority and laggards. Innovators are willing to take risks. Early adopters are the gatekeepers and opinion leaders who exist within a given community, and time of adoption is greater than one standard deviation earlier than the average time of adoption. Early and late majorities are individuals whose time of adoption is bounded by one standard deviation earlier or later than the average. And finally laggards, that adopt last an innovation (Rogers, 1995; Valente, 1996). According to Guttman (2013) we are now at the beginning of the adoption lifecycle where everyone who is using Bitcoin is an Innovator. Later on Diginomics (2014) mentioned that '*the trend – as of 2014 – seems to lie somewhere at the midway point of early adoption*'. Byrne (2014) based on Gladwell (2000) theory argued that the Bitcoin innovation is fast approaching the point at which an innovation reaches a '*critical mass – where beyond a certain point in time, mass adoption of an innovation occurs*'.

Bitcoin consultant and activist Andreas Antonopoulos claims that there are three pillars of mainstream adoption that are currently being built in the Bitcoin space: User interfaces, user adoption and price stability.

- User interfaces: have to be simple for the user. Bitcoin wallets in general have become more user friendly over the years, but it's important for these wallet developers to also keep security as a priority.
- User adoption: As more people join the Bitcoin network, the currency on that network becomes exponentially more useful. Bitcoin can only be a currency if people are willing to accept it as payment.
- Price stability: Once there are hundreds of millions – or billions – of Bitcoin users, price stability becomes a more practical proposition. It is difficult for Bitcoin to maintain a stable price level when there aren't many users because it doesn't take much money to move the price in one direction or another on an exchange. A stable price would also lead to more users joining the network, which would in turn lead to better user interfaces for everyone to use (Torpey, 2014).

Silinskyte (2014) used Unified Theory of Acceptance and Use of Technology (UTAUT) model in order to investigate Bitcoin user behavior. An empirical study took place and 111 responses were collected from Bitcoin users and non-users via an online survey tool. The results indicate that the factors significantly influencing the behavioral intention to use Bitcoin include performance expectancy and effort expectancy. Furthermore, actual usage of Bitcoin is affected by facilitating conditions and behavioral intention.

A consumer survey in U.S.A, U.K and Argentina that took place in 2013 and investigated Bitcoin awareness revealed that in U.S. just over a quarter (25.3%) of the responders have heard of the crypto currency. The U.S.A is lagging the other two countries, Argentina and the U.K. In those nations, Bitcoin awareness is apparently in the region of a third, with 37.9% and 32.2% respectively. Regarding trust to Bitcoin, U.S.A consumers also lag Argentineans and British Bitcoin users, but trust levels are still apparently running high among U.S.A Bitcoin-aware. The survey found 62% of U.S.A consumers who are Bitcoin-aware said they trust the currency, vs 73% of Bitcoin-aware Argentineans' and 69% of Bitcoin-aware British'. Greater awareness of Bitcoin appears to help foster greater levels of trust (Lomas, 2013).

As far as the profile of the 'average Bitcoin user' in concerned Simulacrum (2013) based on 1,000 valid responses to an online survey posted in February 2013, the Bitcoin community claimed that average Bitcoin user is male (95.2%), 32.1 years old, libertarian / anarcho-capitalist (44.3%), non-religious (61.8%), with a full time job (44.7%), and is in a relationship (55.6%).

2. Methodology

An empirical research study was conducted using an online survey. A link to Facebook profiles of the researchers notified users about the online questionnaire website. Users willing to participate visited a tailor made website and responded to the questionnaire. Internet users have been chosen to be surveyed as non-users haven't favourable attitudes towards the use of Bitcoin. The research was conducted from 14/4/2014 to 14/6/2014. Finally 130 completed and usable questionnaires were recorded.

The questionnaire used in the study consists of three sections. The first section investigates use of Internet, the second preferences of financial transactions and attitudes towards Bitcoin and the third demographic characteristics. Five point Likert scales were used, ranging from strongly disagree to strongly agree. A jury of 12 experts (stakeholders of Technological Education Institute of Central Macedonia) was surveyed to determine face and content validity of the proposed questionnaire (Dimitriadis et al., 2013). Then a pilot study with 15 Internet users was conducted to pretest the questionnaire. Weaknesses of the questionnaire were located and some of the questions were re-phrased.

