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The Evolution of 2nd Generation Crypto Currencies

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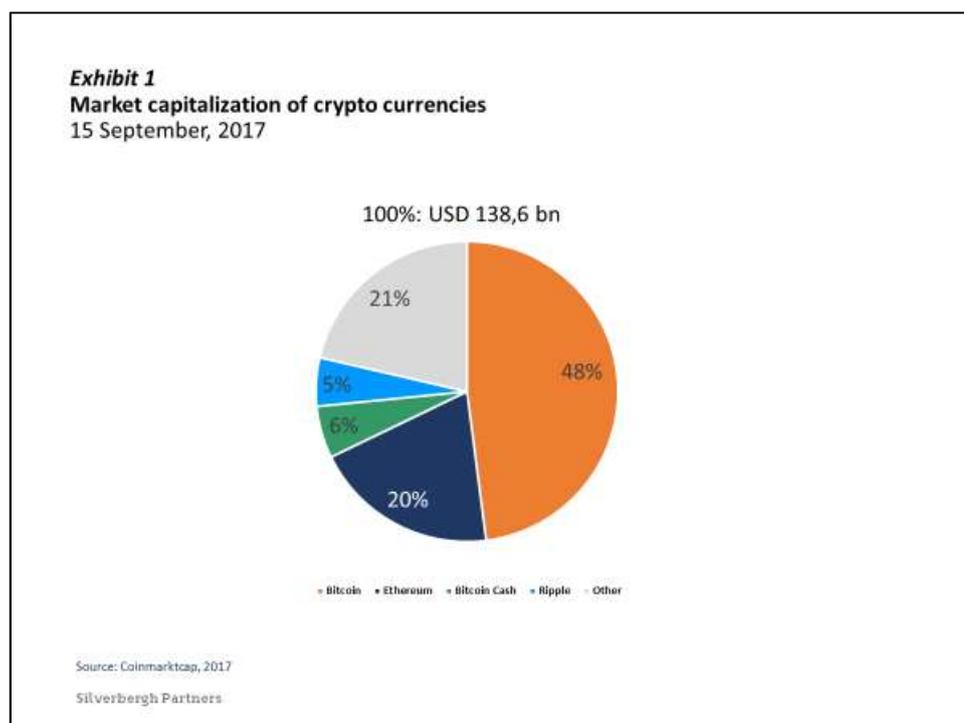
Crypto currencies (CC) are attracting increasing attention not only as payment instruments but also more recently as an investment asset class. The underlying blockchain technology is moving into the mainstream enabling payment processes, efficient operating processes and identification procedures. Hence, it is expected that for future transfer of financial assets, blockchain, and more specifically CCs, will gain significant importance. On the contrary however, doubts have been voiced more explicitly that given some structural deficiencies, crypto currencies fall short of traditional currencies and will not prevail as such. Therefore, they may not substitute or even complement traditional currencies on a larger scale.

In this article, we will investigate the deficiencies of CCs today. Functionalities of traditional currencies are being revisited and discussed whether they apply to CCs as well. Some suggestions will be provided how CCs could be further developed into more widely used 'currencies'. As such, CCs might become more competitive and relevant and as a result gain market share as a means of payment, as a store of value and as an investment asset class.

I. Introduction: Crypto currencies today – a heated market and an evolving regulatory response

Market capitalization of CCs has skyrocketed

In the last few months, the discussion of the validity of CCs as a means of payment or investment asset class has accelerated.¹ The reason for this being that CCs and especially the most prominent currencies Bitcoin and Ether have exhibited a drastic price spike and excessive volatility². In the period between 1 January 2017 and 1 September 2017 Bitcoin's price went up by 387% (Ether: 458%). This equates to a market capitalization for Bitcoin of USD 78.4 bn (Ether USD 36.5 bn). Since then (as of 15 September 2017) the market has corrected and both CCs have lost value. The total CC market capitalization is USD 138.6 bn for all CCs. Given the market rally in the previous months, asset managers as well as private investors have considered reallocating even more of their funds to CCs in order to monetize the uplift. (Exhibit 1). The price decline of Bitcoin by about 40% down to USD 2977 (15 September 2017) wiped out about USD 30 bn of market capitalization only for Bitcoin. This came as a reaction to China's announcement declaring ICOs as illegal.³



