BLOCKCHAIN FOR BUSINESS

ABOUT THE MODULE:

- Blockchain for business - 2 ECTS

- Topics:

  1. Business activities & processes (2h)

  2. Innovation management using information systems (2h)

  3. Blockchain components and security methods (2h)

  4. Blockchain business transformation (1h)

  5. Blockchain-enabled business processes (1h)

BLOCKCHAIN FOR BUSINESS
BUSINESS ACITIVITIES AND PROCESSES

CONTENT

LEARNING GOALS

Explain the concept of business process and its role in contributing to competitive standing of a firm:

1. Explain what are business processes (BPs) and why they are important in the context of market competition and business efficiency.

2. Recognize important drivers for business process support and optimization by using information systems.

3. Explain what is a process view on organization and what tools does it offer for improving business processes.

4. Identify the opportunities for blockchain application in supporting the goals of business process optimization.

QUIZ:

- Follow the link to the quiz :

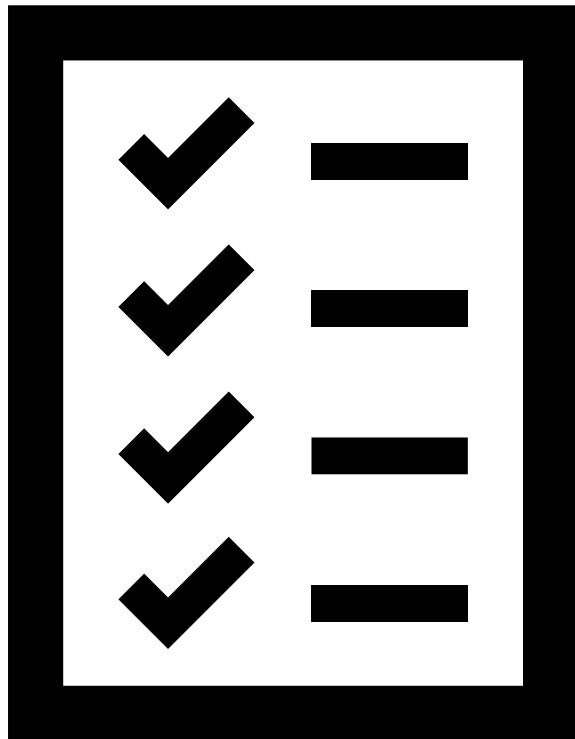 - Moodle block "Business acitivities and processes" ➡ Quiz #1 "The opening quiz".

LEARNING GOALS

Explain the concept of business process and its role in contributing to competitive standing of a firm:

1. **Explain what are business processes (BPs) and why they are important in the context of market competition and business efficiency.**

2. Recognize important drivers for business process support and optimization by using information systems.

3. Explain what is a process view on organization and what tools does it offer for improving business processes.

4. Identify the opportunities for blockchain application in supporting the goals of business activities.

BUSINESS PROCESS

- The goal of a business is to deliver the value offered at the lowest possible cost. Organizations create and deliver value in the form of a product or service, which they offer to consumers or to other organizations

- Regardless of the type of organization, the product or service is created via a sequence of tasks or activities that take a set of inputs and convert them into the desired output

- This sequence of flows of work and activities is referred to as a **business process.**

- **Business process** – a set of interrelated or interacting activities that use inputs to deliver an intended result (ISO 9000).

- Inputs and outputs may be tangible (e.g. materials, components or equipment) or intangible (e.g. data, information or knowledge).

Trigger → Step 1 → Step 2 → Step 3 → Outcomes

BUISNESS PROCESS FLOWS

- A business process "flows" through different functions in an organization as the various steps needed to complete the process are executed.

- Data generated in each step and across an entire process are accumulated over time. These data are then organized in a manner that is meaningful and useful for some purpose, such as creating a report summarizing sales for the previous month. Once the data have been organized into a sales report, managers and employees can analyse problem areas and work together to improve them.

THREE MAJOR FLOWS IN ORGANIZATIONS

Information Flow

Enterprise Information System

Data & Document Flow

Physical Flow
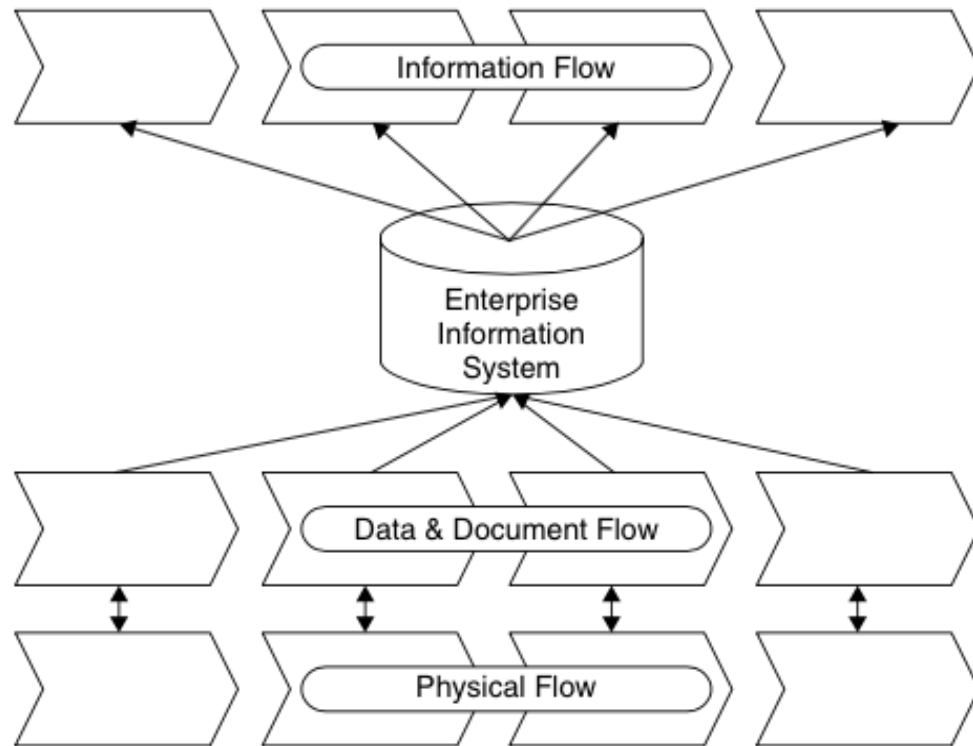
1. Data are then organized in a manner that is meaningful and useful for some purpose, such as creating a report summarizing sales for the previous month – **Information flow.**

