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COMPLIANCE & LEGAL
SECTION

Blockchain and FinTech - a Canadian perspective

- *Annick Demers, Counsel, Blake, Cassels & Graydon LLP*
- *Prakash Hariharan, Chairman, Analytixinsight*
- *Usman Sheikh, Partner, Gowlings WLG*

PRESENTATION

- FinTech snapshot
- FinTech Ecosystem in Canada
 - Collaborations FinTechs & legacy players
- Summary of regulators' initiatives worldwide
- Regulators' initiatives:
 - Canadian regulators
 - Regulators from jurisdictions other than Canada

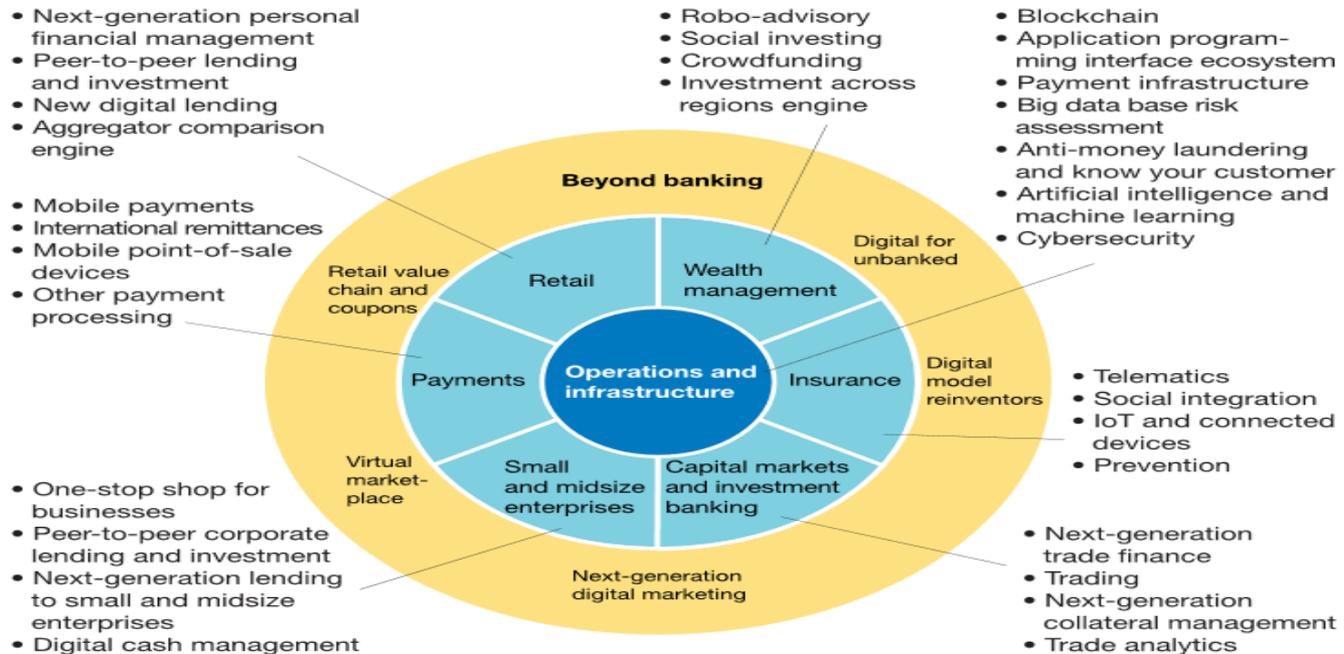
FINTECH SNAPSHOT

- « FinTech » Ecosystem
 - Competing financial service providers
 - Additional service providers (effective services and customer experience)
 - Technology solution providers to the financial institution
- Areas
 - Payment, funds transfer and retail trade
 - Lending (consumer loan, mortgage, lending to small businesses, crowdfunding and peer-to-peer lending)
 - Wealth management and financial data analysis
 - Markets and trade
 - Blockchain (including smart contracts)
 - Insurance
 - Cybersecurity

KEY FINTECH TRENDS

We see more than 30 areas emerging as new norms in banking.

