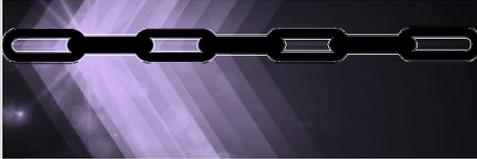
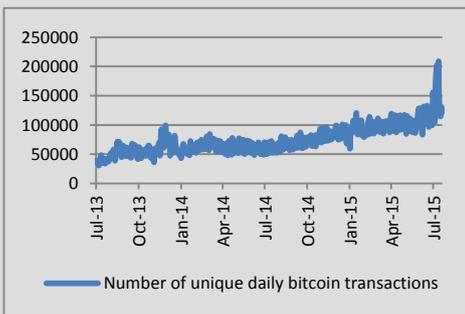


# BLOCKCHAIN, BITCOIN AND BEYOND...

## FAST-PACED INVESTMENT AND DEVELOPMENT OPPORTUNITIES

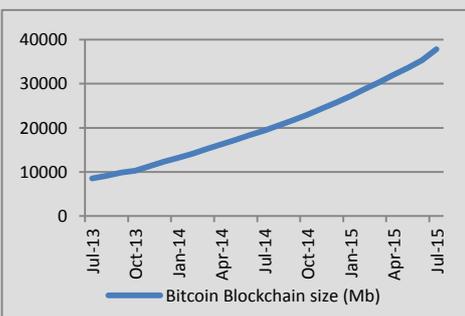


### NUMBER OF BITCOIN TRANSACTIONS



Source: CoinDesk data

### BITCOIN BLOCKCHAIN SIZE (MB)



Source: blockchain.info

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## Blockchain buzz

Following our previous publication *“Exciting technology with considerable promise”*, this note looks at some of the buzz surrounding the investment and development of both blockchain technology and bitcoin currency.

Using commentary from key leaders, we look at how the thinking behind the use of blockchain technology is evolving and how its importance and potential applications are reflected in the burgeoning group of associated businesses. For bitcoin, we can also see the growth in transactions and the increased narrative around the structure of the currency.

- UK supportive** In the UK, the Government, Central Bank and regulators seems to be singing off the same hymn sheet and want to maintain a backdrop which is conducive to attaining the UK Government’s stated ambition for the UK to “cement its world-leading position in developing FinTech, and to become a global hub for financial innovation”.
- Global buzz building** Overseas, we continue to see a building chorus of industry leaders, financial services experts and entrepreneurs, all suggesting that the adoption of blockchain across a range of industries and for a range of purposes is a matter of “when, not if”.
- Significant investment** CoinDesk estimates that more than U\$800 million has been invested in bitcoin/blockchain start-ups so far – a number which already outstrips the U\$638 million estimated VC investment in first-sequence internet start-ups in 1996. Even allowing for inflation, that is a strong indication of the potential which investors see for the technology.
- Bitcoin as validation of blockchain** Structurally, bitcoin as a currency continues to grow. In our view, just as important is the fact that bitcoin has “validated” the blockchain. Bitcoin’s ongoing success and growth demonstrates that a blockchain-driven infrastructure can scale and adapt, without loss of integrity or security.
- Current examples** Businesses that are already operating include those which leverage blockchain technology in mobile payment systems, trading platforms, tracking, data management and audit systems. In the US, Nasdaq Private Market (NPM) is already progressing a pilot using blockchain technology to facilitate the secure issuance and transfer of shares of privately-held companies. Outside the FinTech space, smart contracts and the health sector are areas currently being explored.
- A ‘killer’ application?** Importantly, the opportunities around its use for micro- or nano-payments remain immense. This includes the opportunity to better monetise internet content and reduce the levels of spam.
- Timing is key** Blockchain FinTech companies, which encompass many different uses, already exist but they still need further investment to accelerate their development. Opportunities abound, and investors have the chance to back some truly exciting businesses.

## The potential of blockchain

Blockchain technology has been made possible by advances in cryptography, internet performance and computing power. Its use for tracking and transferring digital assets online without the need for a common trusted party has ground-breaking implications for the business world. The technology is not just a threat to relevant, incumbent systems but also a significant opportunity to develop more trusted services.

### A catalyst for change

Blockchain had the potential to *“change the whole trading and settlement topic”*.

*“When somebody with a strong brand and security level establishes it as a reliable service, then the whole industry will follow. That is my personal prediction.”*

**Source: Oliver Bussmann, Chief Information Officer of UBS, October 2014**

*“Blockchain Technology is “the biggest thing since the internet – a catalyst for change in all areas of our lives”.*

**Source: Bitcoin developer Jeff Garzik**

The technology behind cryptocurrencies *“is at least as much an opportunity for incumbents as it is a disruptive threat”.*

**Source: Blythe Masters, CEO of Digital Asset Holdings**

## UK Government support

For emerging companies to flourish, supportive industry and governmental backdrops are vital. It's here that the UK seems to have a positive attitude. In March 2015, a report by the UK Government Chief Scientific Adviser was published which made recommendations which aimed to ensure that the sciences continue to contribute most effectively to FinTech. The report built on the Government's action to provide a longer-term vision for the UK FinTech sector. Its recommendations were intended to provide a *“firm foundation to support and catalyse the growth of the sector out to 2025”*. Importantly for the sector, it made the case *“that the Government, regulators, business and academia must work together closely and in innovative ways”*.

