IOWA STATE UNIVERSITY
Debbie and Jerry Ivy College of Business

Can Blockchain Concepts Be Used in the Financial Close Process?

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I appreciate the helpful discussions and feedback from Jim Davis, Melvin Lamboy-Ruiz, Kelly Leonard, and Maureen Mascha and presentation preparation assistance from Yogita-Amit Shah.

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Outline

- Motivation
- Blockchain concepts to cover
- Can blockchain be used in the financial close process?
- Summary

Word of Caution

Blockchain

- 26,000 projects were started in 2016
- Only 8 percent were active in 2017

Motivation

- Blockchain concepts are important for accounting students
- Blockchain most useful for structured transactions
- Accounting students are generally familiar with structured accounting transactions and the financial close process

Learning Objectives

- Students will understand basic blockchain concepts
- Students will analyze whether blockchain concepts may apply to a more familiar process (i.e. financial close process)

Blockchain

- Possible infrastructure of choice for managing exchanges of value just as the Internet provided the infrastructure for managing exchanges of information

Source: Tapscott, D., and A. Tapscott. 2016. How blockchain will change organizations. *MIT Sloan Management Review* 58 (2).

Benefits to Finance and Accounting

- Better reporting with data published simultaneously
- Fewer reconciliations
- Easily updated data
- Easier to authenticate transactions

Source: Vetter, A. 2018. Accountants take note: Big banks enter the blockchain game. *Accounting Today* June 27.

Strengths and Weaknesses

Strengths	Weaknesses
Visibility	Lack of privacy
Aggregation	Lack of standardization
Validation	Garbage in, garbage out
Automation	Black box effect
Resiliency	Inefficiency

- Visibility – ability of participants to follow items through the entire process
- Aggregation – information on blockchain comes from a variety of sources: firms, customers, regulators, etc.
- Validation – once information is captured in a distributed ledger, it has been authenticated and thus, it is difficult to temper with.
- Automation – ability to execute certain transactions automatically in response to pre-specified conditions.
- Resiliency – entire blockchain database is fault-tolerant because it is replicated on every node.

Source: Babich and Hilary 2018.

Key Elements of Blockchain

- Distributed ledgers
- Smart contracts
- Consensus algorithm
- Cryptography
- Permission

Source: Maslova, N. 2018. Blockchain: Disruption and Opportunity. *Strategic Finance* July.

Types of Blockchain

- Public
- Private
- Hybrid

Source: Maslova, N. 2018. Blockchain: Disruption and Opportunity. *Strategic Finance* July.

Types of Blockchains by Permission Model

	Read	Write	Commit	Example
Public permisssionless	Open to anyone	Anyone	Anyone*	Bitcoin, Ethereum
Public permissioned	Open to anyone	Authorized participants	All or subset of authorized participants	Sovrin
Consortium	Restricted to an authorized set of participants	Authorized participants	All or subset of authorized participants	Multiple banks operating a shared ledger
Private permissioned ('enterprise')	Fully private or restricted to a limited set of authorized nodes	Network operator only	Network operator only	Internal bank ledger shared between parent company and subsidiaries

Source: Hileman, G., and M. Rauchs. 2017. *Global Blockchain Benchmarking Study*. University of Cambridge.

Key Success Factors for Blockchain

- Widespread understanding
- Maturity of blockchain technology, interoperability, and standardization
- Integration with legacy systems
- Regulatory and legal frameworks
- Increasing the number of participants

Source: Maslova, N. 2018. Blockchain: Disruption and Opportunity. *Strategic Finance* July.

Myths of Blockchains

Myth	Reality
Blockchains are ‘trustless’	Blockchains always require some degree of trust
Blockchains are immutable or ‘tamper-proof’	**Transactions on a blockchain network can be reversed by network participants under specific circumstances**
Blockchains are 100 percent secure	**Blockchains are not automatically more secure than other systems**
Blockchains are ‘truth machines’	**Garbage in / garbage out applies to every blockchain that uses non-native digital assets and/or external data inputs**

Source: Hileman, G., and M. Rauchs. 2017. *Global Blockchain Benchmarking Study*. University of Cambridge.

Why Auditing Will be Needed?