Key fintech trends



McKinsey&Company | Source: Panorama by McKinsey

FINTECH ECOSYSTEM IN CANADA

Collaborations mentioned in the media :

- Power Corporation: investment in Wealthsimple
- NBC: agreement with Lending Club
- CIBC, Desjardins, TD and Scotia : creation of internal innovation labs
- CIBC and Scotia: collaboration with Thinking Capital
- Manulife : partnership with Garmin
- RBC :
 - Considering reward program using on blockchain technology
 - Partnership with Nymi
 - Alliance with UBER
- Scotia : partnership with Kabbage
- TD : partnership with Nymi and Moven

REGULATORS' INITIATIVES WORLDWIDE

- Adoption of guidelines / framework / legislative bill (ex: OCC)
- Creation of sandboxes (ex: FCA, MAS, ADGM, AKMA and OCC)
 - Safe space to test innovative products and develop a business model / delivery mechanism without immediately incurring all the normal regulatory consequences of engaging in the regulated activity.
- Participation to innovation hubs / sandboxes (ex: Bank of Canada and MAS)
- Introduction of innovation hubs (launchpads) (ex: OSC)
 - Allows regulators to work directly with FinTech companies to help them navigate their regulatory framework.
- Creation of dedicated internal workgroups (ex: AMF)
- Consultation with industry (ex: AMF, Department of Finance)
- Conducting market studies (ex: Competition Bureau, Bank of Canada, etc.)

CANADIAN REGULATORS

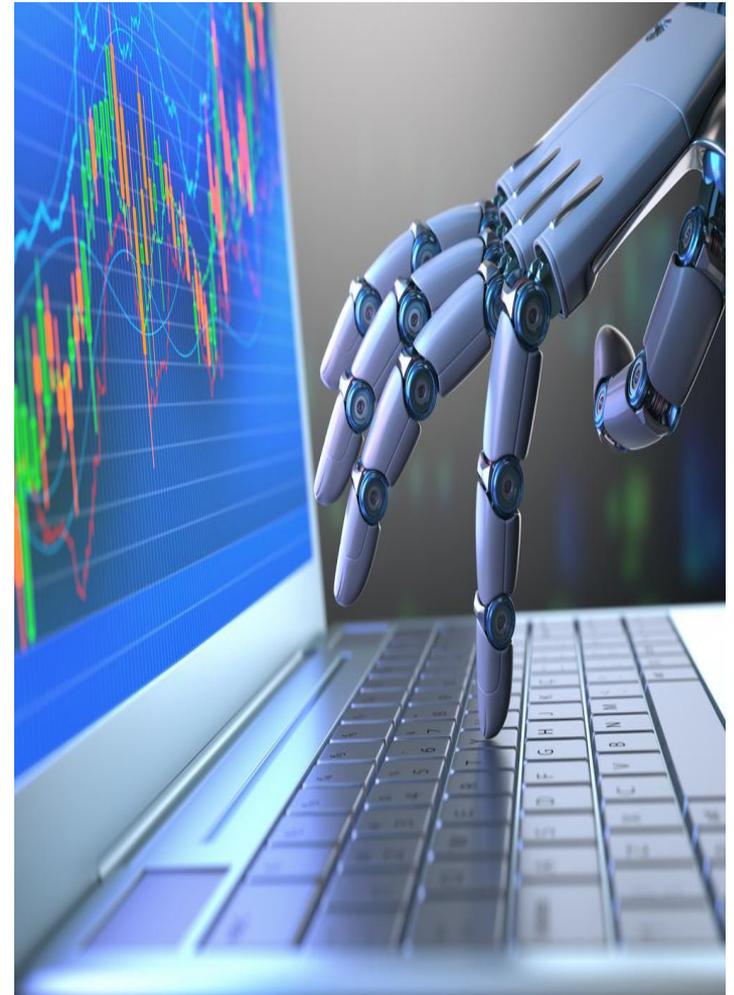
- Department of Finance:
 - Release of consultation process on the national payment system (April 13, 2015)
 - Release of consultation process on the Federal Financial Sector Framework (August 26, 2016)
- Competition Bureau
 - Launch of market study to assess the Canadian FinTech Ecosystem (May 19, 2016)
- Bank of Canada :
 - Attribution of internal resources to conduct a market study
 - Announcement of participation in Project Jasper - blockchain testing (June 16, 2016)
- Quebec's Autorité des marchés financiers (AMF):
 - Creating an internal FinTech group (June 13, 2016)
 - Creating an advisory FinTech committee (September 14, 2016)
- Ontario Securities Commission (OSC)
 - Introducing an innovation hub referred to as the LaunchPad (October 24, 2016)

