BLOCKCHAIN FOR BUSINESS

INNOVATION MANAGEMENT USING INFORMATION SYSTEMS

KA2 - Cooperation for Innovation and the Exchange of Good Practice Strategic Partnerships for higher Education 2018, no. 2018-1-LT01-KA203-047044

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LEARNING GOALS

Explain the concept of business innovation and the role of information systems in company innovation:

1. Explain what is innovation.
2. Recognize different types of innovation.
3. Explain the role of blockchain in process and business model innovation.
4. Explain the role of blockchain in enabling business development and innovation.

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RECAP

1. What are business processes (BPs) and why are they important in the context of market competition and business efficiency?
2. What are 3 major flows in organizations?
3. What drives companies adopt IT solutions to optimize their business process?
4. What are 4 business activities?
5. What are the opportunities for blockchain application in supporting the 4 business activities?

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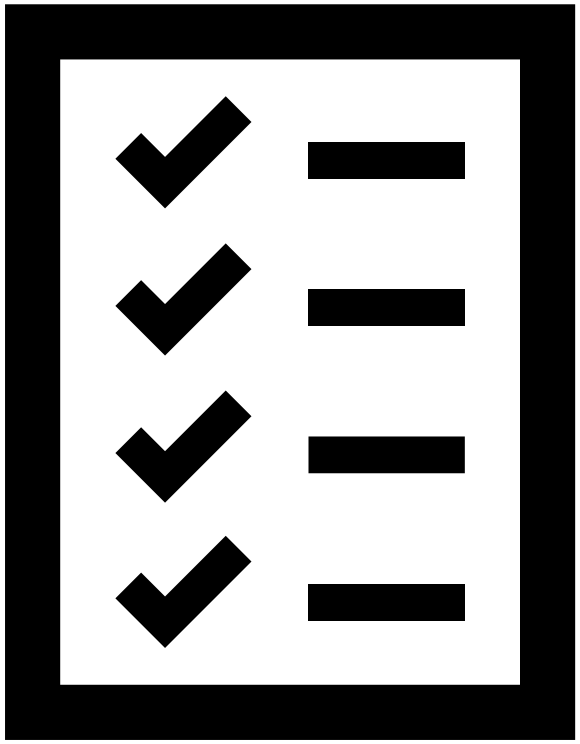
QUIZ:



- Follow the link to the quiz :
  - Moodle block “Innovation management using information systems" 

    Quiz #1 “The opening quiz”.

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WHAT IS INNOVATION?

- The word innovation was used as early as the 12th century. The term was used in France as „renewal“ or „giving a new shape to an existing object“.
- Inovation:
  - *lat*. *innovatio* – new structure;
  - i.e., newly created thing.
- The difference between invention and innovation:
  - Invention – a new idea;
  - Innovation – a new idea, which has been successfully implemented in practice.

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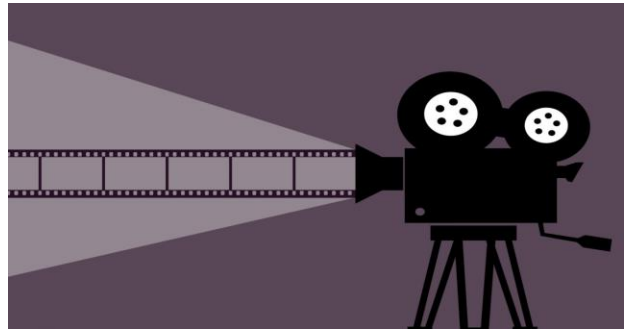
WHAT IS INNOVATION?

- The concept of innovation is broad, ambiguous, because it is used in a variety of different fields of science, art, and business practices.
- In business: innovation means the introduction of new or substantially improved products (goods or services) or processes, new marketing or organizational methods in business practice.

Watch a video: 02:39 min

5 types of innovation



https://youtu.be/jNoYwJiL6mw

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THE GOAL OF INNOVATION

- Moving ahead!
- The goal of innovation – **improve the exisitng situation** (business, social, ethical, health, societal, etc.).
- In the realm of economics – innovation is the major source for **efficiency boost** - i.e., the leverage for profitability boost.