¹ CNBC: <https://www.cnbc.com/2017/09/12/cnbc-exclusive-cnbc-andrew-ross-sorkin-interviews-jpmorgan-chases-jamie-dimon-from-cnbc-institutional-investor-delivering-alpha-conference.html> 12 September 2017; retrieved 15 September 2017

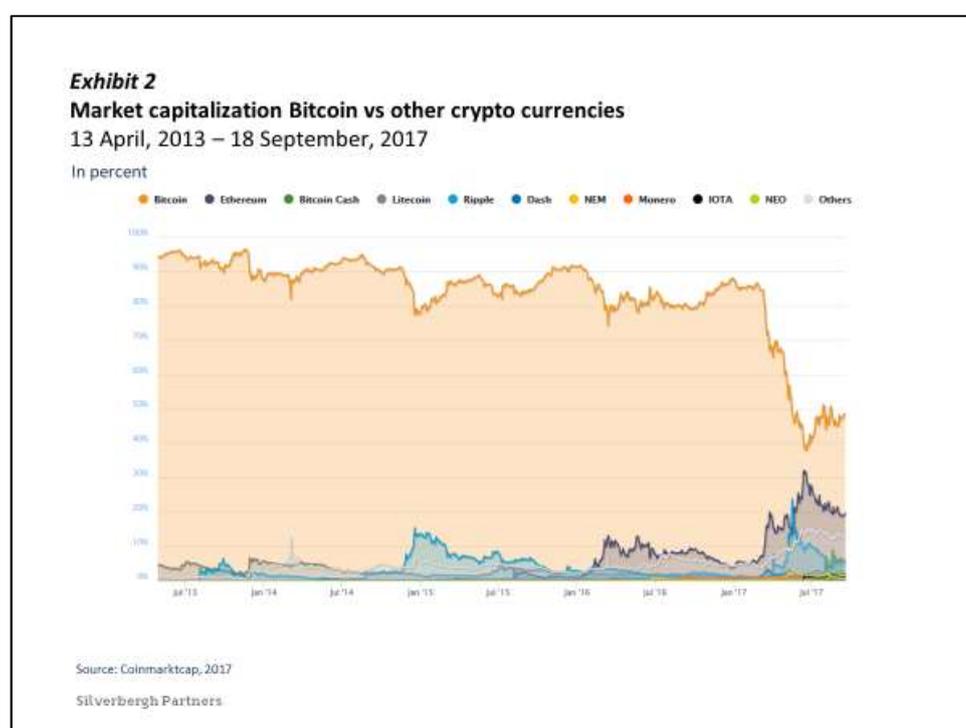
² Volatility as of 15 September 2017 Bitcoin/USD vs. (EUR/ USD) in Pips: Hourly – 450 (15), Daily – 2636 (93), Weekly 2500 (103)

³ Financial Times: China central bank declares initial coin offerings illegal, 4 September 2017

⁴ Coinmarketcap: accessed 15 September 2017

What is a crypto currency? In the public debate, several terms are being used e.g. blockchain, tokens, Initial Coin Offerings (ICO). However, there seems to be a confusion even among investment professionals about the actual meaning of each of these terms. Blockchain is the underlying technology, a public ledger in the form of a code which is the de-facto framework in which information is stored or transactions take place. Token is a key which allows the owner to determine the volume and ownership of a (digital) asset. It can come in the form of a digital currency but is also used to obtain and define ownership of other digital assets e.g. shares in a company⁵ or ownership of physical assets like commodities and apartments⁶. In this discussion, we focus on CCs only.

Bitcoin is the best-known example of a CC. Since early 2017 the importance of other CCs has caught up relative to Bitcoin. (*Exhibit 2*) The evolution of the value of a CC is determined by the perception of whether it will serve primarily as a means of payment or whether the underlying technology and ecosystem will also be used for other purposes.⁷



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⁵ Fortune: Cryptocurrency Chaos as China Cracks Down on Initial Coin Offerings; <http://fortune.com/2017/09/12/cryptocurrency-china-initial-coin-offerings/> 12 September 2017; retrieved 15 September 2017

⁶ Venturebeat: Britain's 'Bra Baroness' will sell apartments in her new \$326 million Dubai tower for Bitcoin <https://venturebeat.com/2017/09/05/britains-bra-baroness-will-sell-apartments-in-her-new-326-million-dubai-tower-for-bitcoin/> 5 September 2017; retrieved 15 September 2017