REGULATORS FROM JURISDICTION OUTSIDE OF CANADA

- UK's Financial Conduct Authority (FCA)
 - Project Innovate (October 1, 2014)
 - Regulatory Sandbox - part of Project Innovate (May 9, 2016)
- Germany's Federal Financial Supervisory Authority (BaFin)
 - Ongoing dialogue with FinTech Industry
- Monetary Authority of Singapore (MAS)
 - Release of consultation paper (June 6, 2016)
 - Release of guidelines for their FinTech regulatory sandbox (November 16, 2016)
 - Announcement blockchain testing initiative to conduct interbank payments (November 16, 2017)
- Australian Securities and Investment Commission (ASIC)
 - Release of consultation paper (June 8, 2016)
- Abu Dhabi's Financial Service Regulatory Authority (FSRA) & Global Market (ADGM)
 - Release of consultation paper (August 31, 2016)
 - Announcement of regulatory sandbox (November 2, 2016)
- Hong Kong Monetary Authority (HKMA)
 - Adoption of a sandbox regime (in effect as of September 6, 2016)
- USA's Office of the Comptroller of Currency (OCC)
 - Release of whitepaper (March 31, 2016)
 - Creation of the Office of Innovation / decision to implement regulatory framework & to create a sandbox (October 26, 2016)
- US Bill to introduce the Financial Services Innovations Act of 2016 (September 22, 2016)

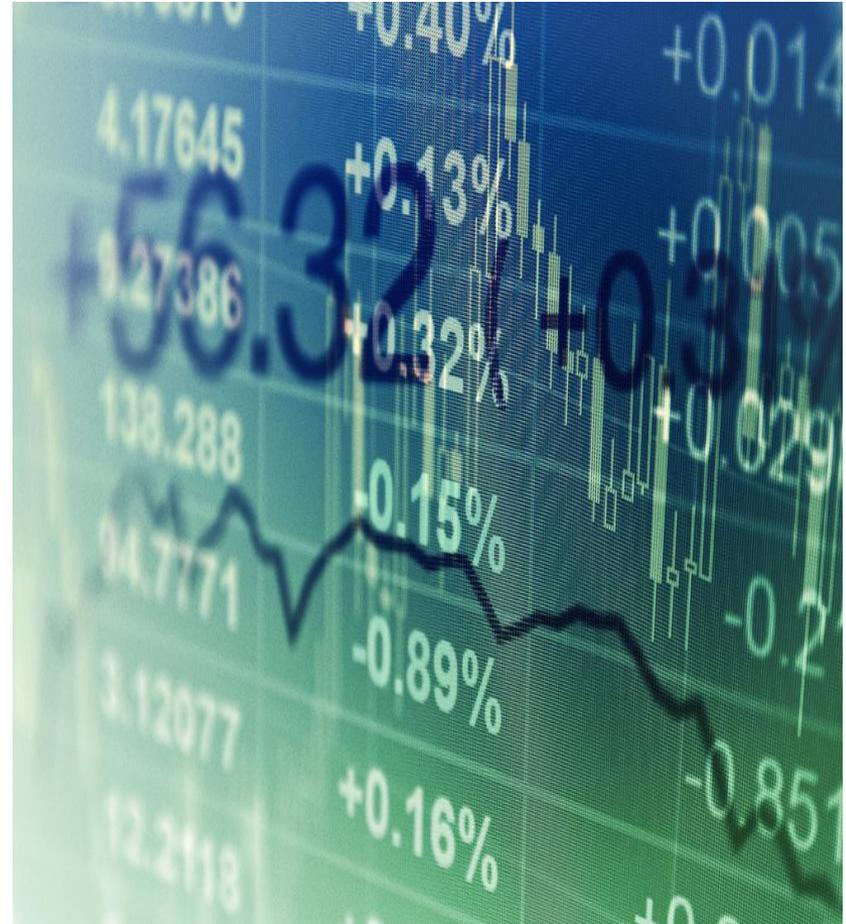
Computers redefining the finance industry: Trading