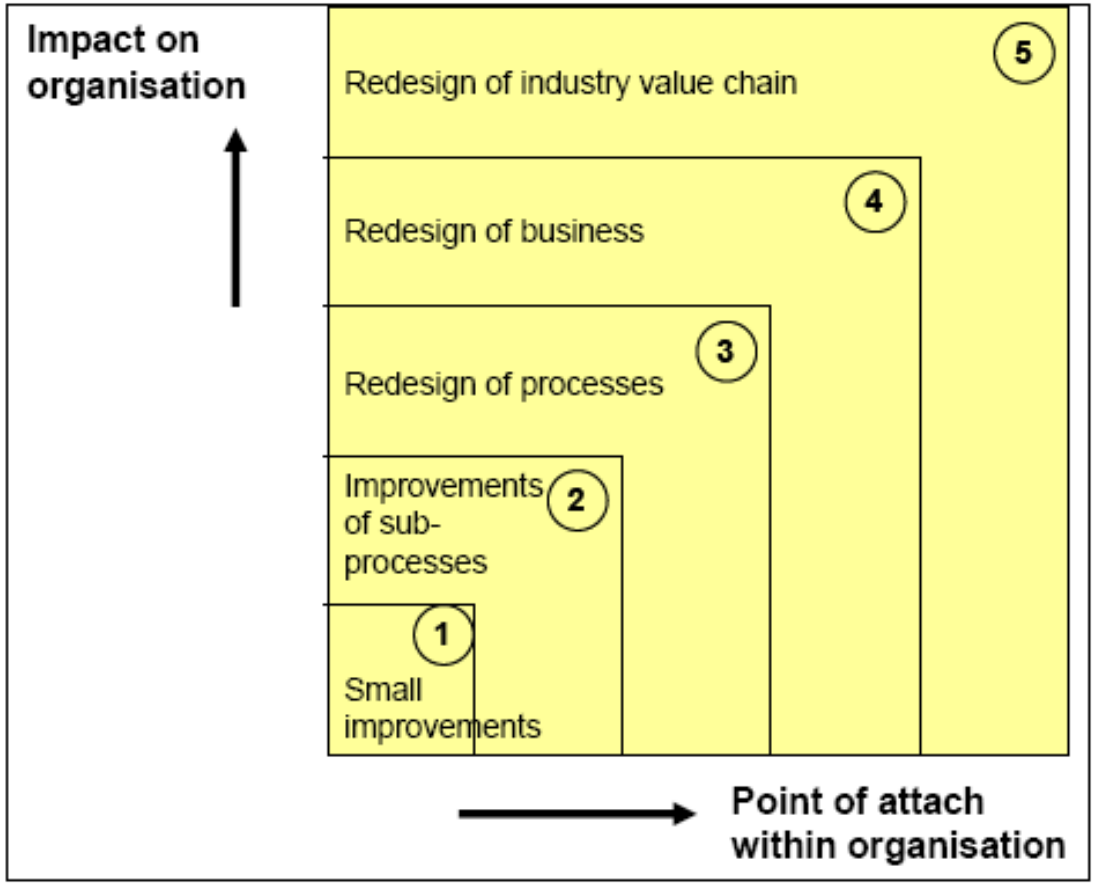

Figure 1. Levels of Process Innovation

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THE IMPORTANCE OF INNOVATION TO BUSINESS

- There are three generic risks to business:
  1. Low demand for services or products;
  2. Inefficient operation management;
  3. Lack of innovation.
- All the three risks directly or indirectly stem from the company's capacity to innovate:

  - The markets have never been static, and the company which is not innovating will eventually become outcompeted /obsolete and forced out of business.

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THE BUSINESS ENVIRONMENT TODAY

- Intensified competition:
  - Global markets, global competition;
  - New product development cycles are shortening.
- Continuous innovation is the only way for the companies to remain on the market (survive).
- The knowledge of what innovation (process) is and how it can be (best) applied is crucial for the company's survival!
- However, be prepared – innovation failures prevail, and innovation success rate isn't high!

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INNOVATION VS. IMPROVEMENT

	Improvement	Innovation
Level of change	Incremental	Radical
Starting point	Process problems	Environmental change
Frequency of change	Continuous	Discrete
Participation	Bottom-up	Top-down
Risk	Moderate	High
Primary enabler	Statistical control	Information Technology