⁷ Cointelegraph: <https://cointelegraph.com/news/bitcoin-price-inversely-correlates-with-ethereum-potential-factors-why>, 8 April 2017; retrieved 15 September 2017

⁸ Coinmarketcap; retrieved 18 September 2017

Regulators are in the process of figuring out how to deal with CCs

Regulators take different perspectives on how to deal with CCs. The SEC has turned down a request to issue a CC ETF, a derivative on the underlying CC market. The reason being that the underlying market faces deficiencies and is traded outside the influence of US jurisdiction.⁹ Unlike the US, Switzerland's FINMA has provided a license to a crypto fund which is only open to 'qualified investors'. Germany's BaFin classifies CCs as 'financial instruments' and means of payment but not as currencies because no claim can be put to the issuer.¹⁰ The Chinese People's Bank of China, although it only recognizes CCs as a 'virtual asset', has recently¹¹ developed and tested the first national CC.¹²

Even though deficiencies of CCs might exist, potential CC use cases cannot be neglected

There are a couple of deficiencies associated with CCs which are brought forward as criticism and doubts for further expansion of the CC sector.

- Price discovery is difficult given unregulated underlying markets and a significant share of offshore trading activity.
- High price volatility is caused by a significant capital inflow into the market and withdrawals (relative to market size).
- CCs are challenged to keep the code protected, credible and unchanged (which is the intention). On numerous occasions however, the codes have been manipulated and funds have been stolen¹³.
- Bitcoin in particular is being used in illegal business transactions. Therefore, CC backed transactions are increasingly becoming the subject of criminal investigations and anti-money laundering regulation¹⁴. This implies significant operational challenges as well as a trust and credibility burden for a broader group of potential users.
- Because no right against the issuer is implied by the ownership of CC, they are not commonly accepted as a means of payment and not well-positioned as a store of value. CCs do not qualify as currencies in technical terms, but are already being used for payment purposes (and speculation) today. There is significant public interest to learn more about CCs and to potentially make use of them in the future. Some users require anonymity in a CC transaction which occasionally is being criticised. Is this different compared to today's situation? If cash is

⁹ U.S. Securities and Exchange Commission: Stock www.sec.gov/rules/sro/batsbzx/2017/34-80206.pdf 10 March 2017; retrieved 17 September 2017

¹⁰ BaFin: https://www.bafin.de/EN/Aufsicht/FinTech/VirtualCurrency/virtual_currency_node_en.html 2017 retrieved 15 September 2017;

¹¹ Reuters: <https://www.reuters.com/article/us-china-bitcoin/bitcoin-can-be-an-asset-but-not-currency-china-central-bank-adviser-idUSKBN19S0BS> 7 July 2017; retrieved 15 September 2017

¹² Cryptointhenews: <https://www.cryptocoinsnews.com/chinas-central-bank-completes-digital-currency-trial-blockchain/> 10 January 2017; retrieved 15 September 2017

¹³ Coindesk: <https://www.coindesk.com/dao-attacked-code-issue-leads-60-million-ether-theft/> 17 June 2016, retrieved 15 September 2017

Money Life <http://www.moneylife.in/article/so-crypto-currency-is-worth-stealing/51350.html> 21 August 2017; retrieved 15 September 2017

¹⁴ Stepstoe: <http://www.stepstoe.com/publications-12162.html> 13 September 2017; retrieved 15 September 2017

being used in a transaction today it is also associated with anonymity.¹⁵ If these development needs are addressed in the future, CCs will gain in importance.

- CCs are not being recognized in the context of a coherent and unified international accounting framework.

Addressing the above concerns will foster the further use of CCs.

It will also be important to embed any currency into a sound institutional framework.

What are the potential learnings which can be drawn from the traditional institutional framework for a future institutional setting?

II. Functionalities of a currency in the traditional institutional framework

In economic theory, there are three specific characteristics of money:¹⁶

1. Medium of Exchange
2. Unit of Account
3. Store of Value

In the traditional framework, a currency is issued by a central bank which also guarantees its value as it is de facto a claim against the central bank. Additionally, the central bank seeks to ensure the stability of a currency by managing the supply of money, influencing the current account balance and the cost of capital through the setting of interest rates. At times, it intervenes in FX markets in order to influence exchange rates. As such, it creates the framework for all stakeholders in an economy to engage in transactions and to transfer financial funds. Depending on the central bank set up, it even pursues economic objectives e.g. the stimulating of economic growth and maintaining a certain rate of employment.