2. Data are often found in documents, such as invoices, orders, etc. which are created and modified in different steps of as process – the **document flow.**

3. There are data associated with each step of the process, such as locations, quantities, amounts, responsible staff, etc. – the **data flow.**

4. There is a **physical flow** of the process – physical activities associated with the process.

LEARNING GOALS

Explain the concept of business process and its role in contributing to competitive standing of a firm:

1. Explain what are business processes (BPs) and why they are important in the context of market competition and business efficiency.

2. **Recognize important drivers for business process support and optimization by using information systems.**

3. Explain what is a process view on organization and what tools it offers for improving business processes.

4. Identify the opportunities for blockchain application in supporting the goals of business activities.

A FEW EXAMPLES TO CONSIDER:

- Case 1: UPS and left-turn elimination;

- Case 2: Oil rig & loss of data;

- Case 3: Kiva systems for warehouse automation.
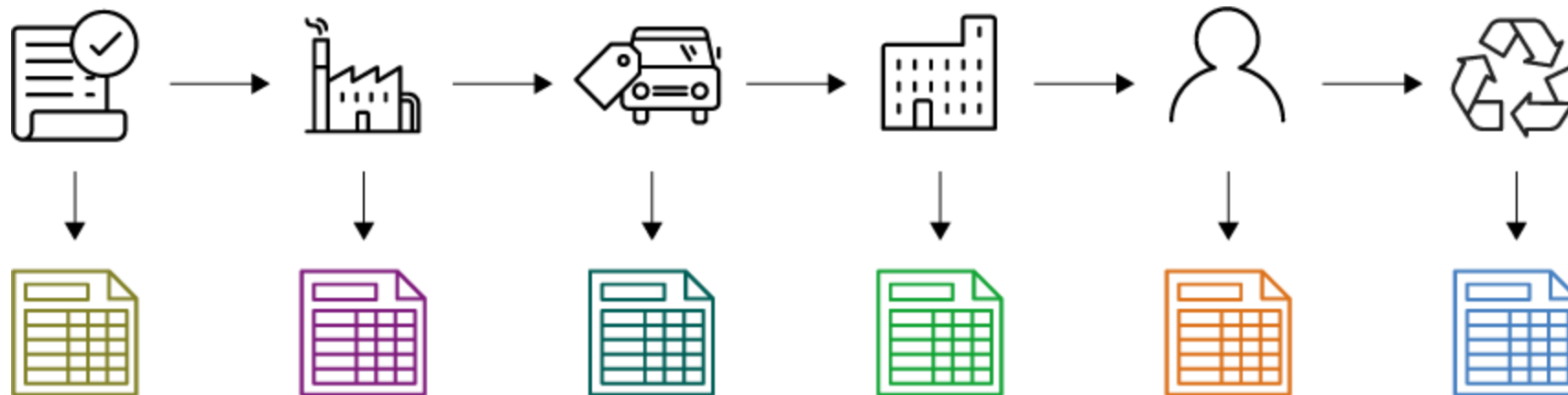
Case 1. Supporting the business process of UPS with smart IT application

Read the case.
What economic, social, and environmental benefits were brought by IT innovation?

December 9, 2007

Left-Hand-Turn Elimination

By JOEL LOVELL

It seems that sitting in the left lane, engine idling, waiting for oncoming traffic to clear so you can make a left-hand turn, is minutely wasteful — of time and peace of mind, for sure, but also of gas and therefore money. Not a ton of gas and money if we're talking about just you and your Windstar, say, but immensely wasteful if we're talking about more than 95,000 big square brown trucks delivering packages every day. And this realization — that when you operate a gigantic fleet of vehicles, tiny improvements in the efficiency of each one will translate to huge savings overall — is what led U.P.S. to limit further the number of left-hand turns its drivers make.

The company employs what it calls a "package flow" software program, which among other hyperefficient practices involving the packing and sorting of its cargo, maps out routes for every one of its drivers, drastically reducing the number of left-hand turns they make (taking into consideration, of course, those instances where not to make the left-hand turn would result in a ridiculously circuitous route).

Last year, according to Heather Robinson, a U.P.S. spokeswoman, the software helped the company shave 28.5 million miles off its delivery routes, which has resulted in savings of roughly three million gallons of gas and has reduced CO_2 emissions by 31,000 metric tons. So what can Brown do for you? We can't speak to how good or bad they are in the parcel-delivery world, but they won't be clogging up the left-hand lane while they do their business.

http://www.nytimes.com/2007/12/09/magazine/09left-handturn.html?_r=0

Case 2.
The role of IT in oil company's data acquisition, processing, and communication

Study the chart.
What percentage of data is lost due to inappropriate support by IT?