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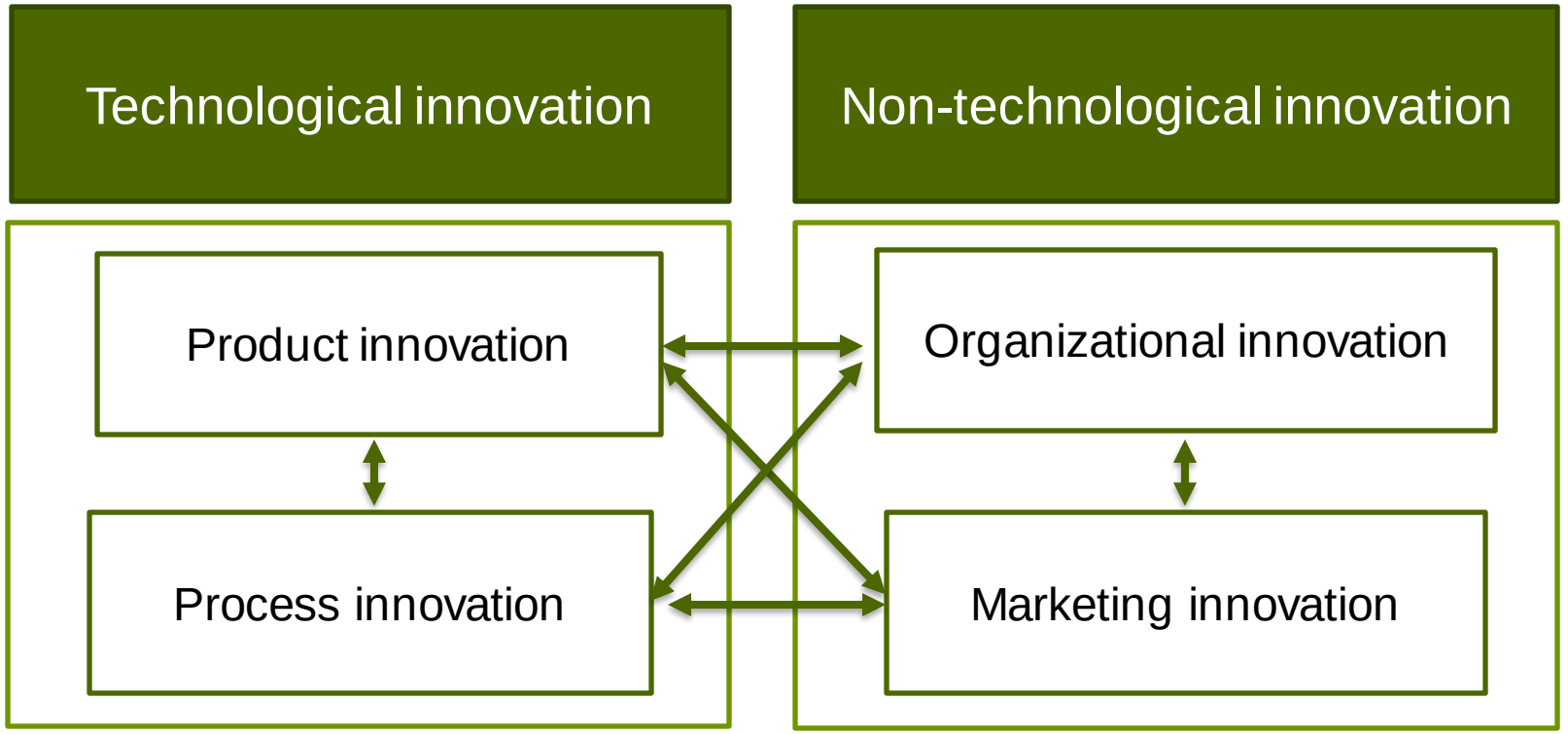
INNOVATION TYPES (OECD)



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INNOVATION TYPES (SATELL, 2017)

1. **Sustaining** innovation – improving existing capabilities in existing markets, clear idea of what problems need to be solved and what skill domains are required to solve them.
2. **Breakthrough** innovation – well-defined problem that's hard to solve.
3. **Disruptive** innovation – creates a new market and value network and eventually disrupts an existing market and value network, displacing established market-leading firms, products, and alliances.
4. **Basic research**.

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TYPES OF INNOVATION

1. **Continuous / Sustainable innovation (exploitation):**

Successful companies are good at responding to **evolutionary** changes in their markets.

