



**26-29 NOVEMBER 2018**  
Dubai World Trade Center  
11:00 - 19:00 Daily

# How Block Chain would Disrupt Construction Industry

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# Major Discussion

1. Understanding Block Chain Technology Disruption
2. Current Challenges in Construction Management
3. Potential Block Chain Applications
4. Implementation Challenges



# Trust is the soul of Block Chain



## The Theory of the Firm

### Transaction Costs:

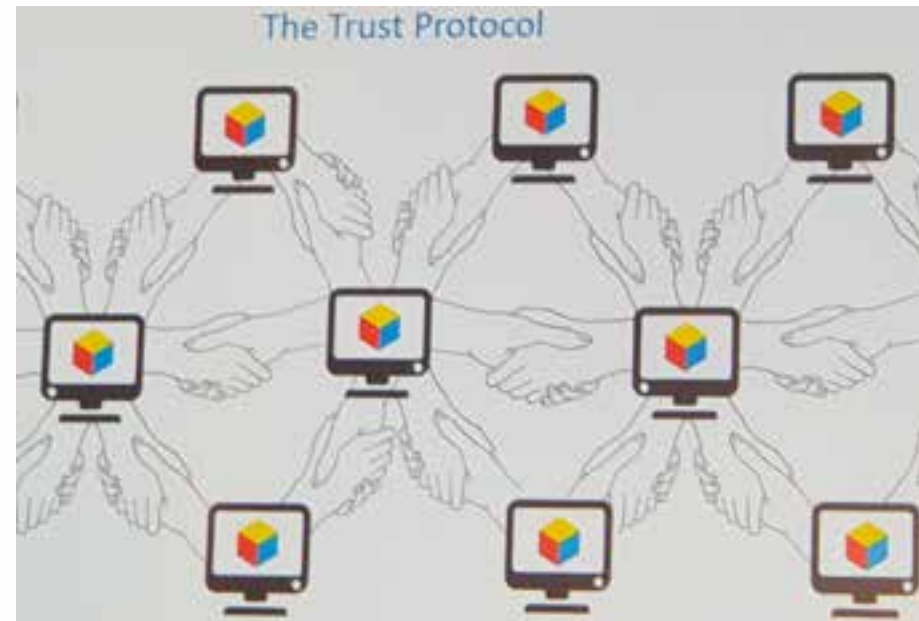
1. Search
2. Coordination
3. Contracting
4. Establishing Trust

