The Team

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Electronics Engineering (2011)
MBA (2013)

Sanctander Bank
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Dalal Capital Advisors LLC
(Portfolio Management)
ICICI Bank (Corporate Banking)

Founder of Women in Blockchain
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Director of MIT Bitcoin Expo 2019

Dr. Hugo Benedetti
PhD in Finance
Boston College (2019)

ESE Business School
Assistant Professor

Corporate Finance (Deloitte)
Financial Advisory (American Appraisal),
Venture Capital (AXA Private Equity),
Strategic Consulting (BCG)
Start-up Advisor (100+ projects)

Julie Smith
MBA 2020

Medici Land Governance
(2018)
Medici Ventures (2017-2018)
AT&T (2012-2014)

Stanford University
BA in Philosophy (2012)

Kenta Yoshida
MBA 2019

MUFG Bank Ltd.
Tokyo, Japan
MUFG Union Bank
Digital Bank, Intern
Los Angeles & San Diego, USA
Japan Digital Design
MUFG-AI Studio, Intern
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Bachelor's in Education (2008)

Zev Vogel, CFA
Yeshiva University (2007)

TFTC Capital, CIO
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JP Morgan, AVP
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Goldman Sachs, Analyst
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Agenda

1. Intro

2. Commercial Real Estate

3. Blockchain Benefits

4. Key Findings

5. Recap / Conclusion
Agenda

1. Intro
   - Scope of Research
   - Methodology
2. Commercial Real Estate
3. Blockchain Benefits
4. Key Findings
5. Recap / Conclusion
Research Scope

How can blockchain and asset tokenization be applied to commercial real estate?
Our research is focused on the tokenization of securities that have reference to real, fixed assets.

<table>
<thead>
<tr>
<th>Assets (economic concept of value + legal concept of property)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Intangible</strong></td>
</tr>
<tr>
<td><strong>Movable</strong></td>
</tr>
<tr>
<td>Patents, trademarks, Franchise agreements, domain names, mortgage servicing rights, other IP, brand rights</td>
</tr>
</tbody>
</table>

Real estate (buildings, land, airspace, subsoil rights), trees
Methodology

**Literature Review**
- Security Tokens
- Real Estate
- Blockchain x Real Estate

**Interviews**
- Academic
- Blockchain Industry
- Real Estate Industry
Agenda

1. Intro
2. Commercial Real Estate
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Direct vs. Indirect

Direct CRE

Indirect CRE
Inefficiencies in Direct CRE Investment

- Inefficient property search due to fragmented listings data
- Chain of title and lien recording increase fraud risk, title insurance costs and slow clearance process
- Predominantly offline due-diligence is time consuming an mostly paper driven
- Slow, expensive and opaque financing mechanisms and payments
Investors have several indirect CRE investment vehicles

- REITs
- Private Funds
- Mutual Funds
- ETFs

Source: http://www.finra.org/investors/alerts/public-non-traded-reits-careful-review
REIT Ecosystem Ripe for Improvement
Agenda

1. Intro
2. Commercial Real Estate
3. Blockchain Benefits
   - Security token vs. Tokenized security
   - Potential blockchain benefits for CRE
4. Key Findings
5. Recap / Conclusion
## Key Definitions

**Token**: a blockchain-based representation of an asset/security/something.

<table>
<thead>
<tr>
<th>Tokenized Security</th>
<th>Security Token</th>
</tr>
</thead>
<tbody>
<tr>
<td>Token represents a security that exists independent from a blockchain</td>
<td>Token represents a security that doesn’t exist outside of the blockchain (i.e. DAO)</td>
</tr>
<tr>
<td>Blockchain embedded</td>
<td>Blockchain native</td>
</tr>
<tr>
<td>Traditional security achieves additional features (positive and negative) by being represented by a token</td>
<td>Blockchain native securities embed the full range of blockchain features (positive and negative) by removing the off-chain link</td>
</tr>
<tr>
<td>‘Depository receipts’</td>
<td>‘Bearer asset’</td>
</tr>
</tbody>
</table>
We investigated a number of potential blockchain benefits for CRE:

- Access to Unserved Investors
- Potential Liquidity
- Administration
- Streamlining Payments
- Transparency to the Underlying Asset
- Customizability
- Granularity
- Demand from New Segments
- Automation, faster settlement, smart compliance, and many others...
Agenda

1. Intro
2. Commercial Real Estate
3. Blockchain Benefits
4. Key Findings
   Three domains of blockchain application to real estate
   Domain 1: Use Cases
   Domain 2: Use Cases
   Domain 3: Use Cases
5. Recap / Conclusion
Three Domains of Blockchain Application for Real Estate