If we take this as a baseline, what are the institutional agendas of certain stakeholder groups which determine the evolution of CC?

- **Central banks/ regulators:** They intend to maintain the monopoly¹⁷ of providing money for the market, including fiat money. Depending on their status as a regulator, they tend to protect the established system as this provides stability rather than fostering innovations (which are associated with instability and risk).
- **Banks/ intermediaries:** Their objective is to make profits. This is done through the different lines of business of a commercial bank. The essence of borrowing money in the market or from central banks is that churning this money will generate an attractive return on capital. In order to achieve this, new opportunities (and product innovations) are being pursued to pocket attractive spreads. Capital requirements are ideally kept at a minimum and competition from new entrants needs to be avoided.

¹⁵ Hileman, Rauchs, Cambridge Business School, Centre of Alternative Finance:

https://www.jbs.cam.ac.uk/fileadmin/user_upload/research/centres/alternative-finance/downloads/2017-global-cryptocurrency-benchmarking-study.pdf 2017; retrieved 15 September 2017

¹⁶ Mishkin (2013), The Economics of Money, Banking, and Financial Markets, 10th ed, Harlow (UK), Page 94 ff

¹⁷ This is the most commonly known set up. However, other configurations are also possible e.g. in Switzerland the introduction of a parallel official currency was rejected in a referendum in the 1930s whereas the 'WIR money' still exists today. In Italy the discussion of the introduction of a parallel currency has just been revived. Switzerland's FINMA as well as other regulators take a more proactive approach as the tech sector develops and as it promises to contribute to overall economic development.

- **Businesses and consumers:** Their key interest is access to (cheap) credit and liquidity, stability of a currency and the ability to transfer funds quickly at low costs.
- **New entrants:** Their objective is to take a ‘fair share’ of the business from incumbent banks. In the past, it has been difficult to attack incumbents. Regulatory costs for market entry have been significant, large-scale infrastructure has been difficult to access, and acquiring customers through traditional marketing avenues has been costly. CCs and the underlying blockchain technology are a game changer which de facto devalues classical structural advantages of incumbents and provides a platform for new evolving business models (e.g. peer-to-peer lending). Therefore, the evolution of technology-driven financial service businesses will contribute to the differentiation of the banking value chain.

What does this mean for behavioural patterns in the evolving financial institution framework? At the outset central banks, regulators and banks are critical to the evolution of new developments. They have something to lose. The users of a currency tend to be more positive – they have something to gain. In 1976, the Nobel Prize Winner and famous Economist and Philosopher Friedrich August von Hayek¹⁸ published his perspectives on currency competition. He focused very much on commercial banks and the function of the store of value whereas, from today’s perspective, there are additional considerations as stated above.

As of 2017, we seem to be moving into a transitional phase in which central banks, regulators and commercial banks are reconsidering their approach to CCs and the blockchain. Central banks are starting to experiment with CCs¹⁹ and commercial banks are seeing the potential of the blockchain to offer new services and to reduce operating costs. As technology develops, we might get closer to a situation Hayek originally had in mind.

III. The future CC landscape, characteristics of evolving CCs and the role of technology

Having described the characteristics and criticism regarding today’s (privately established and unregulated) CCs, we will now discuss potential improvements which might provide some guidance to the evolution of the future CC landscape.

- **Poor price discovery due to non-transparent markets with weak regulatory frameworks:** This is not unique to CCs. There are other financial and commodity markets where the same criticism could be applied. This is characteristic of evolving markets. Existing exchanges and market places might strengthen their framework with the help of financial regulators. Alternatively, international exchange operators could step in competing within a more stable regulatory and operating framework. Exchange operators however can only indirectly influence the liquidity of a market and hence the markets vulnerability to manipulation (which is higher as liquidity is low). They do not have an influence on the code of the CC and the mining mechanism.
- **High volatility:** This impacts a number of functionalities. As a means of payment, this is counterproductive as it might impact on the value received in a transaction. If however, immediately after the transaction the transacting currency is being exchanged for a more stable currency, this will be less of an issue. In a non-digital world this was impossible. In today’s digital payment environment there are technical solutions and market places which enable such transfer schemes e.g. Lykke, an online market platform for the transfer of digital financial assets.²⁰ High volatility is helpful in proprietary trading but it may be a burden if a