- **Algorithms run equity research and Trading**
- Machine learning and neural networks employed to analyze and utilize several 100 factors concurrently to pick stocks
- Stocks scored on several parameters – fundamentals and technical indicators
- Performance regressed over time to decide optimal weightings for stock choices
- Different trading algorithms today -
 - Proprietary Trading (Prop Trading): Discovering, buying, selling stocks done via algorithms
 - Algorithmic trading: Block trades to sell large amounts of stock without impacting price
 - Predatory Trading: Trading to sniff out and counter such block trades
- Industry faces paradigm shift as focus moves out of fundamentals and into statistics to make stock picks

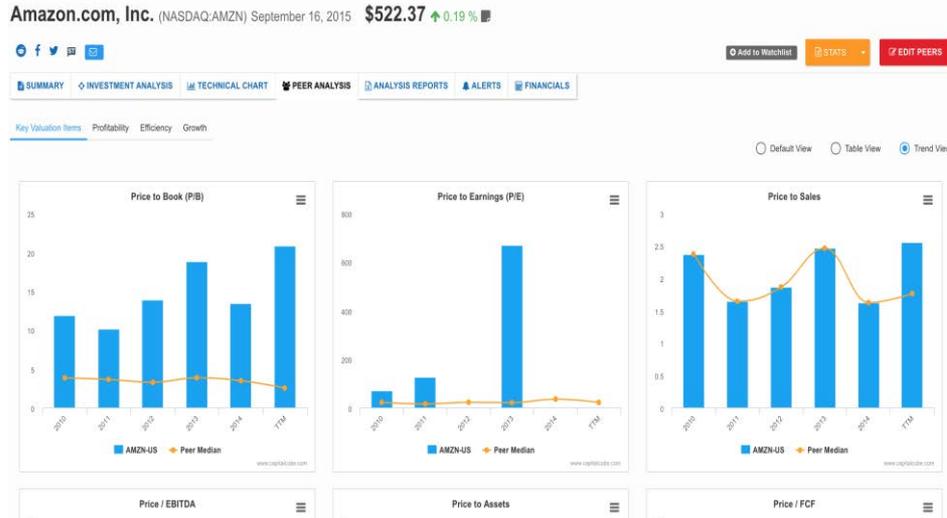


Computers redefining the finance industry: Equity Research

- Equity research fundamentally algorithmic, bound by set of rules
- Content is king for financial portals
- Manual stock coverage significantly inefficient, necessitating need for automated narrative generation
- News, stock tips and trading – all happen on mobile device
- Providing content seamlessly – research, scores, trading ideas, screening tools – need of the hour

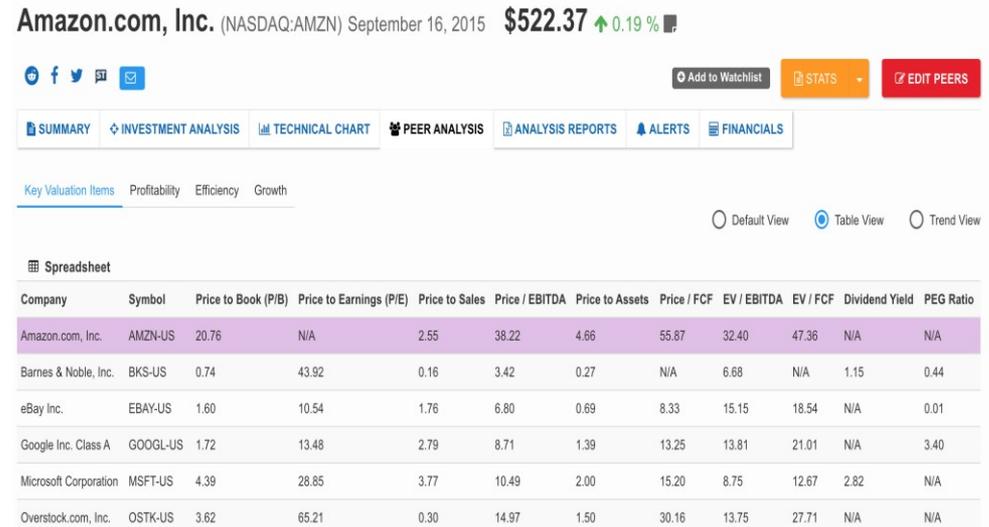


Graphical representation of important ratios



Comparing companies on P/B/, P/E, P/EBITDA across 5 yrs and also the TTM value

Profitability and other ratios for the company under analysis and also those of the peers



Narratives from numbers

Velocity Minerals Ltd. (TSX VENTURE:VLC.H) September 28, 2015 **\$0.013** 0.00 % 

Stock Screener - CapitalCube Add to Watchlist STATS EDIT PEERS

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Score: 50 

Company numbers are TTM (trailing twelve months) or latest available. Share price data is previous day's close unless otherwise stated.