The report included a Vision Statement which outlined the steps necessary to cement global leadership in FinTech development in the UK.

*“The UK will be the premier location for starting, growing and retaining innovative financial technology businesses. The UK environment will provide outstanding access to leading academic talent, investment and facilities and promote global thought leadership on emerging digital solutions. It will provide unrivalled international connectivity, a regulatory environment that balances risk and innovation, and will foster and maintain the optimal conditions for growing businesses.”*

**Source: UK Government Office for Science, March 2015**

It also emphasised the key role that regulators must play in managing a changing business environment:

*“The role of Government is to provide leadership and catalysis – the business and academic sectors must play the major role in developing and delivering new business models. The regulators are key to ensuring that existing, new and emerging risks are identified and managed effectively.”*

**Source: UK Government Office for Science, March 2015**

So, it isn't just the business world that recognises the need to embrace the development and potential of new technology. Regulators and Central Banks also acknowledge the responsibility to encourage innovation. Globally, not all have the same view but here are some examples of how the UK – where the approach is based on recognition of the potential - has reacted:

#### How the UK authorities see it

*"...we have an objective to promote competition. Innovation can be a driver of effective competition, so we want to support innovation."*

**Martin Wheatley, Chief Executive of the Financial Conduct Authority, November 2014**

*"Digital currencies, potentially combined with mobile technology, may reshape the mechanisms for making secure payments, allowing transactions to be made directly between participants. This has potentially profound implications for a financial system whose payments mechanism depends on bank deposits that need to be created through credit. Similarly, technology has enabled the emergence of new business models, such as peer-to-peer lending and crowdfunding, which create alternative sources of finance for both individuals and businesses."*

*"The emergence of private digital currencies has shown that it is possible to transfer value securely without a trusted third party....the distributed ledger technology that their payment systems rely on may have considerable promise. This raises the question of whether central banks should themselves make use of such technology to issue digital currencies."*

**Source: Bank of England, February 2015: One Bank Research Agenda Discussion Paper**

*"...I want to see whether we can make more use of them for the benefit of the UK economy and British consumers....We stand at the dawn of a new era in banking. Mobile banking apps, peer to peer lending, digital currencies -- technologies such as these are going to transform our lives, and create huge economic opportunities."*

**Source: UK Chancellor of the Exchequer George Osborne, August 2014**

*"The government considers that while there are clear barriers to digital currencies achieving widespread use in their current form, the 'distributed ledger' technology that underpins digital currencies has significant future promise as an innovation in payments technology. The government wishes to foster a supportive environment for the development of legitimate businesses in the digital currency sector....."*

**Source: HM Treasury, March 2015: Digital currencies: response to the call for information**

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In March 2015, the UK government launched a new research initiative to address the opportunities and challenges for digital currency technology and increased research funding by £10 million to support that.

## Help, enhance, replace

There are clear views on just how this technology can help, enhance or replace existing systems, business structures and currencies. Not least, the opportunity to make digital records more secure. The enhancement and evolution of payment systems is a topic which is raised frequently. It's clear that the future is one which includes decentralised problem-solving with no need for a trusted third party. In addition, bitcoin represents a significant opportunity for evolving currency and commentary across government and industry points to the ease of use and wider popularity of bitcoin.

### The opportunity to make digital records more secure

*"As with money held as bank deposits, most financial assets today exist as purely digital records. This opens up the possibility for distributed ledgers to transform the financial system more generally."*

**Source: Bank of England Quarterly Bulletin 2014 Q3 - Innovations in payment technologies and the emergence of digital currencies**

*"Bitcoin represents not only the future of payments but also the future of governance."*

*"We live in the 21st century but are still using command and control organizational structures from the 16th century. Bitcoin is one of the best examples of how a decentralized, peer-to-peer organization can solve problems that these dated organizations cannot. Like the internet, Bitcoin is not owned or controlled by any one entity, so it presents incredible opportunities for new levels of efficiency and transparency in financial transactions."*

**Source: Dee Hock - founder of Visa**

*"Until now whenever we've needed to transfer money we've had to rely on a third party, whether it be a bank, a clearing house or a payment network. Bitcoin offers, for the first time, a method for transferring value and making payments from anywhere to anywhere, in real-time, without any intermediary. This could mean we soon see many billions of people sending bitcoin everyday as easily as they currently send a text message."*

**Source: Lawrence H. Summers - Secretary of the Treasury under President Bill Clinton**

*"[Digital Currencies] may hold long-term promise, particularly if the innovations promote a faster, more secure and more efficient payment system."*

**Source: Ben Bernanke, when Chairman of the Federal Reserve USA**

*"Virgin Galactic is a bold entrepreneurial technology. It's driving a revolution and bitcoin is doing just the same when it comes to inventing a new currency."*