- Transaction recorded in a blockchain may still be
  - Unauthorized, fraudulent, or illegal
  - Executed between related parties
  - Linked to side agreement that is 'off-chain'
  - Incorrectly classified in financial statements
- Many transactions recorded in financial statements reflect estimated values that differ from historical cost
- Auditors need to consider and perform audit procedures on these estimates

Source: Deloitte. 2017. *Blockchain Technology and its Potential Impact on the Audit and Assurance Profession*. Available at: https://www.aicpa.org/content/dam/aicpa/interestareas/frc/assuranceadvisoryservices/downloadabledocuments/blockchain-technology-and-its-potential-impact-on-the-audit-and-assurance-profession.pdf

Differences between ERP and Blockchain

ERP	Blockchain
Centralized	Decentralized and distributed
High tampering risk	Low tampering risk
Many data operations	Append only
Relational database	Linear transactional database
Human labor-intensive	Non labor-intensive
Currently do not have self-enforcing contracts	Easier to create self-enforcing smart contracts
Controls are specifically designed and in place	Controls could be set through smart contracts – smart controls
Accounting-specific modules	Currently no accounting-specific modules

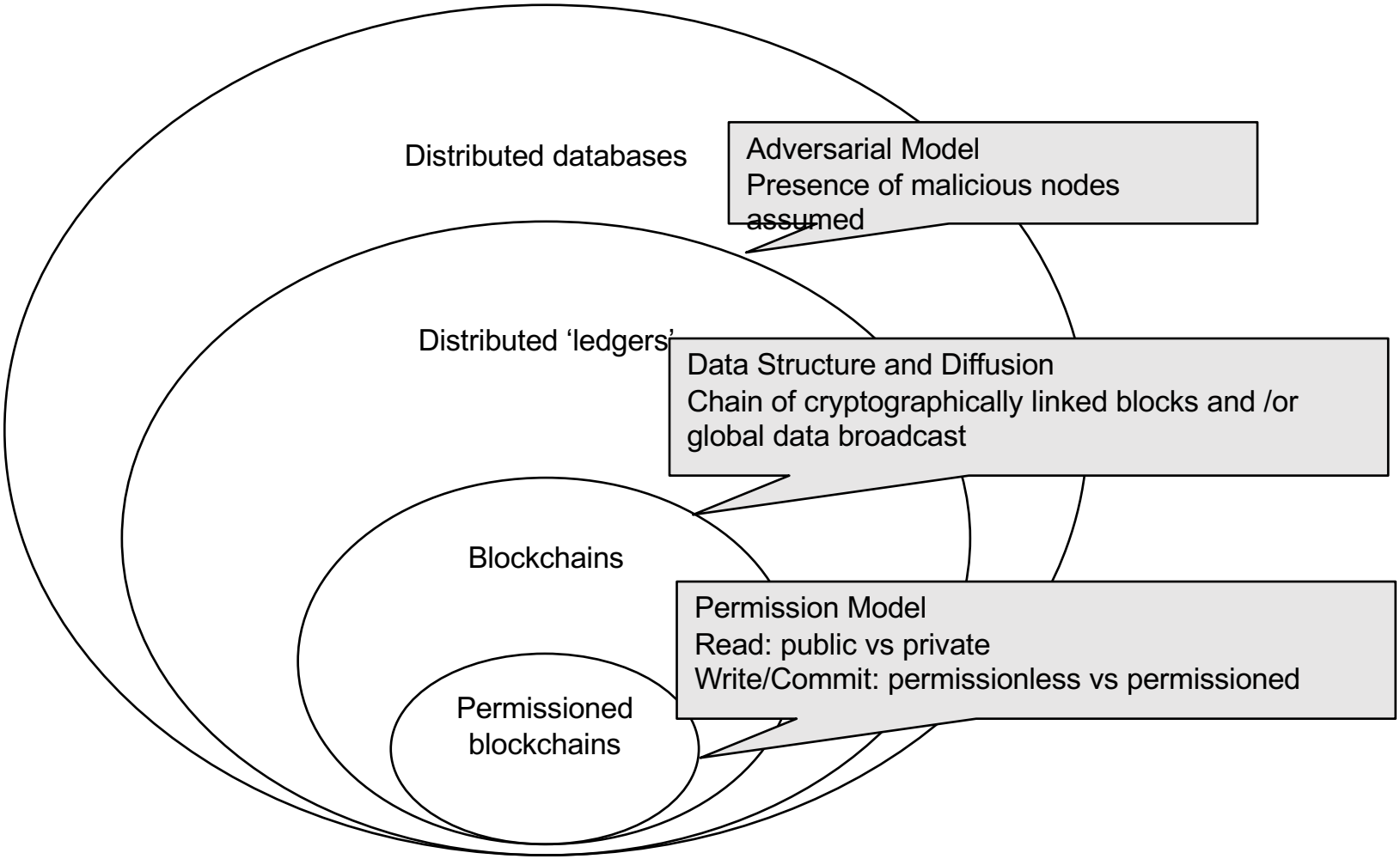
Source: Dai, J., and M. Vasarhelyi. 2017. *Journal of Information Systems* 31 (3): 5-21.