Overview

- Velocity Minerals Ltd. currently has a negative book value and its current Price/Assets ratio of 0.20 is lower than its peer median (0.97).
- VLC.H-CA's book value of equity is not positive and suggests that that it is not meaningful to analyze its ROE versus P/E in order to determine whether the company has an operating or growth advantage.
- The company did not record any revenues for the last twelve months making the comparison of net margin versus asset turnover meaningless.
- Compared with its chosen peers, changes in the company's annual earnings are better than the changes in its revenue, implying better than median cost control and/or some economies of scale.
- Over the last five years, VLC.H-CA's return on assets has improved from median to better than the median among its peers, suggesting the company has found relative operating advantages.
- VLC.H-CA currently does not have any debt.

Provide “Analysis Reports” for e.g. “Fundamental Analysis”, “Corporate Actions”, “Dividend Quality” and “ Earnings Quality”

All reports are algorithmically generated

ETF Peer Analysis

WisdomTree Japan Hedged Equity Fund (NYSE Arca:DXJ) July 24, 2015

Summary Chart **Peer Analysis** Fundamentals Constituent Analysis News

Performance Volatility Fund Detail Investment Style Fund Index

Spreadsheet

Fund Ticker	Fund Name	Closing Price	52 Wk High	52 Wk Low	1 Day Price Return (%)	1 Week Price Return (%)	1 Month Price Return (%)	1 Year Price Return (%)	YTD Price Return (%)	3 Year Annualized Price Return (%)	5 Year Annualized Price Return (%)	Inception Annualized Price Return (%)	Net Expense Ratio (%)
DXJ	WisdomTree Japan Hedged Equity Fund	57.24	60.59	45.88	(0.57)	(1.07)	(3.83)	14.99	15.33	21.45	10.13	1.44	0.48
DXJC	WisdomTree Japan Hedged Capital Goods Fund	27.80	30.74	24.31	(0.83)	(1.91)	(5.35)	6.30	7.91	N/A	N/A	12.78	0.43
DXJF	WisdomTree Japan Hedged Financials Fund	30.49	31.06	22.19	0.10	(0.39)	(0.58)	21.22	26.83	N/A	N/A	21.88	0.43
DXJH	WisdomTree Japan Hedged Health Care Fund	34.51	34.65	25.04	0.70	1.55	6.41	29.35	33.60	N/A	N/A	33.48	0.43