¹⁸ Hayek (1976), Entnationalisierung des Geldes, Tübingen

¹⁹ Bank for International Settlements (BIS): BIS Quarterly Review, 17 September 2017

²⁰ <https://www.lykke.com/>

position cannot be hedged in the absence of a liquid derivatives market.²¹ If the underlying market stabilizes, risk investors will be attracted to providing liquidity also in derivatives markets. As a consequence, volatility of trading positions can be managed. For the storage of funds, it is however still advisable to exchange the funds for a more stable (financial) asset.

- **Integrity of the code:** Even though manipulations have occurred, one should not forget that we are at an early development stage of CCs. Conceptually, there are different potential solutions to deal with this. The update of codes and processes might be used to keep the respective CC safe. ‘Hard forks’²² would be one of the last potential solutions if a code has been manipulated.
- **Illegitimate flow of funds:** This argument holds true as today’s CCs are unregulated and are designed to maintain confidentiality of the counterparties. One can imagine however a more regulated form of a CC e.g. a crypto dollar or a crypto yen. The benefit for central banks would also be that they could anticipate these CC volumes in their monetary policy design. In that case, using this CC would come along with disclosing the identity of the counterparts to a regulator.²³ Illegitimate flows of funds would be undermined but the benefit of operational efficiencies and security would be ensured. At the same time, unregulated CCs might still exist in parallel allowing the individual to choose the CC which best meets his needs.
- **No backing with a “true value”:** At the heart of the criticism is that CCs are very much ruled by supply and demand economics²⁴ rather than a positive intrinsic value²⁵ and institutional backing. A general acceptance as a means of payment and store of value does therefore not exist. This argument might be revisited in the future. The recent inverse price correlation of Bitcoin vs. Ether suggests that there might be a positive intrinsic value (>0) associated with Ether recognizing the value of the Ethereum business model and network.

In a case where a CC is issued by a central bank, this formal argument would no longer hold. One might question the relevance of the formal argument. Deposit money is being created by commercial banks. Money creation is not limited to central banks and is no longer backed by gold. The days of the Gold Standard (~1870-1944)²⁶ and the subsequent Bretton Woods system (until 1973) are long gone.²⁷ As such, the value of a currency is (basically) based on trust. If trust erodes on a larger scale, central banks as well as governments might also be challenged not to default. In that case ‘the lender of last resort’ would no longer exist.

Alternatively, private counterparties could issue a CC which also provides a claim against the issuing counterparty. This would however only work if volatility is limited. Otherwise the issuer would risk declaring bankruptcy if the currency appreciated drastically (as the claim against the issuer would appreciate as well). To avoid this, the CC could, for example, be linked to a national currency which would provide stability. One could also imagine that a counterparty with a large volume of sales and payment operations might be able to issue such a currency (e.g. Amazon, eBay). Operational efficiencies could be monetized and the CC could

²¹ As contracts for difference (CFD) are being launched, a financial market is in the early stages of development. This however is very much driven by the intention of speculators to participate in the CC rally with less capital involved given the higher leverage of CFDs compared to trading in the underlying market. The downside risk associated with these trades is however significant.

²² This is a change in the protocol which leads to a loss of value of the traditional blocks generated previously. It is however used to keep the integrity of the overall system in case of manipulation.

²³ In that case, a key requirement would be to not separate the public and private part of a ledger.

²⁴ Friedman (1959): “The demand for money: some theoretical and empirical results”, *The Journal of Political Economy*, vol 67, no 4, pp 327–51.

²⁵ Bloomberg: <https://www.forbes.com/sites/jasonbloomberg/2017/06/26/what-is-bitcoins-elusive-intrinsic-value/#42113f5d7194>, 26 June 2016; retrieved 20 September 2017

²⁶ Elwell, Craig K.: *Brief History of the Gold Standard in the United States*, 2011; retrieved 28 September 2017

²⁷ Friedman, Milton; Schwartz, Anna Jacobson: “A Monetary History of the US 1867–1960”, 1963; retrieved 28 September 2017

be integrated into a broader commercial framework.²⁸ The claim could be settled with any physical item on the platform (e.g. consumer goods). In that case and from a customer's perspective, sovereign risk (if holding a national currency) would be replaced with counterparty risk (in the case of using the proprietary CC as issued by the private counterparty).