3. Findings

a) The sample

From the 130 respondents 63.1% were male and 36.9% female. The age groups responded more and completed the questionnaire are those considered more productive, 36-40 with a percentage of 21.6% and 31-45 with a percentage of 19.2%. Young respondents from 19 to 24 and 25-30 participated in a percentage 14.4% and 11.2% respectively despite the fact that they are more techno-savvy. Ages 52 and over participated only in a percentage 10.77%.

One out of four of the responders hold a bachelor degree and a significant proportion of responders have undertaken studies beyond the basic degree. Specifically, 6.9% of respondents hold a Ph.d degree and 20% a master degree.

		Frequency	Percent %
Gender	Male	82	63.1%
	Female	48	39.7%
Age	19-24	18	13.85%
	25-30	14	10.77%
	31-35	20	15.38%
	36-40	27	20.77%
	41-45	24	18.46%
	46-50	13	10.00%
	51-55	9	6.92%
	>55	5	3.85%
Higher Level of education	Ph.d	9	6.92%
	Master	26	20.00%
	Bachelor	54	41.54%
	Post Secondary Education	24	18.46%
	Secondary Education	17	13.08%

Table 1: Sample breakdown

b) Internet use

The sample consists of users that surf enough time at the Internet. Nearly half of the responders (49.3%) surf one to three hours a day, while a cumulative percentage 40.77% at least 3 hours/day (24.62% 3-5 hours and 16.15% more than 5 hours a day).

A multiple choice question was used in order to investigate reasons for internet use. The majority, 86.15%, of the responders use it as a medium to communicate with other people and to connect through social media (79.23%). Playing games, shopping and information retrieval follow with 64.62%, 57.69% and 53.85% respectively. Nearly 45% of the responders mentioned that they use it for online education and for their job.

From the responders who use the internet for shopping more than half (56.98%) use it on an average 2-3 times a year to buy goods or services. A percentage of 31.4% use it on average once a month and only 11.63% are likely to shop weekly.

c) Payments on the internet

In regards to payment, 39.29% of responders who purchased goods or services prefer to pay with PayPal. PayPal is one of the world's largest internet payment companies processing almost 10 million payments for customers per day. PayPal has 157 million active digital wallets and is available in 203 markets (PayPal, 2014). Thus responders seem that they feel safe making payments with PayPal. Nearly one out of four of the responders prefer to use a credit card for payments. Bitcoin or other digital coins are preferred by 9.82% of the sample as payment methods and only 8.04% prefer online banking for making payments. In Greece 1.5 million people use online banking in other words a percentage of 13% of the population (Tzortzi, 2014).

Consumers' responses in the survey regarding satisfaction with payment methods are depicted in Figure 1 using diverging stacked bar charts (Robbins & Heiberger, 2011). The percentages of responders who have positive opinion about the payment method (4 and 5 in Likert scale) are shown to the right of the vertical line which corresponds to zero since the percentages of responders who have negative opinion (1 and 2 in Likert scale) are shown to the left. The function Likert of the *HH* package for *R* (Heiberger, 2013) was used in order to implement Figure 1. From the figure it is obvious that responders are very satisfied with payments made with PayPal, and have rather low satisfaction with all the other payment methods. As far as payments with Bitcoin is concerned 15.96% have positive opinion as 4.26% and 11.70% answered that they are 'very' and 'extremely' satisfied.