In a case example, 99% of all data in an oil rig was lost before reaching operational decision makers

From a base of 30,000 data tags, close-to-zero tags are used to inform operational decisions

		Comment	Source
People and processes	0%	Schedule predominantly based on OEM-recommended maintenance intervals	Interviews with operational staff
Deployment	< 1%	No interface in place to enable real-time analytics to "reach" offshore	
Analytics	< 1%	Reporting limited to a few KPIs which are monitored in retrospect	BI and KPI walkthrough
Data management	~ 1%	Data cannot be accessed in real time, enabling only ad hoc analysis	Walkthrough of infrastructure and bandwidth between off- and onshore
Infrastructure	60%	Only ~ 1% can be streamed onshore for day-to-day use	
Data capture	100%	~ 40% of all data is never stored – remainder is stored locally offshore	Assessment of storage capacity (on the highest capacity asset)

BUSINESS PROCESSES AND IT

- 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.

Kiva founder Mick Mountz realized that there had to be a breakthrough in cost reduction for large scale distribution businesses to get to the next level. He came up with the simple, but very clever, idea of having the shelves come to the packing stations at the warehouse, rather than having workers go and retrieve each product from the shelves.

Watch a video:
from 06:00 till 09:00 (3 min)
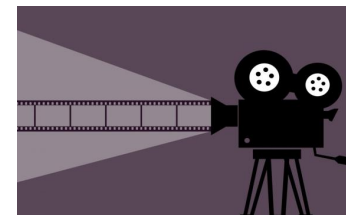
http://www.ted.com/talks/mick_mountz_the_hidden_world_of_box_packing

Mick Mountz TED Talk:
The hidden world of box packing

BUSINESS PROCESSES AND IT

- Organization is (stable, formal) social structure, which consumes (some internal & external) resources to produce products or services.

- Capital and labor are the major resources needed for the production process:

  - **IT** must support effective org. management by collecting, processing, and delivering information (for decision making, reporting, control).

  - **IS/IT can substitute the labor:** task automation, flow integration, disintermediation, etc.

Capital & labor

Products or services

People

IS/IT

Information

IMPROVING BUSINESS PROCESSES WITH IT

- Technology in general, and especially IT, is a key instrument to improve business processes. IT specialists such as system engineers often play a significant role in BPM initiatives.

- Bill Gates, once famously put it:

*"**The first rule** in any technology used in a business is that **automation applied to an efficient operation will magnify the efficiency**. **The second** is that **automation applied to an inefficient operation will magnify the inefficiency**".*

- IT graduates must understand how to design and improve processes — and not only how to build an IT system to automate a narrow part of a business process.

- Business graduates need to understand how technology, and particularly IT, can be used to optimize the execution of business processes.

BUSINESS PROCESS AUTOMATION AND WORKFLOWS

Discussion:

1. What is a workflow? Give examples.

2. Why workflows are important in the context of business management and/or improvement?

Watch a video: 02:36

https://www.youtube.com/watch?v=04hnuyZWhAA
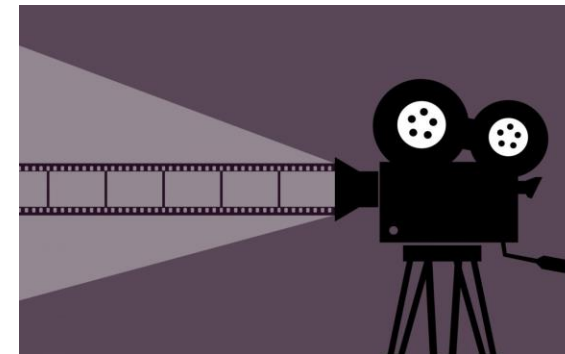
What is a Workflow?

AUTOMATING BUSINESS PROCESSES WITH IT

- Since the very first uses of computers, people have typically developed and adopted IT systems because they believed such systems would allow them to accomplish more, more quickly, and at lower cost (Zuboff, 1985, p. 7).
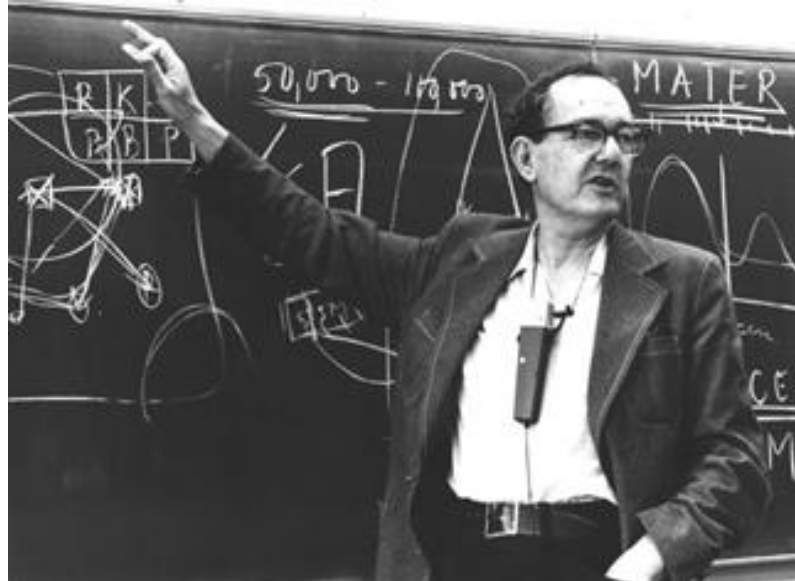
H.A. Simon classified decision making into programmed and non-programmed areas

AUTOMATING BUSINESS PROCESSES WITH IT

- (Business) decisions can be classified into *programmed* and *non-programmed*:

    - **Programmed decisions** are those that are routine and repetitive and where the decision rules are known.