1. Honesty
2. Accountability
3. Transparency
4. Integrity

**Trust is the exception that the other party will behave according to the four principles**



# 1. Understanding Block Chain



Transforming from Network of Information to Value

Block Chain Revolution,  
Dan Tapscott



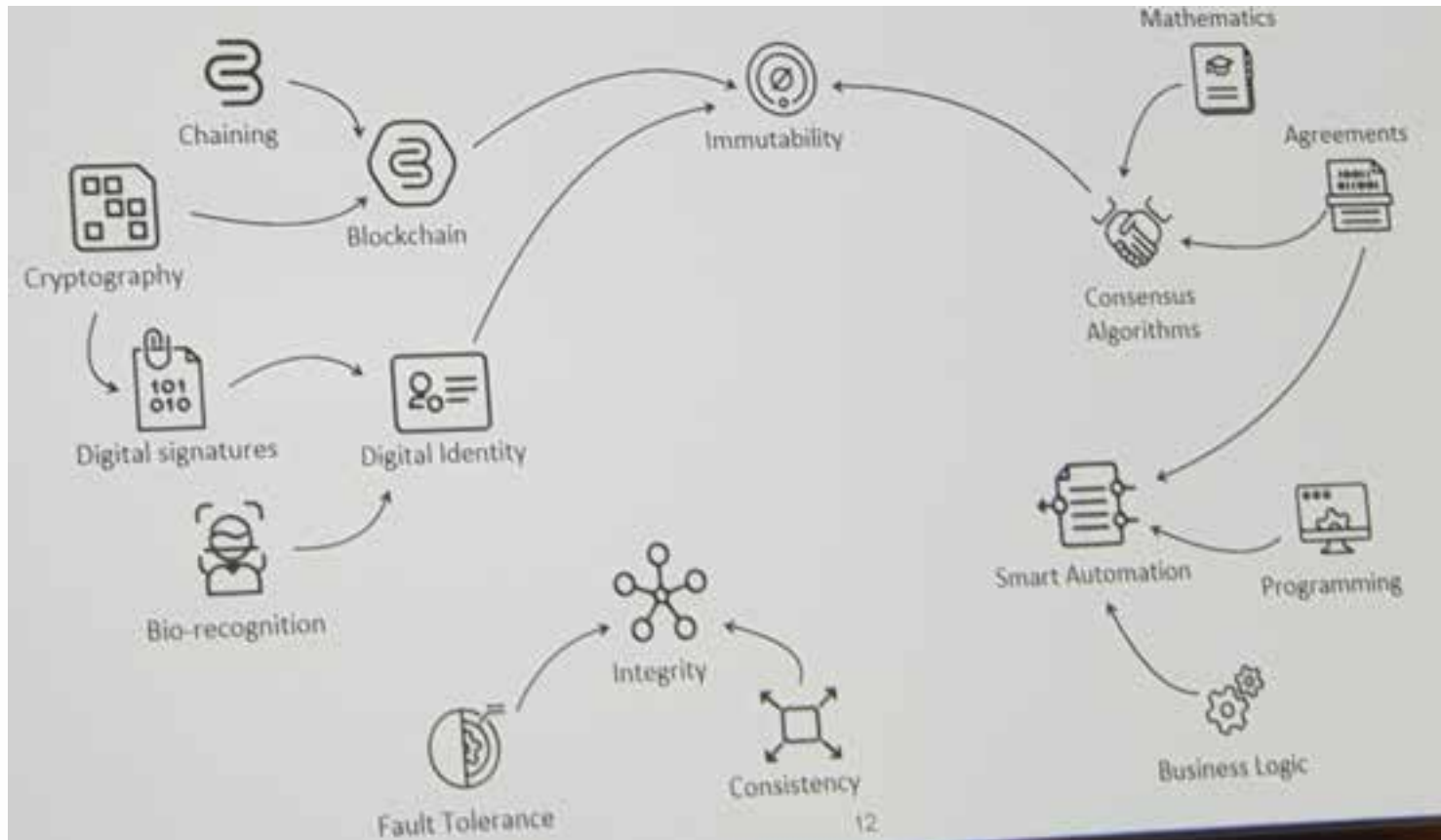
# What's Block Chain



Decentralized Peer to Peer Network

Tamper Proof

DLT



Consensus Driven

Proof of Work

Mining



## Block Chain – Some Major Faces

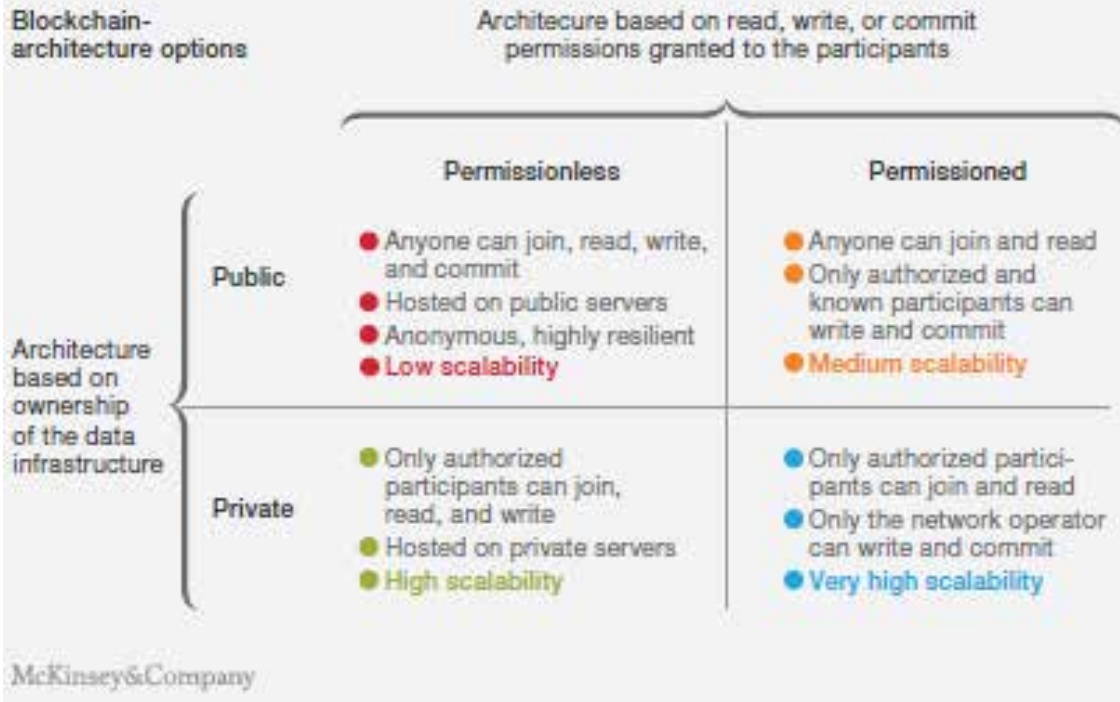




# Block Chain – Classifications



Most commercial blockchain will use private, permissioned architecture to optimize network openness and scalability.



} Hybrid



Source:  
McKinsey & Company  
(2018)

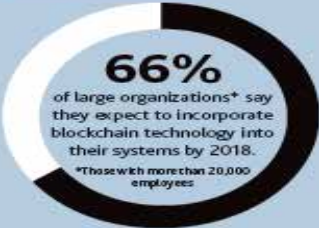
# Block Chain Global Statistics



## Blocked Off

Blockchain, the distributed ledger technology behind digital currencies such as bitcoin, validates and records transactions securely and efficiently. Organizations are rushing to transform to keep hackers at bay and cut costs.  