2. **Disruptive innovation (exploration):**

Where they run into trouble is in handling **revolutionary** changes in their markets

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DIGITAL INNOVATION

- Digitization makes physical products programmable, addressable, sensible, communicable, memorable, traceable, and associable.
- Digital innovation furthermore requires a firm to revisit its organizing logic and its use of corporate IT infrastructures.
- The previously non-digital product — the book— now embeds digital capabilities such as communication, memory, programmability, traceability.
  - Amazon can track how long readers look at pages and readers can find out who else underlined sentences, and so on…

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KEY CHARACTERISTICS OF DIGITAL INNOVATION

Three unique characteristics of digital innovation can be noted:

1. Reprogrammability.
2. Homogenization of data.
3. Self-referential nature of digital technology.

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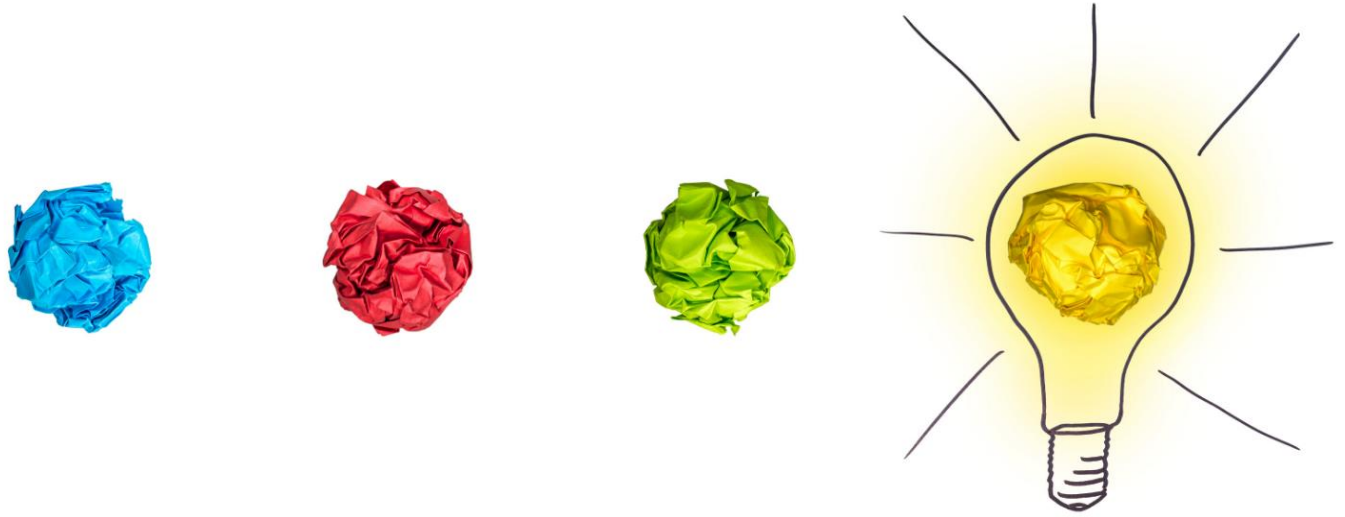
APPLICATION OF INNOVATIONS

1. **Process innovation**;
2. Business model innovation.



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1. PROCESS INNOVATION

Business Context

How is innovation organized to facilitate enhanced process performance?

Process

1. Why are processes created?
2. How are processes managed?
3. What are the defining elements?
4. How are the elements related?

Innovation

1. Why is innovation needed?
2. How is innovation managed?
3. What are the defining activities?
4. How are the activities related?

How does business process configuration influence and shape innovation?

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INNOVATION VS. IMPROVEMENT

Improvement	*Innovation*
1. Process defined	1. Success indicators defined
2. Process measures defined	2. Current strength-weakness analysis
3. Process diagnosis	3. Future opportunities-threat analysis
4. Improvements identified	4. Innovations identified
5. Improvements prioritized	5. Innovations prioritized
6. Process design and test	6. Process design and test
7. Implement improvements	7. Implement innovation

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BLOCKCHAIN FOR BUSINESS PROCESS MANAGEMENT

- Blockchains offer a way to execute processes in a trustworthy manner even in a network without any mutual trust between nodes.
- Large parts of the control flow and business logic of inter-organizational business processes can be compiled from process models into smart contracts which ensure the joint process is correctly executed.
- Trigger components allow connecting these inter-organizational process implementations to Web services and internal process implementations. These triggers serve as a bridge between the blockchain and enterprise applications.

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BLOCKCHAIN FOR BUSINESS PROCESS MANAGEMENT

- By studying business processes and individual routines, you can achieve a very clear **understanding of how a business works**.
- You can also **understand how to change the business to make it more efficient or effective.**
- A company's **BP can be a source of competitive strength** if they enable the company to innovate better or to execute better than its rivals.
- **BP can also be liabilities** if they are based on outdated ways of working that impede organizational responsiveness and efficiency.