(1) Tokenized Securities
- Public
  - Issuers
  - Token Issuance Platforms
  - Exchanges
- Private

(2) RE Investment Value Chain
- Equity investors
- Debt investors
- CDOs / CMOs
- REITs
- Real Estate Funds
- SPVs
- Banks
- Debt Servicers
- Lawyers
- Data Aggregators
- Developers
- Tenants
- Brokers
- Property managers

(3) Tokenized RE Assets
- Domestic
  - Registries
  - Appraisers
  - Maintenence Vendors
  - Primary (new starts) & Secondary
- International
  - Tax & Valuation Entities
  - Surveyors & Urban Planners

Re-Securitization
Tokenized Securities

Key Players

Public
- Token Issuers
- Platforms/Exchanges
- Equity investors
- Debt investors
- CDOs / CMOs

Private

Interviewed
- tZERO
- Harbor
- AlphaPoint
- Securitize
- TokenSoft
- Templum Markets
- Polymath
- IPSX

Findings

• Trading and settlement
  ➢ Finality - Rules of the market (operational finality) and the governing legal framework in the relevant jurisdiction (legal finality)
  ➢ Security Token and Tokenized Securities
We investigated a number of potential blockchain benefits for CRE:

<table>
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<td>Demand from New Segments</td>
<td>Automation, faster settlement, smart compliance, and many others...</td>
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</table>
Access and Liquidity (1/2)

Public REIT

- Historically returns are less than Private REIT
- Access to only 6-11% of the total US CRE market
- Not customizable
- Trade at a premium and are correlated to the public markets

- Boston Properties Inc (BXP), Gramercy Property Trust (GPT), DuPont Fabros Tech (DFT)

Crowdfunding

- Adverse selection – only assets that don't raise capital through traditional
- Multi-year lock in period
- Non-existent/Siloed secondary market
- Uncertainty regarding the type of asset, manual processes

- Fundrise, Crowdstreet, Yieldstreet, Peerstreet, Cadre, Realty Mogul
LIQUIDITY
• New pool of investors
• Lower costs of financing
• Lower transaction cost
• Faster settlement
• Auto compliant smart contracts
• Efficient processes
• Data transparency to underlying asset
Business Case: Manhattan Condo

- Luxury condo in East Village
- Under Reg D rule 506(c)
- Debt financing
- Appraisal - $30 mn
- Ethereum blockchain
- Option of receiving analog or digital interests

"The market in New York is always strong, but it can take some time to sell for the right price in a new construction building. With blockchain tokenization, we can remove the unruly pressure of traditional bank financing, which is much healthier for the project and all of the stakeholders" - Listing broker as quoted in Forbes
Aspen Digital, Inc. is a Maryland corporation that has been formed to own the St. Regis Aspen Resort in Aspen, Colorado. Aspen Digital is a single-asset REIT and currently intends to own only the St. Regis Aspen Resort.

- Token holders are entitled to Aspen REIT income distributions
- The Aspen Digital token represents an indirect ownership in one of the deposited shares
- The TAO ends on September 14th, 2018
- TAO size $18,000,000
- The minimum investment is $10,000

Source: https://templummarkets.com/aspen
**Key Findings**

- Private RE Lockup period can be up to 4-6 years
- Property requires scheduled inspection and confirmation
- Institutional Investors benefit from “opacity premium” in RE market
- Standardization of data continues to present bottlenecks
- Smart contracts will introduce efficiency and greater productivity to back office workflow, allowing coverage of more deals
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- Demand from New Segments
- Automation, faster settlement, smart compliance, and many others...
Business Case: Payments Flow (REITs)

Tenants → Property Manager → Property Owners = REITs → Custodian → Investors (Equity holders)

$ Rents → $ Distributions → $ Principal, Int rate

Banks (Debtholders)
Current Process

Tenants $ Rents Property Owners = REITs $ Distributions

Property Manager

Investors

Lease contract

Bank Account

REIT

Custodian

Business Case: Payments Flow (REITs)
Business Case: Payments Flow (REITs)

Current Process

Tenants → Property Owners (REITs) → Investors

- Tenants pay Rents to the Property Manager.
- Property Managers are REITs.
- REITs distribute Distributions to Investors.

With Blockchain

- Lease contract embedded in the blockchain.
- Transactions are recorded and verifiable.
- Blockchain ensures security and transparency.