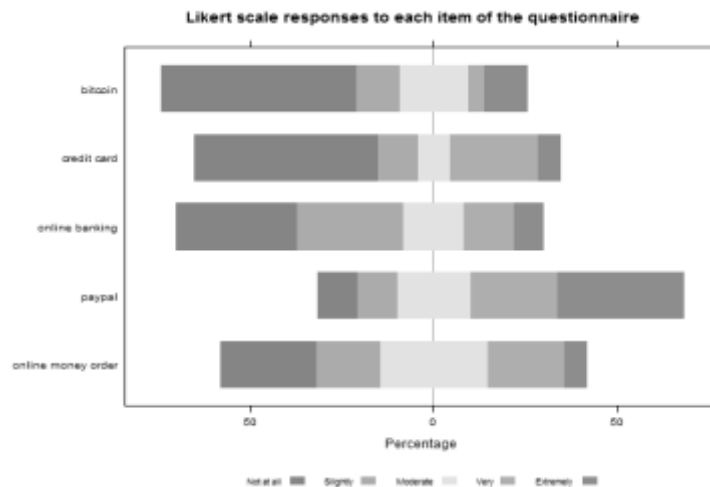


Figure 1. Percentage of consumer' responses to each item of satisfaction with payment methods

d) Bitcoin Awareness and Use

Bitcoin payment system was invented in 2008 and introduced as open-source software in 2009. Nowadays responders in the survey know what Bitcoin is at a percentage of 67.69%. Half of them (35.38%) became aware last year and 20.77% of them up to two years ago. Only a percentage of 11.54% are aware more than two years. Despite the fact that more than six out of ten of the responders know Bitcoin only 17.05% have use it to make payments and 4.55% of them have use Bitcoin more than once. A percentage of 57.95% stated that they are thinking to use Bitcoin for payments in the future.

From the Bitcoin users the majority (72.22%) have a Bitcoin wallet and use it on their own computers, 22.22% have an online wallet and only a 5.56% have a mobile wallet.

A chi-square test was performed to investigate whether ownership of a Bitcoin wallet is related to level of education. The results show that there is a relationship between ownership of a Bitcoin wallet and level of education as $p=0.03 < 0.05$. Bitcoin users have a bachelor or master degree and mobile wallet users have a Ph.d degree. Then, one-Way ANOVA was used to

investigate whether there are significant differences in the mean scores on Bitcoin ownership and age ($p=0.00<0.05$). The actual difference in mean scores between groups was quite large. The effect size, calculated using eta squared, was 0.55 (Cohen, 1988).

Only a percentage of 5.62% of the responders use Bitcoin for investment and only 2.25% of them use it often. Taking into consideration that 13% of Americans would choose Bitcoin over gold for investment (Wile, 2014) and the fact the Greece lags behind U.S.A and other E.U countries in ICT literacy and Internet use then it can be claimed that this percentage is not so low.

'Risking money with an unknown, unregulated technology might seem mad. But that's exactly what the growing community of virtual currency Bitcoin users are doing' (The Guardian 2013). In the study, 47.73% of the responders expressed their moderate trust to Bitcoin as a payment method and 17.05% stated that they trust 'very' and 'extremely' Bitcoin. These responders are those who have already use Bitcoin to make payments. The rest of the responders seem to be cautious towards Bitcoin. One-Way ANOVA was used to investigate whether there are significant differences in the mean scores of trust and age ($p=0.01<0.05$). The actual difference in mean scores between groups was quite large. The effect size, calculated using eta squared, was 0.49 (Cohen, 1988). Slightly more negative attitude responders have towards trust to Bitcoin as investment. 17.05% stated that they trust 'very' and 'extremely' Bitcoin as an investment, 39.77% expressed their moderate trust and a cumulative percentage of 43.18% stated that they trust 'not at all' and 'slightly' Bitcoin for investment.

Regarding future of Bitcoins responders also keep a neutral position. One out of three believes that Bitcoin use will be spread at a moderate degree over the next five years. On the other hand a percentage of 22.99% believe that Bitcoin will have a wide spread. Then a chi-square test was performed to investigate whether attitude is related to level of education. As $p=0.02<0.05$ there is a relationship between attitude and level of education. Users that have a bachelor or master degree believe at widespread use of Bitcoin in the next five years.