In another case, the currency could also be backed by other goods e.g. commodities, by either a private entity or a government. This might open the opportunity to create a CC which might find acceptance from a broad range of users. As a result, the CC would exhibit much more stability compared to CCs in the market today.

One should also not forget that on the competitive dimension of stability, also traditional currencies are challenged given the expansive monetary policies since the financial crisis through Quantitative easing (QE). The holder of traditional currencies and respectively the denominated assets might consider allocating some of his funds to an alternative currency e.g. to a CC. The precondition would however be that he fears losing some of his wealth through accelerated inflation due to central bank monetary policies or by a correction of past inflation of real assets. In the latter case, he would lose if he has allocated funds to real assets. As outlined above, CCs might be more stable in the future. This potential competitive edge of a CC seems to be underrated in today's debate.²⁹

Governments have on their part started to experiment with CCs in order to improve efficiency in the interbank market and to control the effects on monetary and fiscal policies as CCs evolve (e.g. Ecuador, US, Canada, Sweden ...).³⁰

- **Lack of CC accounting framework:** A unified framework would ensure equal treatment and transparency for different stakeholder groups of a certain corporation. The Financial Accounting Standards Board (FSAB) has set up projects to potentially establish a future CC accounting framework and standards.³¹

IV. Summary and conclusion

Today's debate on the pros and cons of CCs is tainted by strong beliefs. Stakeholder groups influence the public debate according to their business objectives.

Clearly, the CCs which are currently in the market exhibit some structural and technical deficiencies and the CC bull market is driven by speculative rationales rather than sound economics.

CCs are however a ground-breaking innovation which, as the digital age evolves, will most likely play a more important role going forward. We have provided some perspectives on how today's criticism of the status of CCs can be addressed.

²⁸ Regulatory implications would need to be investigated.

²⁹ Krugman: <https://krugman.blogs.nytimes.com/2014/10/04/the-long-cryptocon/> 4 October 2014; retrieved 21 September 2017

³⁰ Koning: "Fedcoin: a central bank issued cryptocurrency", R3 Report, 15 November 2016; Cryptonews: <https://www.cryptocoinsnews.com/ecuador-first-nation-create-digital-currency/> 31 June 2017; Jasper: "A Canadian experiment with distributed ledger technology for domestic interbank payments settlement", white paper prepared by Payments Canada, R3 and the Bank of Canada. 2017; Skingsley: "Should the Riksbank issue e-krona?", speech, FinTech Stockholm 16 November 2016; retrieved 15 September 2017

³¹ ThomsonReuters: <https://tax.thomsonreuters.com/media-resources/news-media-resources/checkpoint-news/daily-newsstand/bitcoin-seeks-recognition-from-u-s-gaap/> 11 July 2017; retrieved 15 September 2017

The underlying blockchain technology will provide the basis for further innovation. Regulators, governments and central banks will establish a more refined view about how they want to be involved with CCs in the future. Currently, they are sorting out how operational efficiencies can be leveraged.

Consumers and businesses, on the other hand, will use CCs to decrease their costs of holding cash and transferring funds.³² Some users also intend to maintain a certain level of anonymity associated with payments or the holding of financial assets in CCs.

Public institutions³³ and businesses are already implementing business concepts associated with CCs (e.g. SBB Swiss Federal Railways)³⁴ in order to create the respective infrastructure and outlets for their (digital) products and services. This will help to win and retain customers not only by using CCs but also by moving to a truly digital offering.

All stakeholder groups are well-advised to fully grasp the CC debate and ask themselves how they could utilize CCs and/or the underlying blockchain technology. Even if a company delays CC and digital initiatives for good reasons and possibly to a time when more stable CCs have been established, there is a benefit to 'ask the CC question' today. The activity level around CCs indicates that CCs will not die but that the sector will exhibit a further evolution towards a more refined CC environment with a more stable and differentiated set of CCs.

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³² In peer-to-peer networks

³³ Neue Züricher Zeitung: Stadt Zug wird weltweit zum Bitcoin-Pionier, 10 Mai 2017

³⁴ SBB Swiss Federal Railways: <https://www.sbb.ch/en/station-services/services/further-services/bitcoin.html>;
retrieved 15 September 2017