Blockchain Integration

- Use of blockchain for payment processing.
- LEase contract embedded for smart contract implementation.
Tokenized RE Assets

Key Findings

- There is no single source of truth for information about commercial real estate assets
  - Maintenance history
  - Lease information
  - Occupancy rates
- Lease administration & audit is an incredibly cumbersome and time-intensive process
- Tenant payments: 40% of rent payments by paper check (national average)
- Servicers disclose information monthly
- Building maintenance historical records are “spotty”
We investigated a number of potential blockchain benefits for CRE

- Access to unserved investors
- Potential liquidity
- Administration
- Streamlining payments
- Transparency to the underlying asset
- Customizability
- Granularity
- Demand from new segments
- Automation, faster settlement, smart compliance, and many others...
Business Case: Property Management

Current Process

Lease Contracts
- New
- Amend
- Sublease

Manual Input
DB

Write Monthly Report

Up to 30 days

Tenants

Property Manager

Investors
Business Case: Property Management

Current Process

- Lease Contracts
  - New
  - Amend
  - Sublease

Tenants

Property Manager

Investors

With Blockchain

- =
  - Immutable, single source of truth for lease contracts
  - Data storage & Investment vehicle
  - Real-time base transparency
  - Easy to reconcile the terms of contract and payment history
  - Any changes are traceable by investors and auditors

- Manual Input
- Write Monthly Report
- Up to 30 days

- DB
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Blockchain Application for Real Estate

(1) Tokenized Securities

Blockchain Benefits:
1. Liquidity
2. Access
3. Fractionalization & Customizability

Example workflows / processes:
1. Security token issuance
2. Security token trading
3. P2P transfer of (securitized) debt and equity
4. KYC / AML (reg-aware tokens)

(3) Tokenized RE Assets

Blockchain Benefits:
1. Secure recordkeeping

Example workflow / processes:
1. P2P transfer of (non-securitized) ownership
2. Title verification
3. Disintermediated home sharing

Investment Value Chain

Blockchains in Real Estate:

- REITs
- CDOs / CMOs
- Equity investors
- Debt investors
- Real Estate Funds
- SPVs

Blockchain Benefits:
1. Automatic / frictionless payments
2. Data transparency / traceability

Example workflows / processes:
1. Loan syndication
2. Investment due diligence
3. Debt servicing / lease administration

- Developers
- Tenants
- Property managers
- Lawyers
- Brokers
- Exchanges
- Token Issuance Platforms
- Registries
- Appraisers
- Maintenance Vendors
- Tax & Valuation Entities
- Surveyors & Urban Planners
- Private / Public

Repositories:
- Blockchain
- Digital Currency

International / Domestic

Re-securitization
We are building a general framework that Fidelity can use to perform further research

1. Real Asset
   • What is the asset and what is its purpose?
   • How does the asset come into existence?
   • Who has information about the asset?
   • ....

2. Securitization Process
   • Is the asset frequently securitized today?
   • What is the process by which the asset is securitized?
   • ....

3. Securitized Asset
   • Where are the securities based on the asset traded? What is the process to get those securities listed?
   • What are the reporting and disclosure requirements for the type of security?
   • .....
Fidelity Advisors

Jason Ward
Vice President, Blockchain Product Management

Jurica Bulovic
Innovation Manager at Fidelity Labs at Fidelity
Thanks you!!
List of interviews

- Rob Bould, Director at IPSX
- Asha Dakshinamoorthy, Product Lead of Asset Digitalization at AlphaPoint
- Nariman Noursalehi, SVP of Product Management at tZERO
- Amy Kirsh, Director of Partnerships and Investor Relations at Harbor
- Todd Liapette, CEO at Fluidity Factora
- John Mizzi, Chief Strategy Officer at Bond.One
- Mark Snyderman, Portfolio Manager at Fidelity
- Matt Doherty, MIT Sloan
- George Famutimi, Regulatory Analyst at Circle
- Jase Wilson, CEO at Neighborly
- Chris Chrysostom, Senior Software Engineer at Medici Land Governance
- Ted Winston, Vice President at CBRE
- Phil Renzi, Founder at Renzi Bulger Group
- Henry Elder, President at IBREA
- David Gentler, Professor of Real Estate Finance at MIT
- Steve Weikal, CRE Tech Lead at the MIT Real Estate Innovation Lab
Our research so far has helped us focus on a number of promising topics within our scope

1. Building maintenance history / CRE data aggregators (Carfax for CRE)
   Conclusion: we have found this will continue to be an important topic in our research

2. Mortgage servicing
   Conclusion: this is an important application we will explore, but CRE likely small market vs. Residential

3. Public listed vs. Public non-listed REITS
   Conclusion: still not sure why there are listed vs. non-listed public REITs

4. Community ownership idea
   Conclusion: this is socially interesting, but there are non-blockchain incentive issues among participants in deals like this

5. Peer to peer property sales
   Conclusion: this is very interesting, but likely outside of our chosen scope

6. International access
   Conclusion: this will also fall outside of our chosen scope
Security token ecosystem