By *Novid Parsi*

### RACE TO CHANGE



**US\$450 million**

Amount invested in blockchain organizations in 2016—a **79 percent** increase from 2015



**US\$60 billion**

Potential generated savings for financial service organizations via lower fees and faster delivery on cross-border business-to-business payments—blockchain's single biggest revenue impact



**55%**  
of financial services and fintech executives plan to adopt blockchain by 2018.



**77%**  
of financial services and fintech executives plan to adopt blockchain by 2020.



**50%**  
of large fintech organizations\* will invest in blockchain projects within the next year—and just **19 percent** of large banks will do the same.  
\*Those with more than 500 employees



Source:  
PM Network,  
PMI USA (2017)



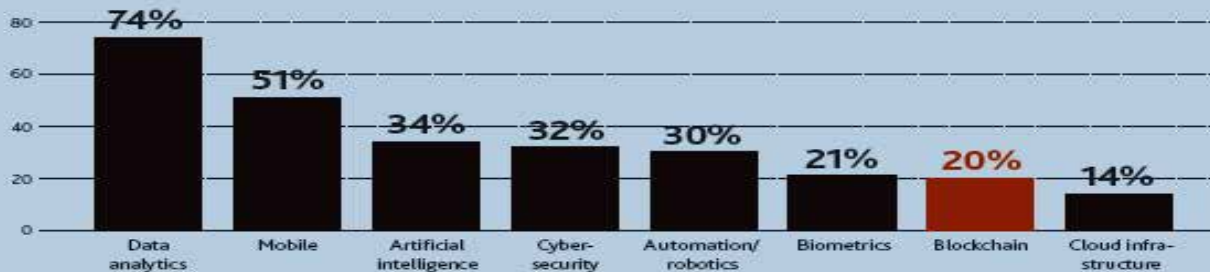


# Block Chain Global Statistics - Continued



## STILL NASCENT

But blockchain isn't the top technology investment priority at financial organizations in the next year.