    - **Non-programmed decisions** are novel and unstructured, and the nature of the problem and decision rules are complex and little understood.

- Programmed decisions can be programmed into IT systems to be executed by computer software.

- The possibility of programming systems with certain algorithmized logic has led humans to strive to automate certain tasks.

IMPROVING BUSINESS PROCESSES WITH IT

- IT systems were built to substitute for humans not only in tasks where fast and vast calculations were required, but also where jobs were perceived to be too complicated or dangerous for humans.

- **Importantly, computation allowed the introduction of control where humans did not have the capability to control.**

BUSINESS PROCESS: AUTOMATION AND CONTROL

- **Control** is the process of ensuring that operations proceed according to plan.

  - At the most basic level this is done by comparing the actual results or output of the system against a target…

  - … and using any differences found to adjust the input side of the system so as to bring activities in line with the target.

- The control procedure, **_input – process – output – monitor and compare – adjust_**, requires what is known as a _feedback control loop_

  - such a loop is a common feature of many Information Systems (IS): stock control, financial control, production control, quality control etc.

EFFICIENCY AND EFFECTIVENESS OF BUSINESS PROCESSES

- *Business process – a set of interrelated or interacting activities that use inputs to deliver an intended result (ISO 9000).*

- **Effectiveness** is the degree to which the organization achieves a stated goal – doing the right thing, producing the desired results.

- **Efficiency** is a measurement of the use of resources to achieve results – the use of resources (input) to produce a desired volume of product (output)

- An organization may be producing the **wrong** output **efficiently** and is thus an **ineffective** organization.

Capital & Labor

People

Products or services

IS/IT

Information

EFFICIENCY AND EFFECTIVENESS OF BUSINESS PROCESSES

Effectiveness: doing the right thing, producing the desired results	Efficient, but not effective: - Goals **not** achieved
Efficiency: the use of resources (input) to produce a desired volume of product (output)	Effective, but not efficient: - Wasted resources

DISCUSSION QUESTIONS:

1. What is a business process?

2. What kind of flows associated with execution of business processes can be distinguished in organizations?

3. What is the role of IT in supporting efficient and effective execution of business processes? For Cases 1 (UPS) and 2 (Oil rig), does the use of IT contribute to efficiency, effectiveness or the lack of those?

LEARNING GOALS

Explain the concept of business process and its role in contributing to competitive standing of a firm:

1. Explain what are business processes (BPs) and why they are important in the context of market competition and business efficiency.

2. Recognize important drivers for business process support and optimization by using information systems.

3. **Explain what the process view on organization is and what tools it offers for improving business processes.**

4. Identify the opportunities for blockchain application in supporting the goals of business activities.

PROCESS VIEW ON ORGANIZATION

- By studying business processes and individual routines, you can achieve a very clear understanding of how a business works.

- 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.

PROCESS-BASED APPROACH

- The process-based approach states that an organization is a system of interconnected and interoperable processes.

- Breaking down processes into types helps to understand how an organization works.

Process

Input:
Decisions
Resores
Materials
Methods

Requirements:
Business startegy
Customer (internal and external)
Society (regulations, rules, norms, etc.)
Declared documents (laws, technical documentation, contracts, etc.)
For the purpose of process quality