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BLOCKCHAIN FOR BUSINESS PROCESS MANAGEMENT

- E.g. **creative products** – with blockchain, a direct connection between artist and consumer is possible. The British musician Imogen Heap has already tried out blockchain technologies.

- E.g. **supply chains** - countless stages in many different regions of the world, often making them difficult to track.

The creation of these resources has been (partially) funded by the ERASMUS+ grant program of the European Union under grant no. 2018-1-LT01-KA203-047044. For more information visit the project website: http://project-blocknet.eu

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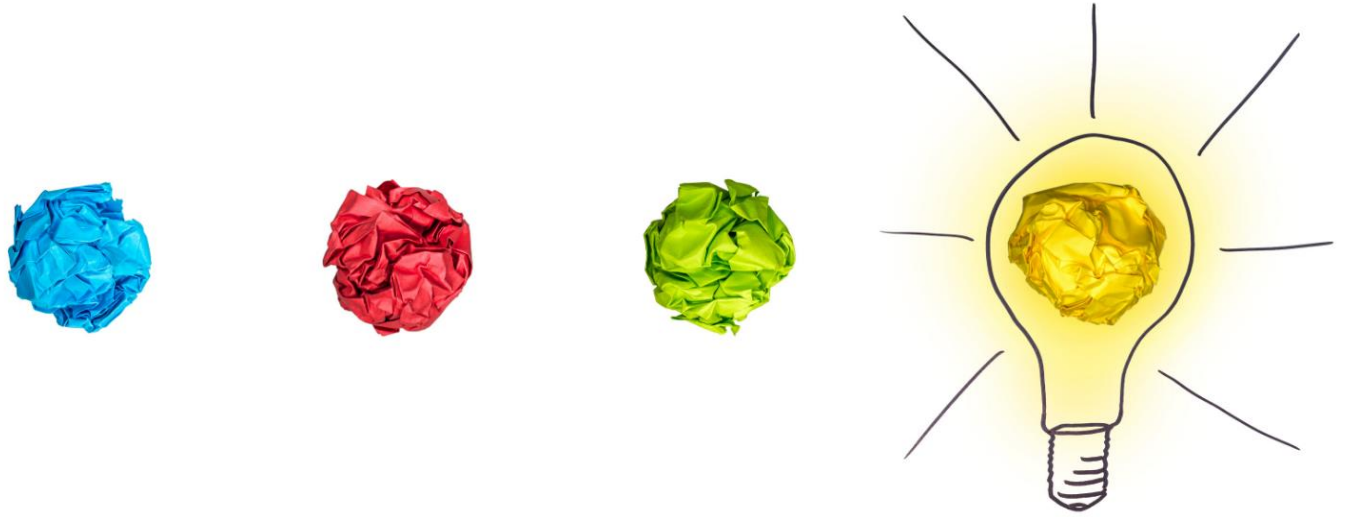
APPLICATION OF INNOVATIONS

1. Process innovation;
2. **Business model innovation.**



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2. BUSINESS MODEL INNOVATION

- Business model innovation is the development of new, unique concepts supporting an organization's financial viability, including its mission, and the processes for bringing those concepts to fruition.
- The primary goal of business model innovation is to realize new revenue sources by improving product value and how products are delivered to customers.
- Business model innovation example: Amazon launched in 1995 as the “Earth’s biggest bookstore.”

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BUSINESS MODEL INNOVATION AND BLOCKCHAIN

- The traditional business models are process-heavy and require the presence of many stakeholders, intermediaries, and third parties due to limited trust and transparency.
- New models have emerged that have disrupted traditional models, such Uber, Airbnb, Netflix, etc.
- Blockchain presents many opportunities beyond cryptocurrency for organizations to disrupt traditional business models by using peer-to-peer exchange with trust, digital and automated execution of business contracts, and agreements with smart contracts.

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BUSINESS MODEL INNOVATION AND BLOCKCHAIN

Blockchain injects trust into business transactions. It fundamentally changes the state of trust in business models by making it dynamic, so that business models can be defined as either 1) trusted, 2) semi-trusted, or 3) untrusted. E.g.:

1. A music distribution model in which music files are exchanged directly from creator to the listeners and monetized without any distributors.

2. A remittance model in which money is transferred from a sender to a receiver without a financial institution acting as an intermediary.