## GAPS BY REGION

Familiarity with blockchain among financial executives varies around the globe:



**100%** of government services and transactions in Dubai, United Arab Emirates will use blockchain by 2020.

## MORE THAN MONEY

Blockchain's benefits extend beyond monetary transactions: It could securely distribute any kind of sensitive information.

Potential cost savings through blockchain adoption:

**70%**  
central finance reporting

**50%**  
business operations

**30-50%**  
compliance

Sources: Banking on Blockchain, Accenture, 2017; Blockchain Enterprise Survey: Deployment, Benefits & Anxieties, Juniper Research, 2017; Deloitte Blockchain Survey, Deloitte, 2017; Blockchain Technology in the Insurance Sector, McKinsey, 2017; Global FinTech Report, PwC, 2017; The Wall Street Journal



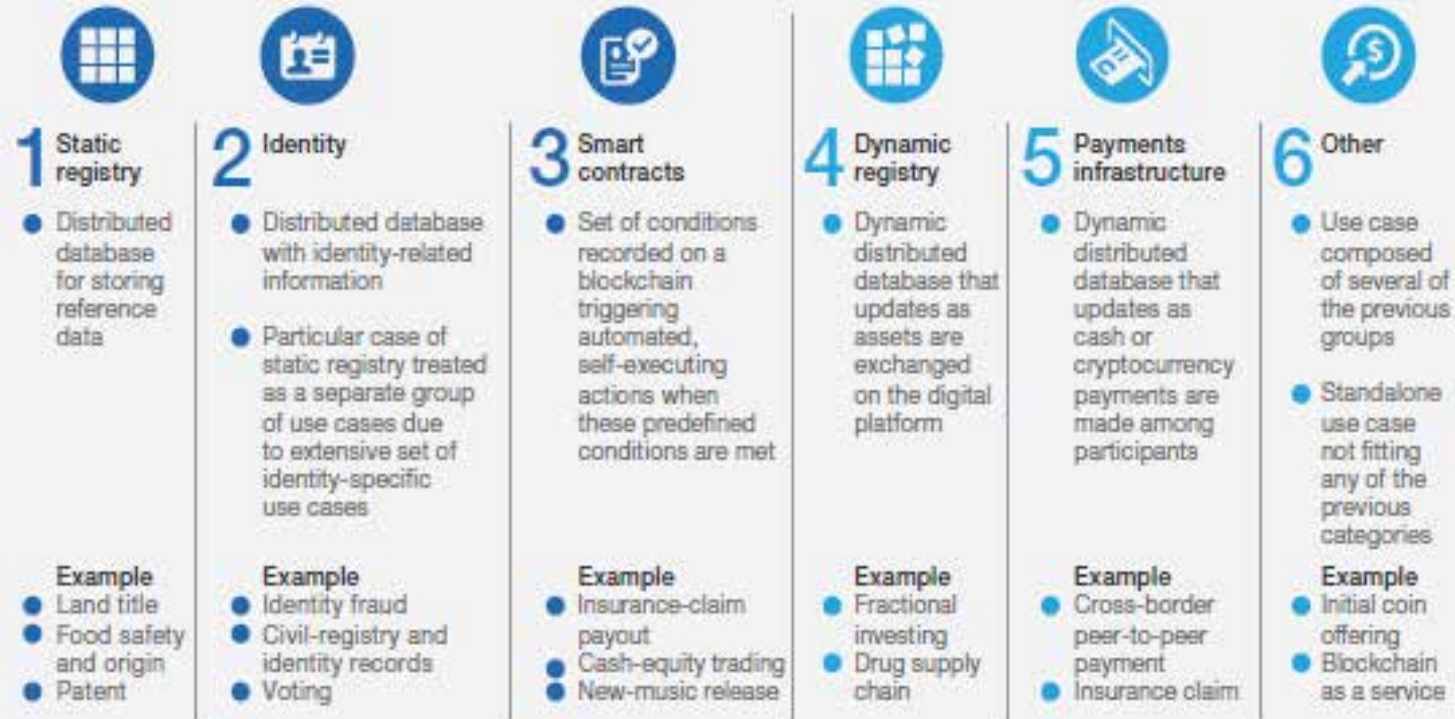
# Block Chain Application Landscape



There are six distinct categories of blockchain use cases addressing two major needs.