4. Conclusions

Nowadays, Bitcoin is a trend. Predicting how this trend will evolve and how it will be adopted by users is not easy. Bitcoin and other digital currencies must reach a balance between convenience and compliance in order to be successful (BBVA, 2013). In this vein a number of questions arise, like: would people trust a currency that is backed by a private entity or an unknown developer? Would the average person hold a digital wallet? For the moment research on Bitcoin and especially on users' attitudes is limited. Thus, the paper aims at investigating consumer views' about Bitcoin in Greece. There is a group of active users of Bitcoin 17% to 20% of the responders who are using the Bitcoin as a payment method and for investments. This group of active users trusts Bitcoin. Another group of respondents, the largest one, ranging from 65% to 70% are not negative towards Bitcoin; however they hold a 'defensive' attitude. Perhaps due to the fact that information provided in Greece about Bitcoin is limited and also only a few companies in Greece have already adopted Bitcoin. Gender has no significant effect on users' beliefs and attitudes. Higher education level is related positively to Bitcoin ownership and age has a relation with trust on Bitcoin.

The success and future of Bitcoin are not clear. Greek consumers are not well informed, however they have not negative attitude towards Bitcoin, and rather they are skepticism. In order to adopt it, they should first understand basic Bitcoin operations and regularities related to its usage. Moreover usefulness of Bitcoin, possible benefits like saving time and money and easiness of use should be communicated to potential users.

References

- Babaioff, M., Dobzinski, S., Oren, S & Zohar, A., 2012. 'On Bitcoin and Red Balloons', *EC'12*, June 4–8, 2012, Valencia, Spain, pp. 56-73.
- Barber, S., Boyen, X., Shi, E., & Uzun, E., 2012. 'Bitter to Better –How to Make Bitcoin a Better Currency', in A.D. Keromytis (Ed.): *FC 2012, LNCS 7397*, pp. 399-414.
- BBVA, 2013, Bitcoin: A Chapter in Digital Currency Adoption. Available at: https://www.bbvaesearch.com/KETD/fbin/mult/130731_EconomicWatchEEUU_Bitcoin_tcm348-398292.pdf?ts=2082013 [7 January 2015]
- Bitcoinhelp, 2014. Bitcoin Price Chart with Historic Events. Available at: <https://Bitcoinhelp.net/know/more/price-chart-history> [13 December 2014]
- Bitcoinwatch, 2015. Economy, Available at: <http://www.Bitcoinwatch.com/> [Accessed 14 January 2015]
- Brito, J., & Castillo, A., 2013. Bitcoin: A Primer for Policymakers, Mercatus Center. George Mason University. Available at: http://mercatus.org/sites/default/files/Brito_BitcoinPrimer.pdf [Accessed 9 December 2014]
- Byrne, J., 2014. 'Diffusion of the Bitcoin Innovation', Working Paper. Available at: https://www.academia.edu/6131668/Diffusion_of_Innovations_Theory_and_Bitcoin [Accessed 16 January 2015]
- Chavez-Dreyfuss, E., & Connor, M., 2014. All the rage a year ago, Bitcoin sputters as adoption stalls, Available at: <http://www.reuters.com/article/2014/12/11/us-markets-Bitcoin-adoption-analysis-idUSKBN0JP2CZ20141211> [Accessed 12 January 2015]
- Cohen, J., 1988. *Statistical Power Analysis for the Behavioral Sciences*, Hillsdale: NJ Erlbaum.
- Diginomics, 2014. The staggering rate of Bitcoin adoption. Available at: <http://diginomics.com/the-staggering-rate-of-Bitcoin-adoption/> [Accessed 7 January 2015]
- Dimitriadis, S., Vrana. V., Dimitriou, S., Kalaitzis, V. & Drogalas, G., 2013. 'Investigating customer satisfaction and service quality in academic libraries: the case of Technological Educational Institute of Central Macedonia', *International Journal of Decision Sciences, Risk and Management*, 5(1), 48-66.
- European Commission, 2013. Greece: Internet usage and digital skills. Digital Agenda Scoreboard2013. Available at: https://ec.europa.eu/digital-agenda/sites/digitalagenda/files/EL%20internet%20use_0.pdf [Accessed 6 April 2014]
- Fisher, J.C., 1971. 'A simple substitution model of technological change', *Technological Forecasting and Social Change*, 3, 75-88.
- Gladwell, M., 2000. *The Tipping Point*. New York: Little Brown & Co.
- Guttman, B., 2013. 'Editorial', in B Guttman (ed). *The Bitcoin bible. The Gold edition, All you need to know about Bitcoins and more. BoD – Books on Demand*, pp. 6-10.
- Heiberger, R.M., 2013. HH: Statistical Analysis and Data Display: Heiberger and Holland. R package version 2.3-37. Available at: <http://CRAN.R-project.org/package=HH> [Accessed 9 December 2014]
- Lomas, N., 2013. Survey: Quarter Of US Consumers Has Heard Of Bitcoin – And Majority Of Them Trust It, Available at: <http://techcrunch.com/2013/06/28/Bitcoin-awareness-and-trust/> [Accessed 9 December 2014]
- Maudlin, J., 2014. The 5 Phases of Bitcoin Adoption, Available at: <http://www.forbes.com/sites/johnmauldin/2014/12/23/the-5-phases-of-Bitcoin-adoption/> [Accessed 1 January 2015]