Output:
Product
Services
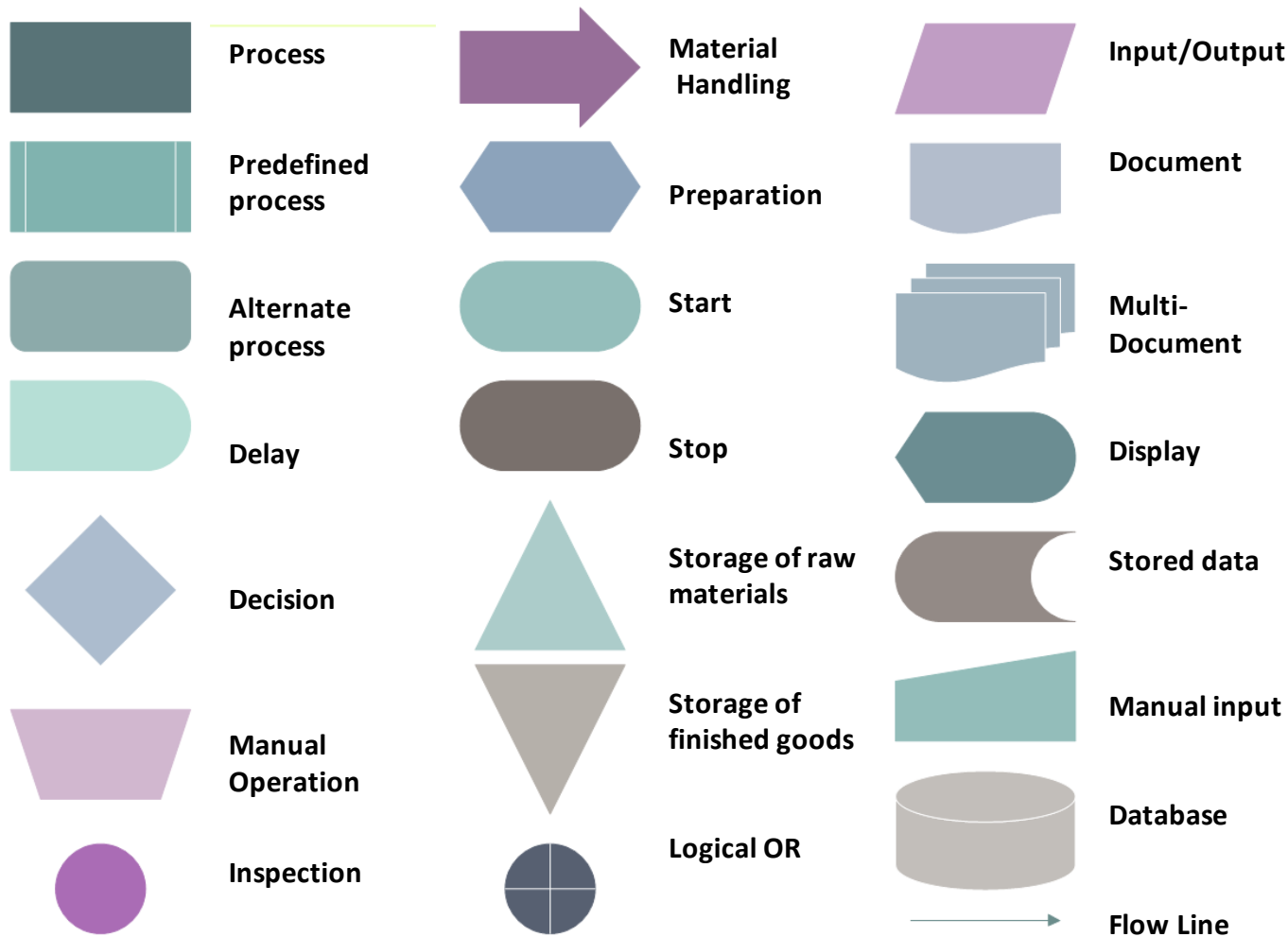Intermediate product
Information about the process
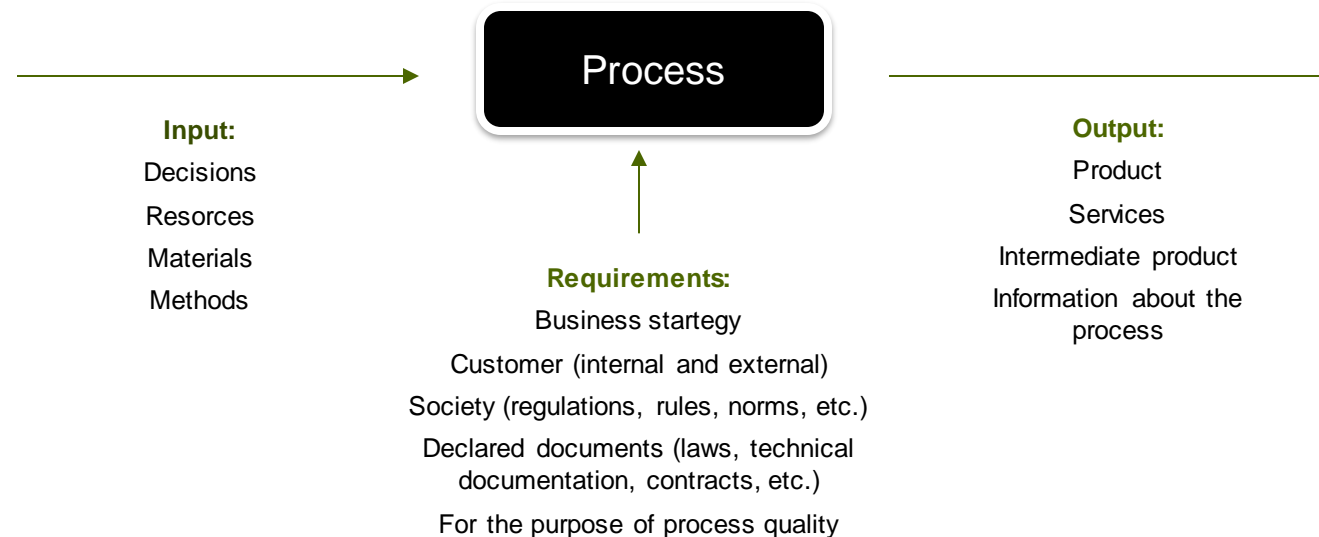
As a process approach can often become a complex system with too many processes, inputs and outputs we recommend using a diagram or flowchart to allow you to better visualize the input-output relationship.
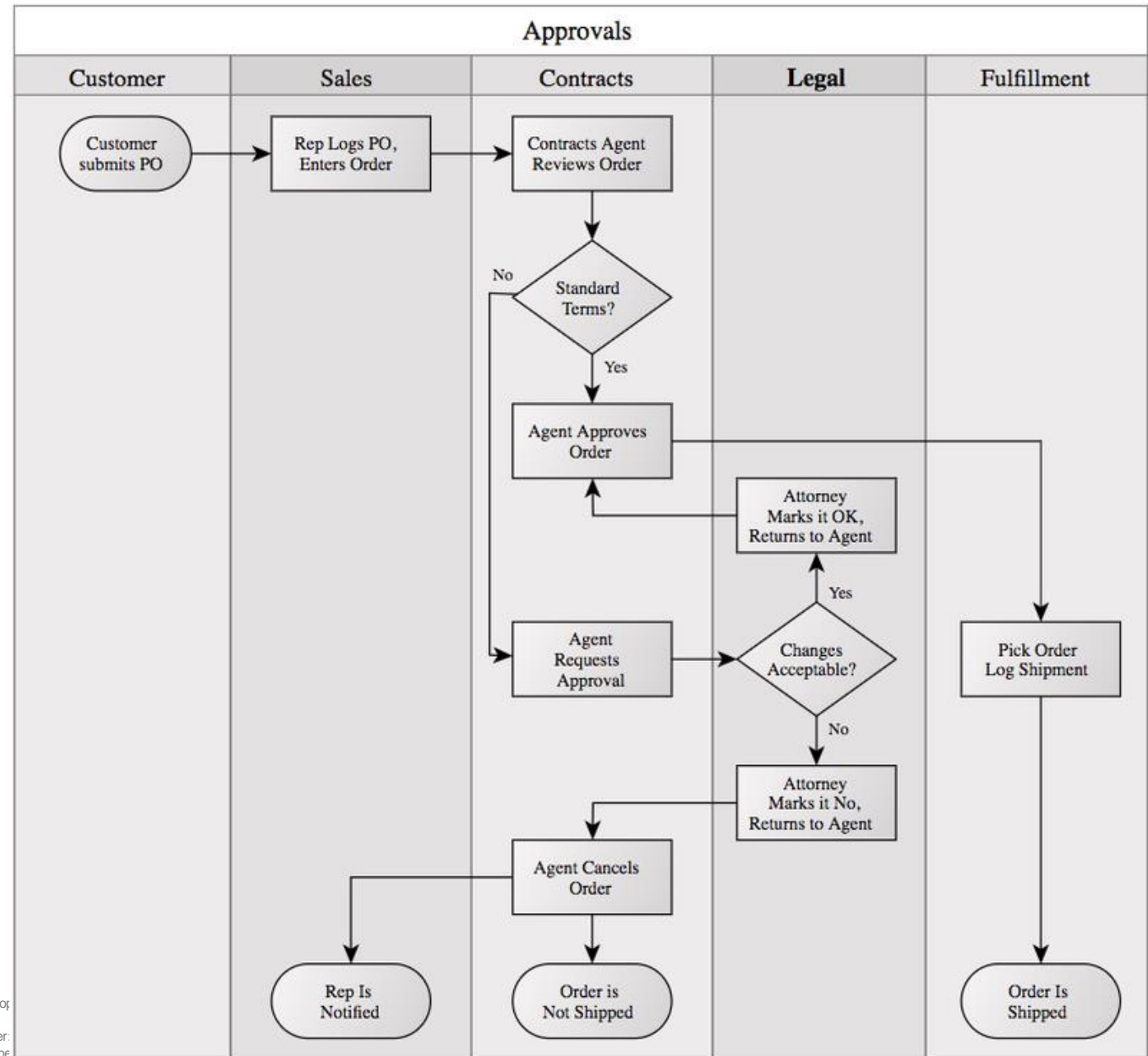
PROCESS FLOWCHART / PROCESS MODEL