Record keeping: storage of static information

Transactions: registry of tradeable information



Source:  
McKinsey & Company  
(2018)



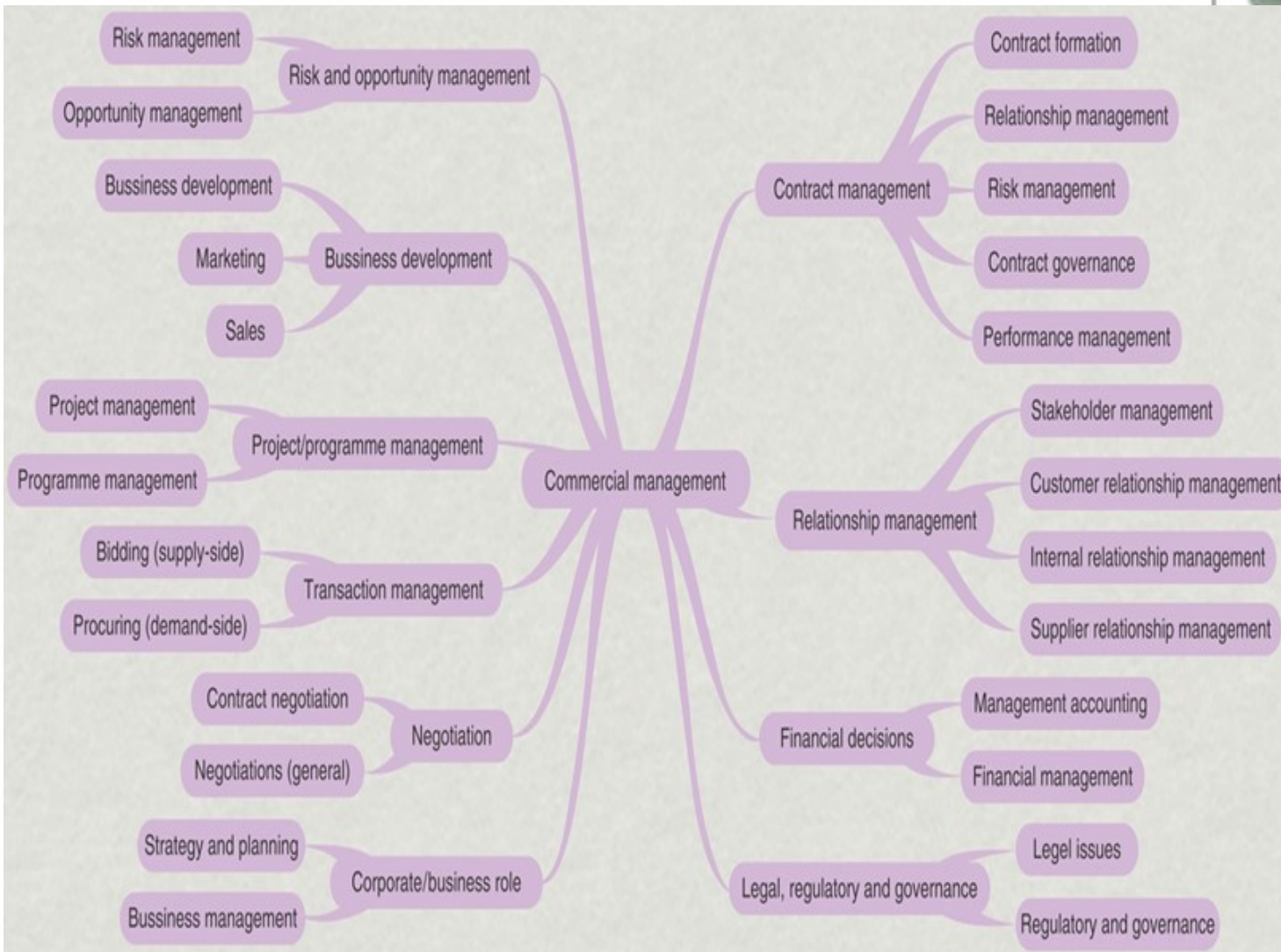
## 2. Construction Management – Some Major Challenges



- i. Contract & Commercial Management
- ii. Supply Chain Management
- iii. Asset Management



# Network of Contracts, Relationships & Processes





# **i. Contracts Management**



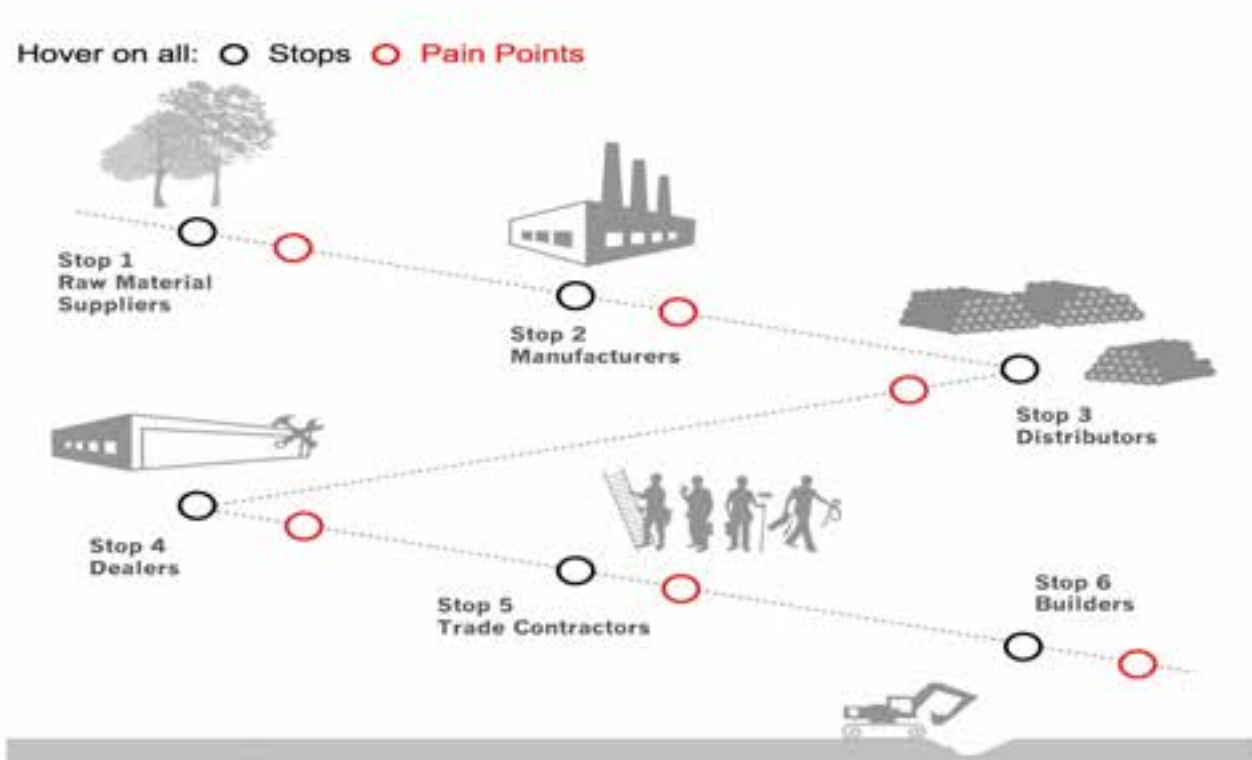
- i. Trust**
- ii. Claims and Variations**
- iii. Cost of Enforcement & Litigation**