- Nakamoto, S., 2008. Bitcoin: A peer-to-peer electronic cash system, Available at: <http://www.Bitcoin.org> [Accessed 14 January 2015]
- Paypal, 2014. Financial, Available at: <https://www.paypal-media.com/about> [Accessed 3 January 2015]
- Robbins, N.B., & Heiberger, R.M., 2011. 'Plotting Likert and Other Rating Scales', In *Joint Statistical Meetings Proceedings, Section on Survey Research Methods*, Alexandria, VA: American Statistical Association, pp. 1058-1066.
- Rogers, E.M., 1995. *Diffusion of innovations*, 4th edition, Free Press, New York.
- Rogojanu, A., & Badea, L., 2014. 'The issue of competing currencies. Case study - Bitcoin', *Theoretical and Applied Economics*, XXI(1), 103-114.
- Ron, D., & Shamir, A., 2013. 'Quantitative Analysis of the Full Bitcoin Transaction Graph', in A.R. Sadeghi (Ed.): *FC 2013, LNCS 7859*, Springer-Verlag Berlin Heidelberg 2013, pp. 6-24.
- Ryan, B., & Gross, N.C., 1943. 'The Diffusion of Hybrid Seed Corn in Two Iowa Communities', *Rural Sociology*, 8(1), 15-24.
- Silinskyte, J., 2014. Understanding Bitcoin adoption: Unified Theory of Acceptance and Use of Technology (UTAUT) application, Master Thesis, University Leiden, ICT in Business.
- Simulacrum, 2013. The demographics of Bitcoin (Part 1 updated), Available at: <http://simulacrum.cc/2013/03/04/the-demographics-of-Bitcoin-part-1-updated/> [Accessed 17 November 2014]
- Singh, V., 2007. Full Circle of Governance: How to Leverage Age Old Organic Structure of Governance. Paper presented at *5th International Conference on e-governance*. 28-30 December 2007 Hyderabad, India Available at: http://www.iceg.net/2007/books/_3/2_281_3.pdf [Accessed 28 November 2009]
- The Guardian, 2013. 'Should you trust Bitcoin? It depends what you think it's for', *The Guardian*, 5 July 2013, Available at: <http://www.theguardian.com/science/political-science/2013/jul/05/Bitcoin-virtual-currency> [Accessed 7 January 2015]
- Torpey, K., 2014. Andreas Antonopoulos Lays Out the 3 Pillars of Bitcoin Mass Adoption, Available at: <http://insideBitcoins.com/news/andreas-antonopoulos-lays-out-the-3-pillars-of-Bitcoin-mass-adoption/26925> [Accessed 17 January 2015]
- Tzortzi, E., 2014. Alarm for e-banking codes theft, Available at: <http://www.kathimerini.gr/774067/article/texnologia/diadiktyo/synagermos-gia-ypokloph-kwdikwn-e-banking-apo-to-emotet> [Accessed 17 January 2015] (In Greek)
- Valente, T., 1996. 'Social network thresholds in the diffusion of innovations', *Social networks*, 18, 69-89.
- Wile, R. 2014. 13% Of Americans Would Choose Bitcoin Over Gold, Available at: http://www.businessinsider.com/Bitcoin-awareness-survey-2014-3#ixzz3P_CYPXSn2 [Accessed 8 January 2015]

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