3. An open market model that connects buyers and sellers directly without an exchange intermediary.

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BUSINESS MODEL CANVAS AND BLOCKCHAIN

Key Partnerships	Key Activities	Value Proposition	Customer Relationships	Customer Segments
• Strengthened company ties inside the supply chain • Strengthened data integrity • Facilitation of payments • Shared networks • Elimination of lengthy processes	• Transform business processes • Peer-to-peer networks **Key Resources** Access via peer-to-peer networks. Improvements in: • Verification • Documentation • Audits	• Verifiability • Access new products or services • Faster transactions • Less expensive transactions • Smart contracts, fewer middle layers	• Greater transparency • Self-service • Automation • No middlemen **Channels** • New channels • New APIs, SDKs	• Reach new customers • Reach new customer segments

Cost Structure	Revenue Streams
• Reduced search costs • Reduced negotiation costs • Reduced IT costs • Reduced transaction costs • Increased costs of IT/software, development personnel	• Recurring revenues • Transaction revenues • Services revenues • Crowdfunding

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HOW CAN BLOCKCHAIN IMPACT BUSINESS MODEL: CUSTOMER SEGMENTS

- Customer segments – the different groups of people or organizations that an enterprise aims to reach and serve.
- An organization using blockchain can address existing customer segments in a market. Customer markets served by blockchain systems can be like the segments served by typical organizations: niche markets, diversified markets, and mass markets.
- Blockchain is distinctive in that it can facilitate access to a target market that was previously not reachable and therefore creates new customer segments for a business.

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HOW CAN BLOCKCHAIN IMPACT BUSINESS MODEL: VALUE PROPOSITION

- Blockchain technology can influence customer value by providing access to products or services that were previously not available or could only be garnered by expensing a large amount of time or money.
- Blockchain technology can also provide faster or less expensive transactions than those completed in traditional settings.
- As an illustration, the customer value proposition of certified notaries for homebuyers is based on facilitating the ownership transfer of the asset from seller to buyer by authenticating the documentation of the respective contracts. Working with a notary for home purchases or sales requires time and is often expensive. Here, blockchain technologies can reduce the transaction cost and time for the respective parties.

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HOW CAN BLOCKCHAIN IMPACT BUSINESS MODEL: CHANNELS

- Describes how a company communicates with and reaches its customer segments to deliver a value proposition.
- One impact of using blockchain is the simplification of doing business. Middle parties may become disintermediated. This is accomplished by removing the requirement for time and personnel required to complete a validity check or a transaction.
- New types of channels may also be introduced within an organization (e.g., by sharing common code to strengthen a supply chain).

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HOW CAN BLOCKCHAIN IMPACT BUSINESS MODEL: CUSTOMER RELATIONSHIP

- Customer relationship describes the types of relationships that a company establishes with specific customer segments. These relationships may be driven by a motivation to acquire customers, to retain customers, or to boost sales.
- Examples of categories of relationships include personal assistance, dedicated personal assistance, self-service, automated services, the creation of communities, or the cocreation of new content.
- DISCUSSION: how can blockchain improve customer relationships?

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HOW CAN BLOCKCHAIN IMPACT BUSINESS MODEL: REVENUE STREAMS

- The revenue streams block represents the cash that a company generates from each customer segment. There are two kinds of revenue streams:
  1. Transaction revenues resulting from one-time payments.
  2. Recurring revenues resulting from ongoing payments to either deliver a value proposition to customers or provide post-purchase customer support.
- Technology companies that provide blockchain-related professional services derive revenues from transaction fees for activity on a network, service level agreements for enterprise clients or platform fees for software-as-a-service (SaaS) contracts.
- The revenues from blockchain have been derived from crypto crowdfunding, using initial coin offerings (ICOs).

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HOW CAN BLOCKCHAIN IMPACT BUSINESS MODEL: KEY RESOURCES AND ACTIVITIES

- Key resources and activities - the most important assets required to make a business model work. Resources may be physical, financial, intellectual, or human. Activities encompass all activities required to deliver value.
- Blockchain technologies can provide the opportunity to make resources more fluid, allowing firms to move away from the traditional ownership and to access resources only when required.
- Applications of public and private / federated blockchains enable firms to automate processes that were previously manual, enabling human resources to focus on other, more value-added activities.

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HOW CAN BLOCKCHAIN IMPACT BUSINESS MODEL: KEY RESOURCES AND ACTIVITIES

- Resources and activities can be affected by blockchain technologies when the users provide many of the key resources and processes and use blockchain technologies to facilitate resource exchange.
- Using the example of smart contracts in real estate transactions, resources such as human capital (e.g., knowledge, skills, experience) and physical capital (assets) are provided by the transacting parties while blockchain technologies facilitate the peer-to-peer exchange of these resources.