## ii. Supply Chain Management

- i. Transparency & Traceability
- ii. Provenance
- iii. Information Exchange
- iv. Trust



## iii. Asset Management

- i. Data Exchange
- ii. Interoperability between multiple Platforms
- iii. Trust



## 3. Potential Block Chain Applications



### Usage Scenarios

- i. Notarization Related
- ii. Transaction Related
- iii. Provenance Related



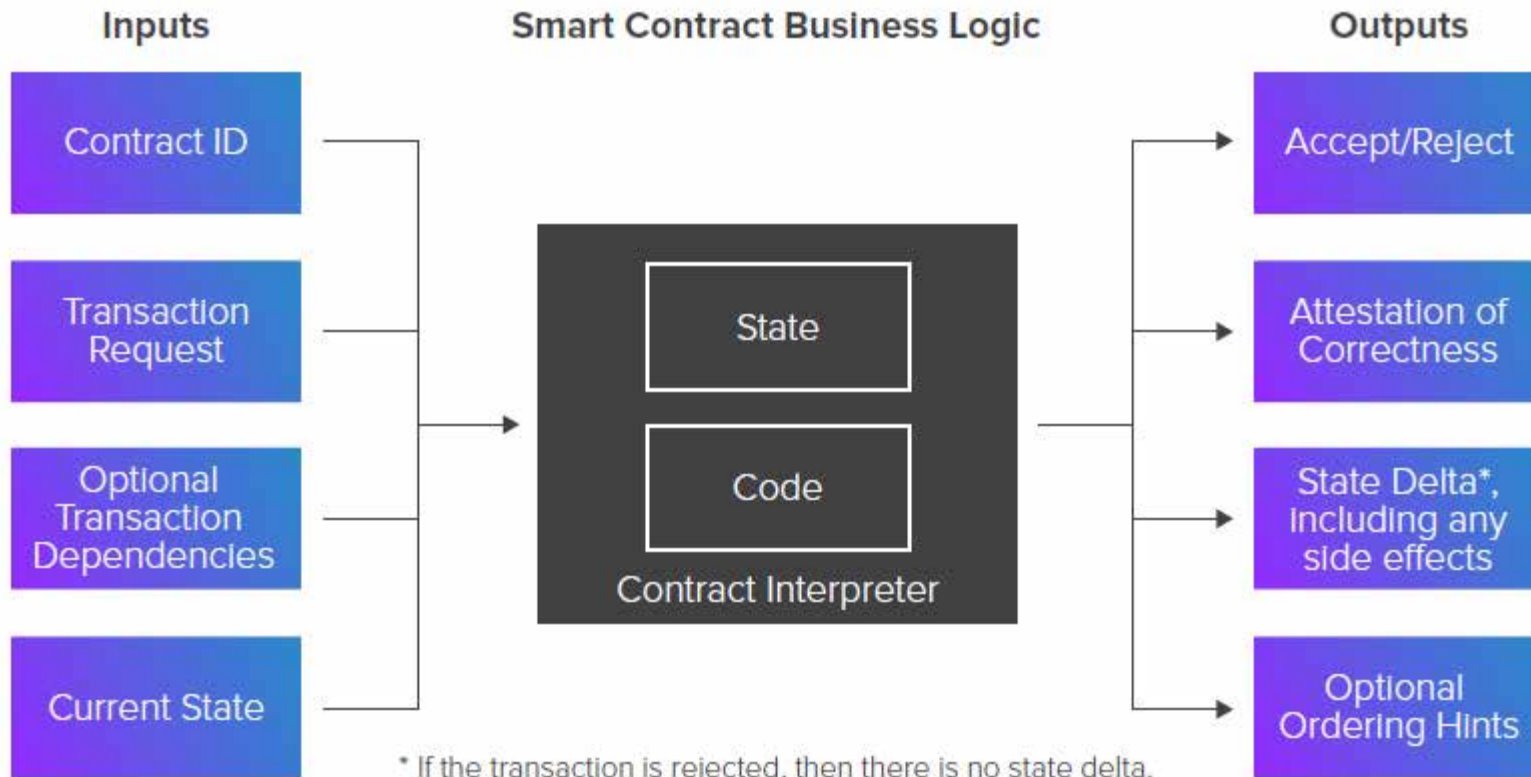
## i. Block Chain enabled Contract Management