ETF Analysis on Performance, Volatility

Parameters like 1 month, 3 month return

Detailed ETF Constituent Analysis

WisdomTree Japan Hedged Equity Fund (NYSE Arca:DXJ) July 24, 2015

Summary Chart Peer Analysis **Fundamentals** Constituent Analysis News

Key Valuation Items Profitability Efficiency Growth

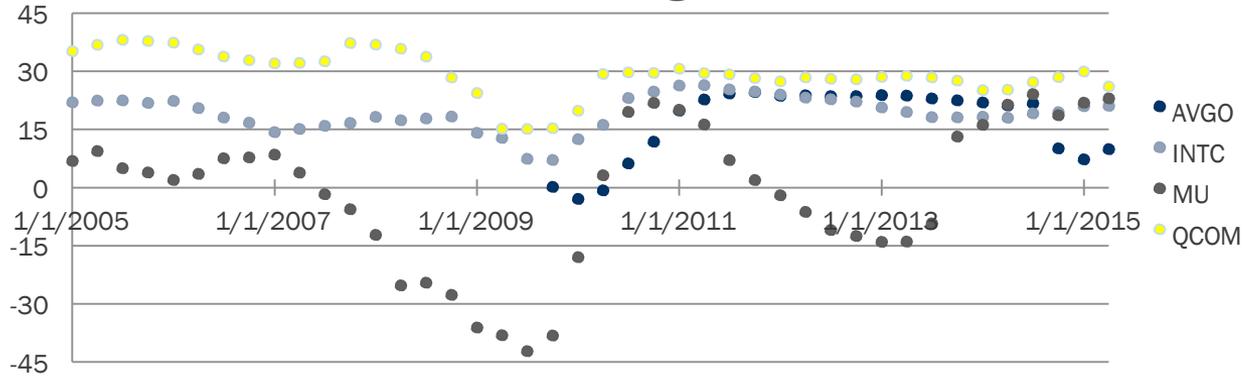
ETF	Ticker	Price to Book (P/B)	Price to Earnings (P/E)	Price to Sales	Price / EBITDA	Price to Assets	Price / FCF	EV / EBITDA	EV / FCF	Constituent Dividend Yield	PEG Ratio
WisdomTree Japan Hedged Equity Fund	DXJ	1.84	18.62	1.71	11.80	1.00	26.80	14.12	31.33	2.16	1.17
WisdomTree Japan Hedged Capital Goods Fund	DXJC	1.74	18.08	1.50	8.13	0.94	40.56	8.83	48.09	1.79	0.80
WisdomTree Japan Hedged Financials Fund	DXJF	1.03	15.84	2.37	8.01	0.09	5.17	10.80	4.67	1.82	1.36
WisdomTree Japan Hedged Health Care Fund	DXJH	3.44	37.59	4.34	31.66	2.27	111.01	26.90	76.24	1.60	59.33
WisdomTree Japan Hedged Real Estate Fund	DXJR	1.81	29.06	4.49	15.00	0.72	27.33	19.32	32.50	1.94	6.56

ETF Constituent analysis on P/E, P/B, P/EBITDA

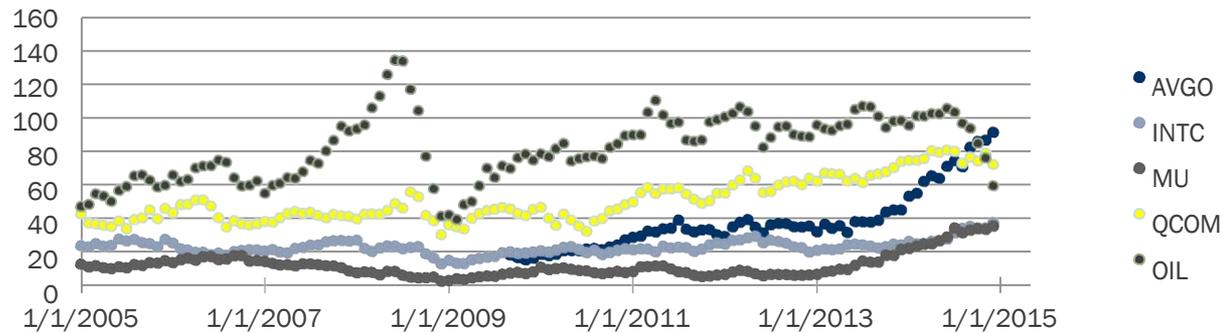
ETF Analysis on profitability, efficiency, growth