Distributed Ledger Technology

- New type of database that enables multiple parties to share database and to modify that in a safe and secure way even if they don't trust each other
- Enable transfer of digital files without relying on central authority
- Participants can independently verify state and integrity of blockchain
- Participants have shared control over evolution of data

Source: Hileman, G., and M. Rauchs. 2017. *Global Blockchain Benchmarking Study*. University of Cambridge.

Blockchains and Distributed Ledgers



Source: Hileman, G., and M. Rauchs. 2017. *Global Blockchain Benchmarking Study*. University of Cambridge.

EY 5 Point Blockchain Fit Test

- Are there multiple parties in this ecosystem?
- Is establishing trust between all parties an issue?
- Is it critical to have detailed transactional record of activity?
- Are we securing ownership or management of finite source?
- Does network of partners benefit from increased transparency across ecosystem?

Source: Maslova, N. 2018. Blockchain: Disruption and Opportunity. *Strategic Finance* July.

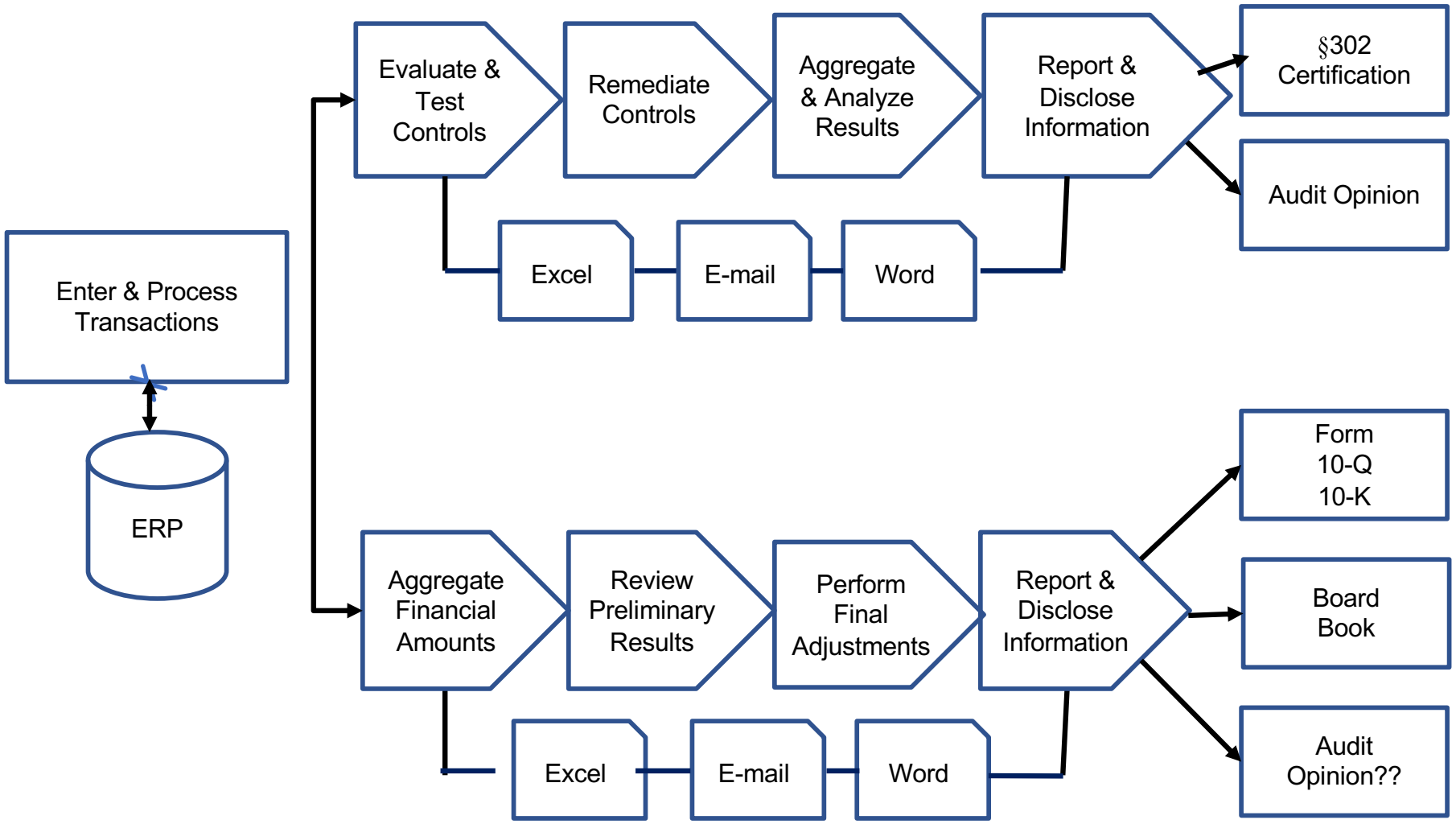
Definition of Financial Close Process

- process of completing the accounting cycle and preparing internal and external reports (PCAOB 2007;Chasan 2012)

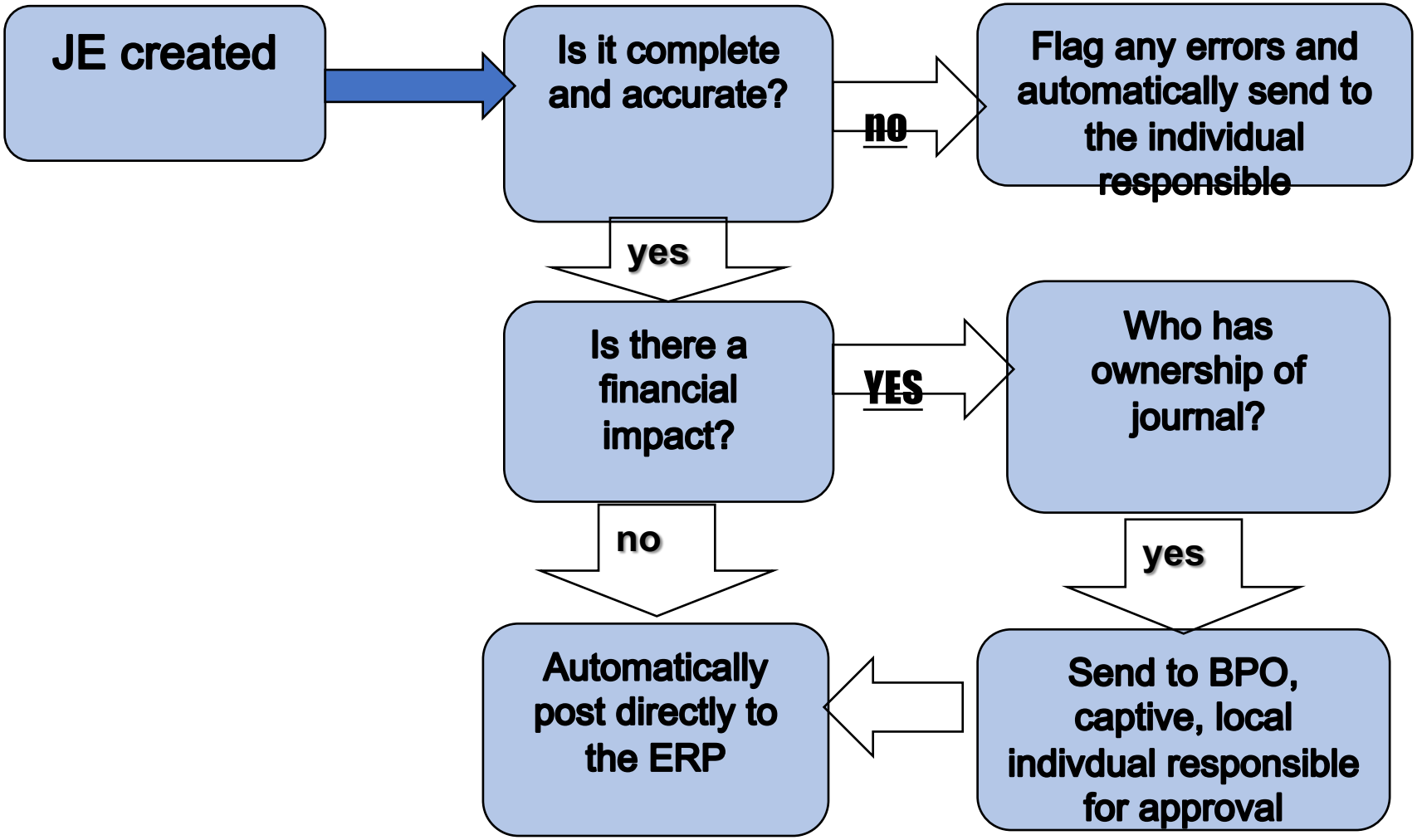
Why is financial close process important?