- Smart Contract on Ethereum
- Payment Execution & Cash Flow
- Contract Administration
- Re-inforce Trusted Behavior
- Avoid Litigations
- Eliminate in-house Lawyers

```
SIMPLE CONTRACT SOURCE CODE  
1  
2  
3  
4+ contract MyContract {  
5     /* Constructor */  
6     address public contractor;  
7     uint256 public allowance;  
8     uint256 public temperature;  
9  
10    mapping (address => uint) public balanceOf;  
11    event Transfer(address _from, address _to, uint value);  
12  
13  
14-    function types(uint _value) {  
15        balanceOf[msg.sender] = _value;  
16    }  
17  
18+    function transfer (address contractor, uint256 allowance) {  
19        if (temperature < 40) throw;  
20        if (balanceOf[msg.sender] < allowance) throw;  
21        if (balanceOf[contractor] + allowance > balanceOf[contractor]) throw;  
22  
23        balanceOf[msg.sender] -= allowance;  
24        balanceOf[contractor] += allowance;  
25        Transfer (msg.sender, contractor, allowance);  
26  
27    }  
28 }
```

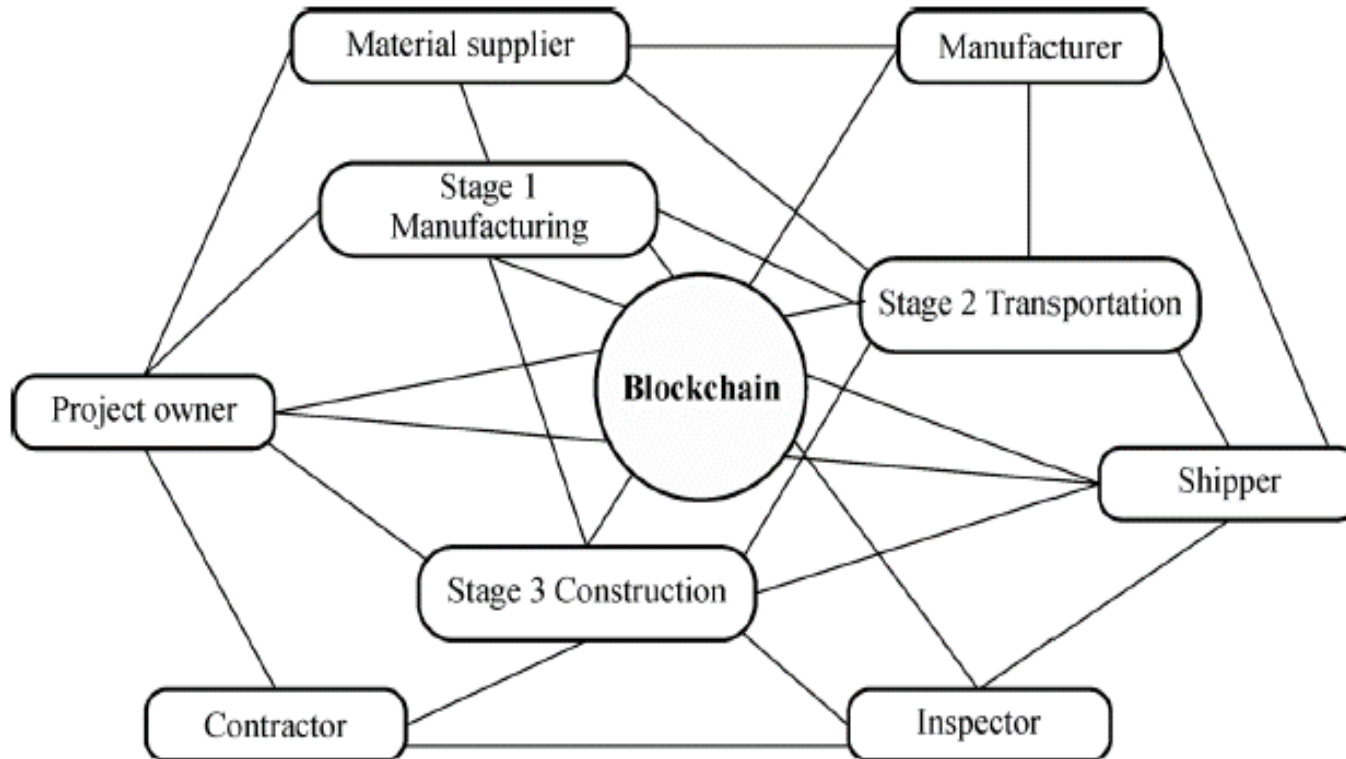
Smart Contract  
Example







## ii. Block Chain enabled Supply Chain Management

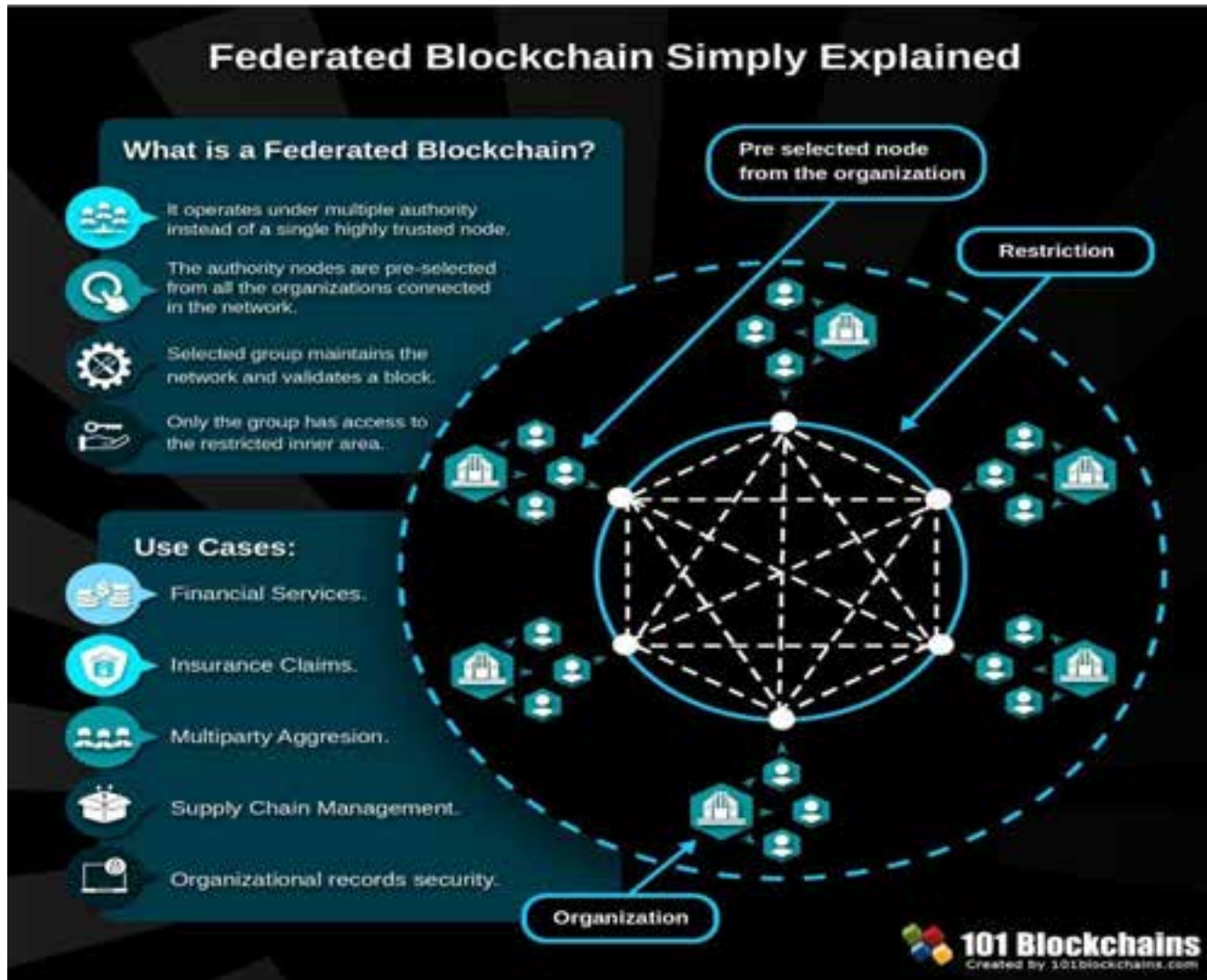


Eg: An Off-Site Fabricated Instrument from Procurement till final Installation

Ref: Jun Wang et al. (2017) The outlook of Block Chain Technology for Construction Engineering Management