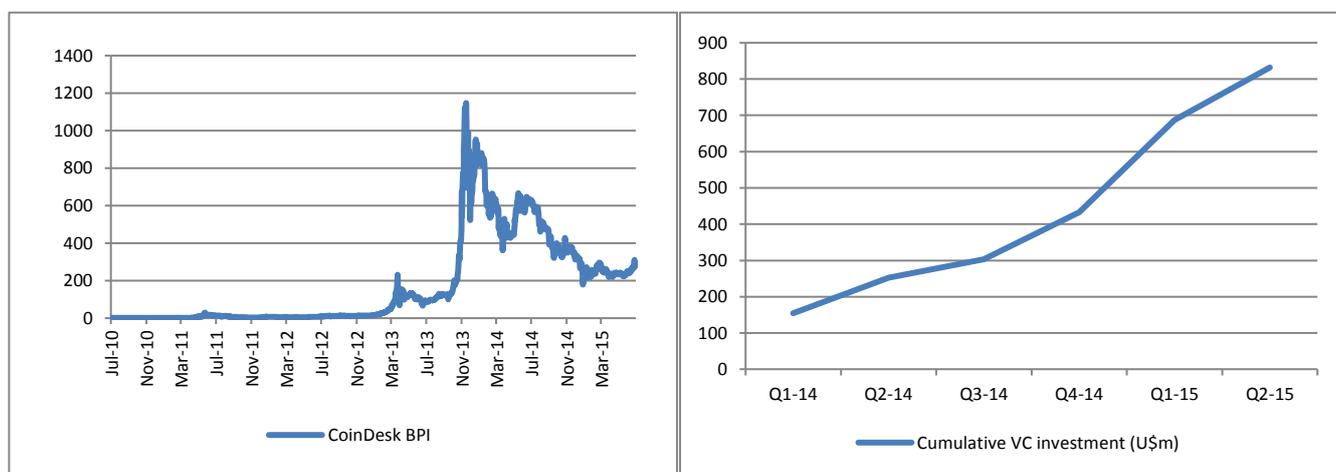
**Sir Richard Branson**

## The growing level of investment

Investment in blockchain technology continues to grow – even in the face of the fluctuating value of bitcoin. Data from CoinDesk shows how the cumulative level of venture capital investment in bitcoin related start-ups has grown since the beginning of 2014.

Bitcoin price (US\$) July 2012 to date

Cumulative venture capital investment in bitcoin start-ups (USm) Q1-14 to Q2-15



Source: CoinDesk

## Where is investment being applied?

We note the wide range of propositions which have attracted investment - including those which are educating and supporting developers in the use of this new technology. We highlight some other examples below to give a hint of the myriad development opportunities which abound in the sector:

- Nano-payments - an e-commerce transaction involving a very small sum of money – hold the promise of bringing economics to many areas of the internet. This includes the prospect of more efficiently monetising internet content and potentially reducing the levels of spam emails if a small charge is applied to an individual email.
- Placing mobile money, bitcoins and blockchain assets on top of any existing SIM card producing secure platforms for developers, consumers and payment providers to leverage and introduce bitcoin & blockchain services on top of existing mobile infrastructure.
- Bitcoin 2.0 platforms that facilitate the trading of the cryptocurrency and offer interest bearing bitcoin accounts.
- Using the blockchain technology behind bitcoin to change how businesses manage data and keep records by providing a decentralized audit system and creating an immutable audit trail.
- Using blockchain technology and mobile payment systems to turn a phone into a point-of-sale terminal and combine security with the disintermediation of the payment space.

## Use-case: Nasdaq Private Market

During the second quarter of 2015, Nasdaq Private Market (NPM) announced a technology initiative to be piloted on ExactEquity in partnership with Chain, a leading provider of blockchain technology to facilitate the secure issuance and transfer of shares of privately-held companies. The project is expected to go live in the fourth quarter of 2015.

Nasdaq CEO Bob Greifeld, had noted that *"This Nasdaq Private Market project aims to simplify the overwhelming challenges private companies face with manual ledger record-keeping. As blockchain technology continues to redefine not only how the exchange sector operates, but the global financial economy as a whole, Nasdaq aims to be at the centre of this watershed development."*

More broadly, he told Bloomberg that the technology will be *"of fundamental importance to Wall Street...the benefits to the industry are immense and cannot be ignored."*

For this project, blockchain technology enables stockholders to seamlessly transfer securities and receive a complete historical record of issuance and transfer of their securities. The use of a distributed ledger using blockchain technology can also offer integrity, audit ability, issuance governance and transfer of ownership capabilities.

## Glossary

**Blockchain:** The ledger (book of records) of all transactions, grouped in blocks.

**Fiat currency:** Currency established by governments to centre an economy onto one kind of transaction medium (e.g. euro, US dollar and yen).

**Fiduciary currency:** A currency without intrinsic value; it derives its worth from the trust users have in the issuer of the currency.

**Digital currency:** A digital representation of value, not issued by a central bank, credit institution or e-money institution, which, in some circumstances, can be used as an alternative to money.

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