- A process map, model or flowchart describes the flow of materials and information, displays the tasks associated with a process, shows the decisions that need to be made along the chain and shows the essential relationships between the process steps.

- Process mapping is used to visually demonstrate all the steps and decisions in a particular process.

BASIC FLOWCHART SYMBOLS AND MEANING

Process

Predefined process

Alternate process

Delay

Decision

Manual Operation

Inspection

Material Handling

Preparation

Start

Stop

Storage of raw materials

Storage of finished goods

Logical OR

Input/Output

Document

Multi-Document

Display

Stored data

Manual input

Database

Flow Line

PROCESS MAP EXAMPLE

SIMPLY EXPLAINED

SOMETHING

GREAT SOFTWARE

geek & poke
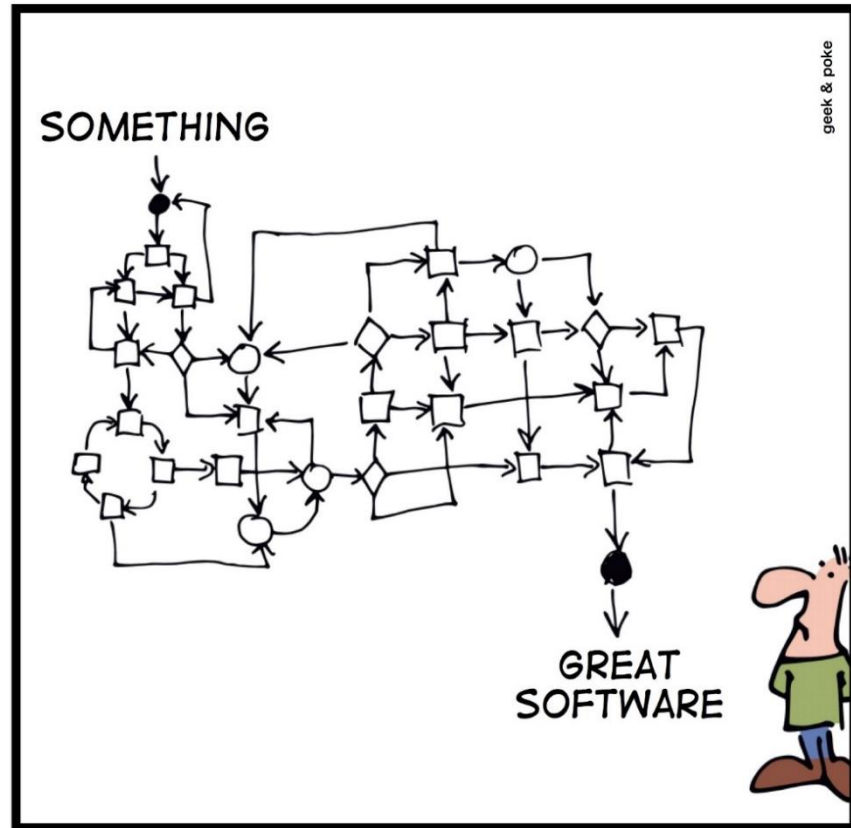
PROCESS REVIEW:

- Performance: what is being done?