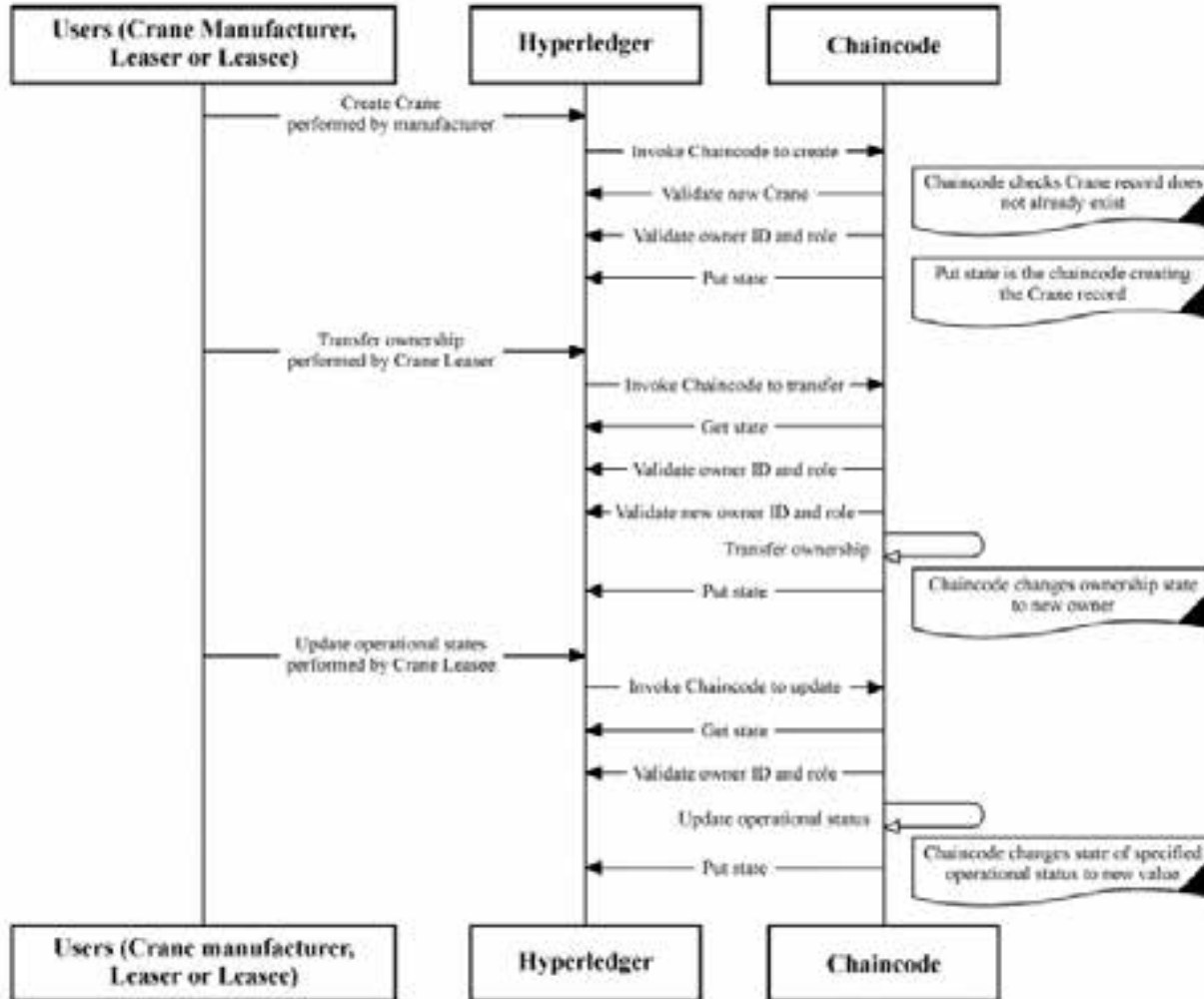
# Supply Chain - Block Chain Model



Source:  
[101blockchains.com](http://101blockchains.com)



### iii. Block Chain enabled Equipment Leasing



An example of a Block Chain-enabled crane leasing based on an IBM Block Chain Platform (2016)

Ref: Jun Wang et al. (2017) The outlook of Block Chain Technology for Construction Engineering Management



# 4. Challenges forward

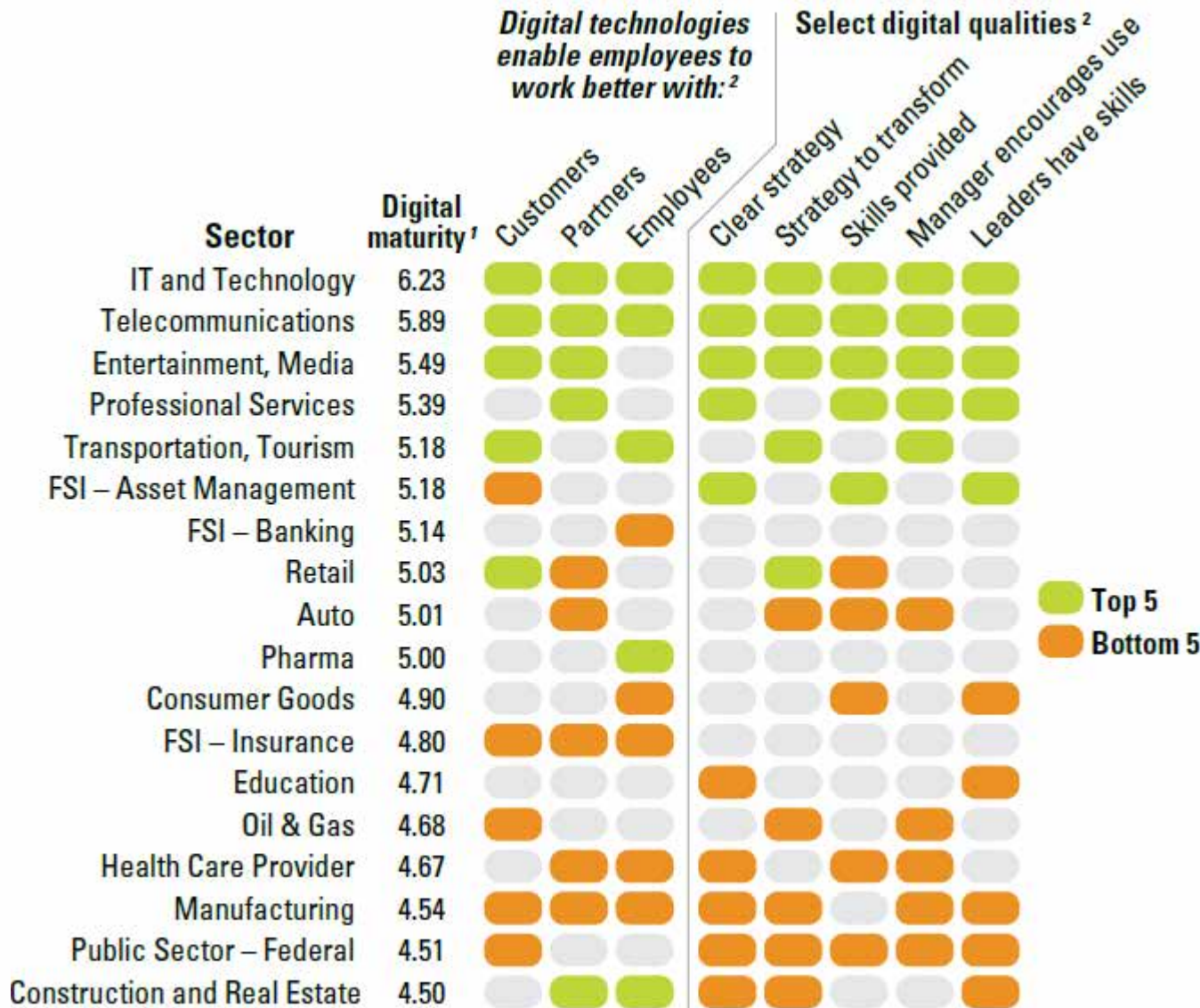


- i. Technical
- ii. Construction Business Related Limitations
- iii. Human Related
- iv. ROI
- v. BIM Integration (Positive Challenge)





# Construction Industry on Digital Map



Source:  
MIT Sloan Management  
Review in Collaboration with  
Deloitte (2018)







Paradigm shifts involve dislocation, conflict, confusion, uncertainty. New paradigms are nearly always received with coolness, even mockery or hostility. Those with vested interests fight the change. The shift demands such a different view of things that established leaders are often last to be won over, if at all.





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