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HOW CAN BLOCKCHAIN IMPACT BUSINESS MODEL: KEY PARTNERSHIPS

- Key partnerships – the network of suppliers and partners that make the business model work. These partnerships may take forms such as strategic alliances, joint ventures, or buyer-supplier relationships to ensure reliable supplies.
- The use of blockchain can also enable the addition of new partners such as technology companies that develop application programming interfaces (APIs) and software development kits (SDKs) and maintain the transactional algorithms.
- Blockchain also facilitates peer-to-peer partnerships between businesses, therefore strengthening and extending supply chains.

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HOW CAN BLOCKCHAIN IMPACT BUSINESS MODEL: COST STRUCTURE

- Cost structure – describes all costs incurred to operate a business model.
- Blockchain implementations can reduce transaction costs such as negotiation costs and search costs and eliminate the costs of intermediaries.
- In the financial services industry, blockchain technologies allow for annual cost savings, which are the result of a reduction in IT infrastructure costs and the elimination of manual processes that did not add much value to the firm.
- Implementations of blockchain to manage financial transfers can shorten the authorization holds currently implemented in banking and credit card processing.
- Operations powered by blockchain require fewer manual steps in aggregating, amending, and sharing data, or providing regulatory reporting and audit documents.

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BUSINESS MODEL CANVAS AND BLOCKCHAIN

Key Partnerships

- Strengthened company ties inside the supply chain
- Strengthened data integrity
- Facilitation of payments
- Shared networks
- Elimination of lengthy processes

Key Activities

- Transform business processes
- Peer-to-peer networks

Key Resources

Access via peer-to-peer networks.
Improvements in:

- Verification
- Documentation
- Audits

Value Proposition

- Verifiability
- Access new products or services
- Faster transactions
- Less expensive transactions
- Smart contracts, fewer middle layers

Customer Relationships

- Greater transparency
- Self-service
- Automation
- No middlemen

Channels

- New channels
- New APIs, SDKs

Customer Segments

- Reach new customers
- Reach new customer segments

Cost Structure

- Reduced search costs
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Revenue Streams

- Recurring revenues
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CASE STUDY: BLOCKCHAIN AS RADICAL INNOVATION

(BY ROMAN BECK AND CHRISTOPH MÜLLER-BLOCH)

(HTTP://128.171.57.22/BITSTREAM/10125/41815/PAPER0666.PDF)

DISCUSSION QUESTIONS:

1. Is blockchain a radical innovation?
2. What blockchain innovation processes were used in the bank case?
3. What are potencial challenges for transitioning from incubation to acceleration?
4. How could blockchain technologies revolutionise banking industry?

More cases of blockchain in banking industry - https://www.fintechnews.org/10-use-cases-of-blockchain-technology-in-banking-2020/

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USING BLOCKCHAIN TO IMPROVE DATA MANAGEMENT AND VALIDATION

- Blockchain could solve data **quality issues**. An example would be using blockchain to validate that the person who posted a message on a social media system (like Twitter) is who you think it is.

- **Protecting critical data**. For example, in cases where criminals or other threat actors gain access to databases with sensitive information. Hash values containing sensitive data are stored in a blockchain that itself is distributed over multiple machines, hackers would only be able to retrieve bits and pieces of the information.

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USING BLOCKCHAIN TO IMPROVE DATA MANAGEMENT AND VALIDATION

- **Sharing information**, even when the information itself is not sensitive, may be associated with disclosing metadata like geographical location which **could** (in extreme cases) **endanger the user**.
- Sensor data gathered by IoT users (called “participatory sensing”) must be transmitted, shared with machine learning algorithms, and stored in such a way that the storage provider is not exposed to inordinate liability. This sensitive ecosystem of identity management, data sharing, and secure data storage could potentially be more easily navigated with blockchain-based implementations.

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USING BLOCKCHAIN FOR PRODUCT QUALITY

- Blockchain could overcome issue over **product authenticity** as well as deliver greater **transparency in certification systems** such as Fairtrade.
- Blockchain techniques may offer a mechanism for **collating and verifying audit information**.
- **DISCUSSION**: how can blockchain can be used in product quality assurance?

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USING BLOCKCHAIN FOR AUDITING

- The system checks the viability and accuracy of all transactions in real-time, there should be no need to go back and revisit what transactions occurred.
- These systems will make it more difficult and more expensive to cheat.
- **DISCUSSION**: how can blockchain can be used in auditing?