Big Data Analysis - Stocks

Net Margins



Semiconductor vs. Oil



Big data correlations analysis

Net Margin analysis for semiconductor cos. for 10 years



BLOCKCHAIN & THE CAPITAL MARKETS

USMAN M SHEIKH, *LITIGATION PARTNER*



GOWLING WLG

SIGNIFICANT IMPACT

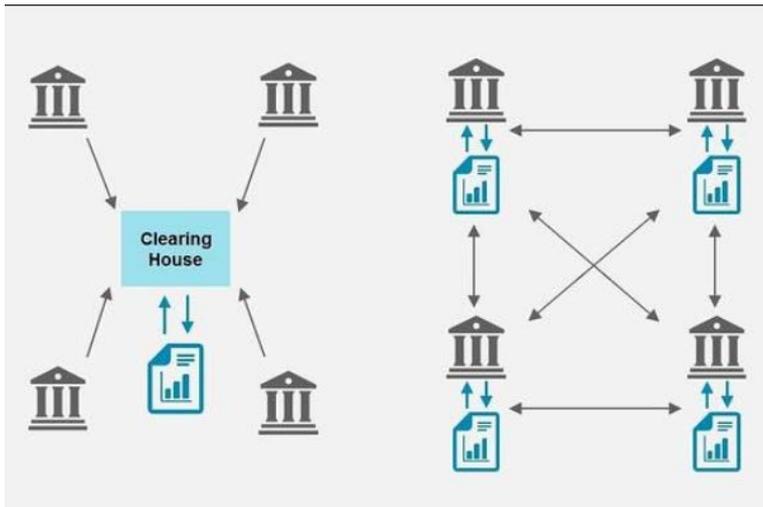
- “You should be taking this technology as seriously as you should have been taking the development of the Internet in the early 1990’s.”
– ***Blythe Masters***
- “The technology likely to have the greatest impact on the financial services industry and the world of business has arrived.” – ***Alex Tapscott***
- “Financial Institutions are early adopters it is estimated that 80% of banks are working on blockchain projects. blockchain will transform the world” – ***Ginni Rometty, IBM***

WHAT IS BLOCKCHAIN?

- **LEDGER** – At its core, blockchain is just a database or ledger of transactions / events (“distributed ledger technology” or “DLT”)
- **CONSIDER THE IMPORTANCE OF LEDGERS IN YOUR LIFE –**
 1. **Bank Transactions**
 2. **Stock Transactions**
 3. **Real Estate Transactions**
 4. **Etc**
- **CRITICAL ELEMENT TO EACH OF THESE LEDGERS –** A trusted third party intermediary

HOW IS THIS LEDGER UNIQUE?

- **NO NEED FOR A TRUSTED THIRD PARTY** – Managed to design a ledger / database that allows transactions directly from one party to another without going through a third party (e.g., a financial institution)



Bitcoin: A Peer-to-Peer Electronic Cash System

Satoshi Nakamoto
satoshin@gmx.com
www.bitcoin.org

Abstract. A purely peer-to-peer version of electronic cash would allow online payments to be sent directly from one party to another without going through a financial institution. Digital signatures provide part of the solution, but the main benefits are lost if a trusted third party is still required to prevent double-spending. We propose a solution to the double-spending problem using a peer-to-peer network. The network timestamps transactions by hashing them into an ongoing chain of hash based proof of work forming a record that cannot be changed without redoing

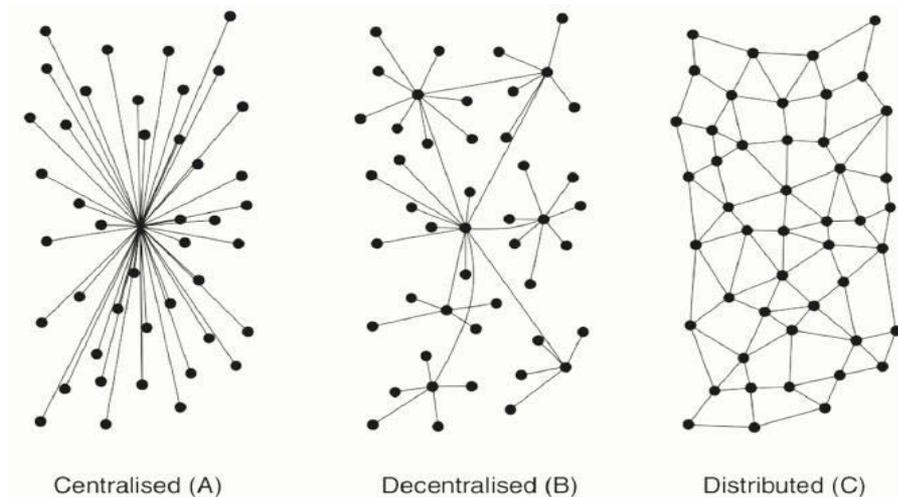
DISINTERMEDIATION

- “The blockchain protocol threatens to disintermediate almost every process in financial services.” – ***World Economic Forum***
- “The technology likely to have the greatest impact on the financial services industry and the world of business has arrived.” – ***Alex Tapscott***
- “If the banks don’t change, we will change the banks” – ***Jack Ma / Alibaba Group***

THE TECHNOLOGY

HOW DOES IT DO THAT?