- Effectiveness: what results are obtained?

- Improvement:

  1. Identify **bottlenecks;**

  2. Calculate **start – end times;**
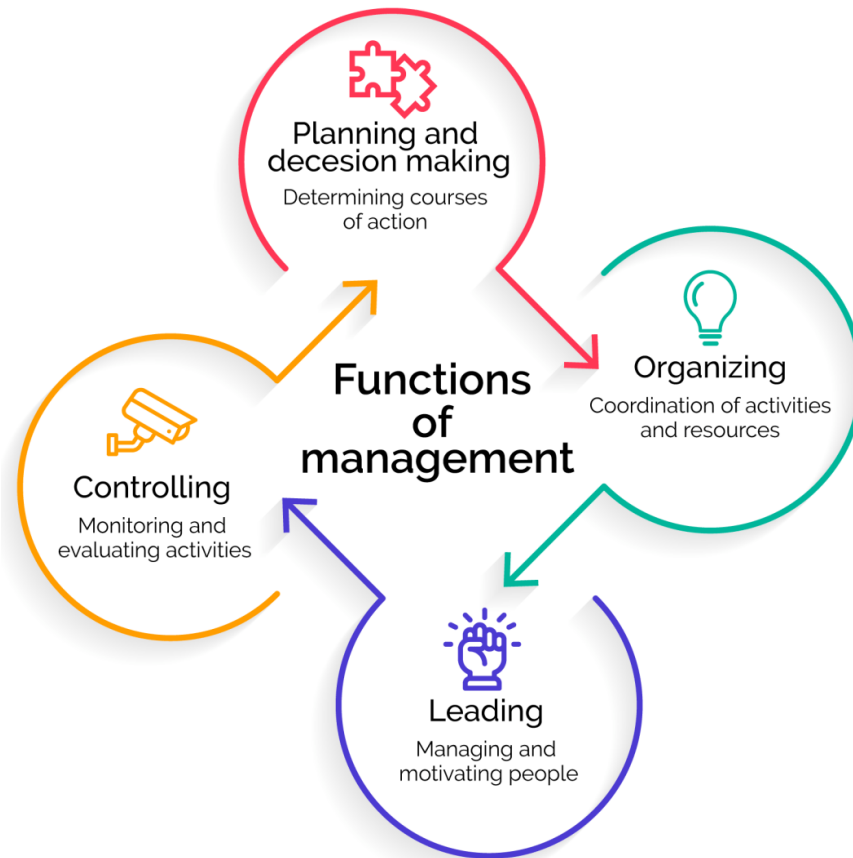
  3. Estimate **process capacity.**

LEARNING GOALS

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BUSINESS MANAGEMENT ACTIVITIES:

Functions of management

- Planning and decesion making — Determining courses of action
- Organizing — Coordination of activities and resources
- Leading — Managing and motivating people
- Controlling — Monitoring and evaluating activities

1. **Planning**;

2. Organizing;

3. Leading;

4. Controlling**.**

1. PLANNING

- Planning – establishment of future activities, closely related to information gathering, forecasting, and decision making.

- Planning steps:

  1. Goal setting (SMART goals);

  2. Analysis of the external and internal environment;

  3. Strategy selection;

  4. Evaluation of results.

Definition of Management
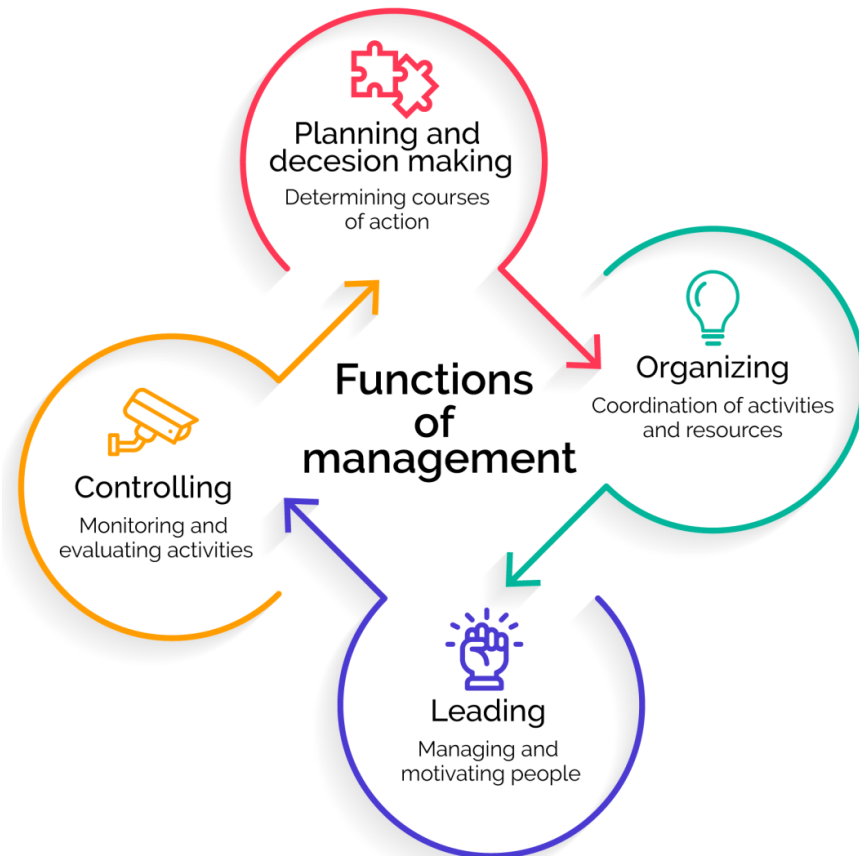**(2:38 min)** https://www.youtube.com/watch?v=_OBqwhYLEJo

STRATEGY

- A strategy is a comprehensive plan to help an organization achieve its mission and set goals.