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USING BLOCKCHAIN FOR MARKETING AND SALES

- Innovative customer loyalty programs;
- More effective customer profiling;
- Better validation of product authenticity;
- Verified Consumer Reviews.
- DISCUSSION: how can blockchain be used in marketing and sales?

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USING BLOCKCHAIN FOR HUMAN RESOURCES

1. Personnel Records.
2. Performance Management Systems.
3. Employee Voice Mechanisms.

- Blockchain principles may not only facilitate such anonymous systems but may also be useful in recording organizations' responses to records of grievance.
- **DISCUSSION**: how can blockchain be used in human resouces management?

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EXAMPLES OF COMPANY'S INNOVATION MODEL

- Concept formation – market pull or technological push;
- Feasibility analysis – technological, economic, operational;
- Product design and prototype development & testing;
- Engineering & Manufacturing design – user interface, P/P ratio, extensible/upgrade capability;
- Meet the FDA requisites – the min. quality standard;
- Production & quality control;
- Marketing promotion – pricing strategy, technology cycle, market structure, channel selection;
- Customer satisfaction, post/disposal service.

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EXAMPLES OF COMPANY'S INNOVATION MODEL

- Research on working process as well as new product.
- Innovating anywhere and learning through.
- Innovation transfer to the counterparts in the organization beyond endeavoring to research.
- Promote linkage between technology and market.
  - The always partner of research – customers.
- To be a responsible profit center.
  - Share and broker information for entrepreneurship & new start-ups.
- Motivation incentive by being the shareholder.

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VERSATILE USE CASES OF BLOCKCHAIN

Name	Sector	Application
TUI	Toursim	Track internal contracts
SWIFT	International payments	22 banks signed for the single platform
Airbus	Manufacturing	Airplane manufacturing
IMB	Blockchain solutions	Non-finance-related blockchain solutions
Webjet	Online travel portal	Find empty hotel rooms
Unilever	Hired IBM	Digital advertising
Nasdaq	Government, finance, advertising	Working in Estonia
Ripple	Payments	International transactions
Enigma	Real estate	Renting of apartment
BitPesa	Donations	For African people
MedRec	Health care	Record management

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FUTURE INNOVATION AND DEVELOPMENTS

INFRASTRUCTURE

PROTOCOLS

ENVIRONMENT

STRATEGIES

APPLICATIONS

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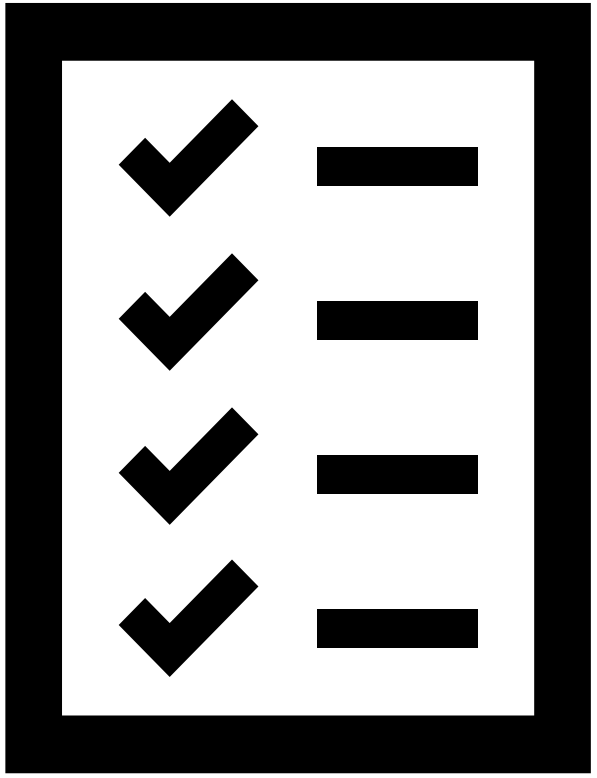
QUIZ:



- Follow the link to the quiz :
  - Moodle block “Innovation management using information systems"

    Quiz #2 “The closing quiz”.

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SELF-REFLECTION QUESTIONS:

1. What is innovation? Provide examples of different types of innovation.
2. How does blockchain impact business model innovation?
3. How can blockchain improve data management and validation?
4. What is the blockchain role in enabling business development and innovation?

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VIDEO MATERIAL

1. 5 types of innovation (2:39) https://youtu.be/jNoYwJiL6mw

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