- **DISTRIBUTED** – There is a distributed digital master ledger of assets and transactions that is shared among participants in the system (“nodes”)



- **TRANSACTION VALIDATED BY CONSENSUS** – For any new transaction, the master ledger can only be updated by consensus of a majority of nodes

HOW DOES IT DO THAT?

- **ACHIEVE CONSENSUS** – Cryptographic process; “proof of work”
 1. Proposed transaction is first confirmed by nodes to be **valid**
 2. Transaction then joins a **block** of similarly cleared transactions (block contains a set of all cleared transactions within that ≈ 10 min period)
 3. The new block contains reference to the prior block – creating a **chain** in the blockchain
 4. The new block is formally added onto the blockchain only after certain nodes (“**miners**”) solve a complicated encryption algorithm (“**hash**”). Miner receives a **reward**.
 5. The new block will populate on the **master ledger** maintained by all nodes in the system.

KEY FEATURES

- **ELIMINATES DOUBLE SPEND PROBLEM** – If try to sell same asset, transaction will be rejected by network as having already been spent
- **NO CENTRAL TRUSTED AUTHORITY REQUIRED** – Strangers can hold / exchange assets without having to trust each other or a central authority
- **TRANSPARENT YET PRIVATE** – Each transaction (since inception) is available to be viewed, but privacy of the parties can be maintained
- **IMMUTABLE RECORD** – Once validated, transactions are immutable (cannot modify, cancel or revoke; irreversible)
- **SECURITY** – Blockchain is considered tamper proof

KEY BENEFITS

- **CUTTING COSTS** – Reduces the need for multiple intermediaries (transaction costs), the need for individual ledgers, etc
- **REDUCING COMPLEXITY AND INCREASING EFFICIENCY** – Fewer intermediaries, streamlines / simplifies processes, reduce errors and delays, reduces data duplication
- **SPEEDING UP TRANSACTIONS** – Enables near to or real time processing of transactions
- **INCREASING SECURITY / RESILIENCE** – No single point of failure
- **TRANSPARENCY** – Obtain real time view of information
- **ENHANCE TRUST** – Enhance trust among parties

PUBLIC / PRIVATE BLOCKCHAINS

- Blockchains can be private or public
- **PUBLIC** – A **public blockchain** is a blockchain where there are no restrictions on reading blockchain data and submitting transactions for inclusion into the blockchain (e.g., Bitcoin)
- **PRIVATE** – A **private blockchain** is a blockchain in which direct access to blockchain data and submitting transactions is limited to eligible persons/entities (e.g., Linux Foundation Hyper Ledger)

APPLICATION TO THE CAPITAL MARKETS

CAPITAL MARKETS

- Prime target for blockchain technology
- Complex global network of interconnected banks and intermediaries
- Significant duplication of data entry; intermediaries often maintain their own ledgers (data silos)
- Results in delays and excessive transaction costs
- Blockchain can reduce / eliminate intermediaries, reduce costs, increase speed and reduce transaction times, heighten security

SOME APPLICATIONS

- **SECURITIES TRADING** – trading, clearing and settlement (T + 3 becomes T + almost instantaneous)
- **FUND TRANSFER / INTERNATIONAL PAYMENTS / FINANCING**
- **CORPORATE VOTING**
- **RegTech** – KYC compliance, regulatory monitoring
- **ASSET MANAGEMENT**
- **REAL TIME FINANCIALS**
- **SMART CONTRACTS** – self-executing contracts (e.g., swaps)
- **DECENTRALIZED AUTONOMOUS ORGS (DAOs)**

IN THE NEWS

R3CEV Consortium includes over 70 banks:

- Goldman (*departure*)
- JPMorgan
- Credit Suisse
- All Six Major Canadian Banks
- Blockchain infrastructure for banking

September 15, 2015 12:42 pm

Blockchain initiative backed by 9 large investment banks

Philip Stafford

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Nine of the largest investment banks, including [Goldman Sachs](#), [JPMorgan](#) and [Credit Suisse](#), are planning to develop common standards for blockchain technology in an effort to broaden its use across financial services.

The group is looking to channel data, ideas and financial backing to a start-up called R3CEV, a New York-based group of trading and technology executives.



Usman M Sheikh

*Partner
Litigation*



usman.sheikh@gowlingwlg.com



416-862-3627

QUESTIONS?