- Last chance to identify problems (including earnings management issues) (Myllymaki 2014, 5)
- Recent economic volatility and increase in number of restatements has increased pressure on companies to timely report performance
- Regulations (i.e., Sarbanes-Oxley, fair value accounting standards, SEC's XBRL mandate) have increased accountants' period-end workload
- Several recent SEC filings have significant control weaknesses related to financial close process
- Time needed to complete the financial close process = internal information environment quality??

Financial Close Process



Characteristics of Financial Close



Characteristics of Financial Close

- Need to determine time period that each transaction occurred
- Account reconciliations are very time consuming

Source: Janvrin and Mascha (2014)

Financial Close Application

- Steps needed to trust accounting records
  - Costly reconciliations
  - Confirmations
  - Verifications
  - Audit procedures
- Block chain facilitates innovation of triple-entry accounting systems – system whereby all transactions are cryptographically sealed by third entry and reside in shared ledger.
- Third entry serves as digitally signed receipt for parties involved in transaction which can be verified without need for central certifying authority or clearing house

Source: Alarcon, J. L., and C. Ng. 2018. Blockchain and the future of accounting. *Pennsylvania CPA Journal* (winter).

Financial Close Application

- Blockchain is a distributed ledger technology
- With new technology, time to complete close cycle is shrinking (use to be 7 business days for large company)
- During close time, transactions sit in limbo between various steps in billing, invoicing, and payment cycle
- Accountants need to determine which period each transactions occurs

Source: Rosenberg, E. 2017. *How Blockchain Is Going To Change Accounting Forever*. Available at: https://due.com/blog/blockchain-to-change-accounting-forever/

Financial Close Application

- Accountants need to determine which period each transactions occurs
- With distributed blockchain, no need for transactions to sit in limbo.
- With distributed blockchain, instant transactions will allow month-end close processes to be cut down or eliminated completely

Source: Rosenberg, E. 2017. *How Blockchain Is Going To Change Accounting Forever*. Available at: https://due.com/blog/blockchain-to-change-accounting-forever/

EY 5 Point Blockchain Fit Test

- Are there multiple parties in this ecosystem?
- Is establishing trust between all parties an issue?
- Is it critical to have detailed transactional record of activity?
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Source: Maslova, N. 2018. Blockchain: Disruption and Opportunity. *Strategic Finance* July.

Limitations

- Early work
- Addresses EY five questions – are these the appropriate questions to concentrate on?
- Limited class validity
- Preliminary learning objectives

Summary

- Blockchain concepts are important for our students to understand
- Consider taking a common application and ask students to evaluate whether blockchain may be appropriate
- Develops students' critical thinking skills
- Addresses EY five blockchain fit questions

Questions?

Thank you for your feedback…

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