- Strategic alignment refers to the management of connections between organizational priorities and business processes, which aims at facilitating effective actions to improve business performance.

- Currently, corporate **strategy is defined first**, **and business processes are aligned with** the respective **strategic imperatives**.

BUSINESS STARTEGY AND BLOCKCHAIN

- Blockchain technology challenges these approaches to strategic alignment.

- For many companies, blockchains define a potential threat to their core business processes. For instance, the banking industry could see a major disintermediation based on blockchain-based payment services. Lock-in effects might deteriorate when, for example, the banking service is not the banking network itself anymore, but only the interface to it.

- These developments could lead to business processes and business models being under strong influence of technological innovations outside of companies.

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Functions of management

- Planning and decesion making — Determining courses of action
- Organizing — Coordination of activities and resources
- Leading — Managing and motivating people
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1. Planning;
2. **Organizing**;
3. Leading;
4. Controlling.

2. ORGANIZING

- Planning and organizational functions are closely related.

- The **organization** is the creation of a system necessary to achieve the set goals.

- An **organizational structure** is a system that outlines how certain activities are directed in order to achieve the goals of an organization. These activities can include rules, roles, and responsibilities.

ORGANIZING AND BLOCKCHAIN

- Organizing refers to appropriate and transparent accountability in terms of roles, responsibilities, and decision processes for different business programs, projects, and operations.

- Blockchain technology might change organizing towards a more externally oriented model of self-governance based on smart contracts. Research on corporate governance investigates agency problems and mechanisms to provide effective incentives for intended behavior.

- Smart contracts can be used to establish new governance models as exemplified by The Decentralized Autonomous Organization (The DAO).

ORGANIZATIONAL CULTURE

- Organizational culture is defined by the collective values of a group of people in an organization.

- Blockchains are likely to influence organizational culture towards a stronger emphasis on flexibility and an outward-looking perspective.

- In the competing values framework, these aspects are associated with an adhocracy organizational culture.

- Furthermore, not only consequences of blockchain adoption must be analyzed, but also antecedents. These include organizational factors that facilitate early and successful adoption.

BUSINESS MANAGEMENT ACTIVITIES:
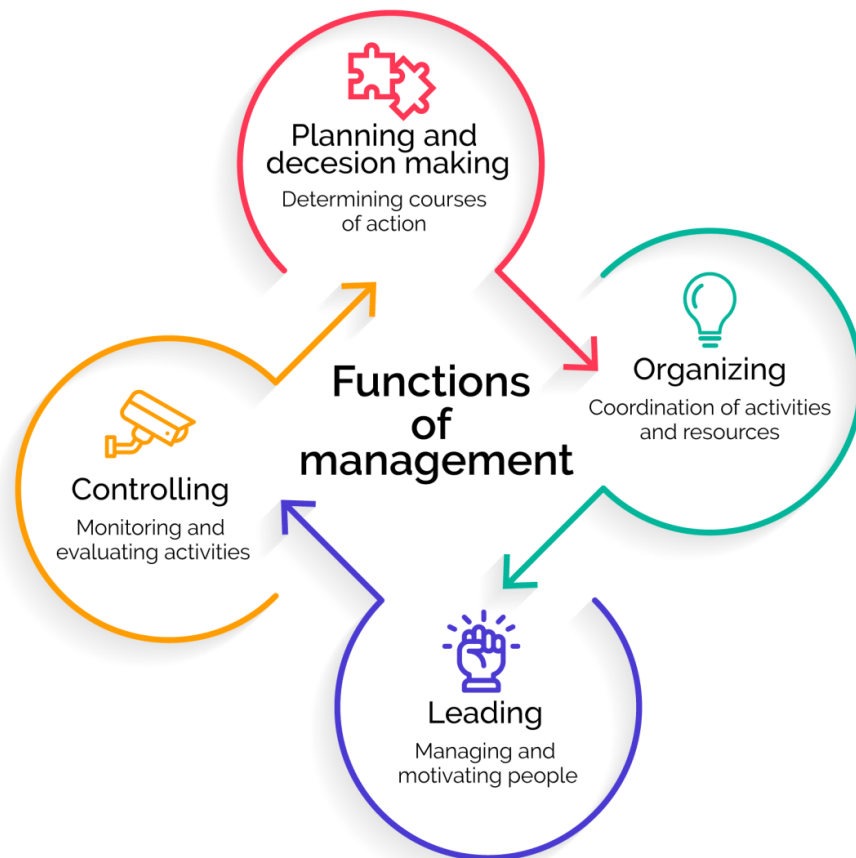
1. Planning;

2. Organizing;

3. **Leading;**

4. Controlling.

3. LEADING

- Leadership in business is the capacity of a company's management to set and achieve challenging goals, take fast and decisive action when needed, outperform the competition, and inspire others to perform at the highest level they can.

- In this function, the use of blockchain technology requires extensions of their skill sets. New required skills relate to partner and contract management, software engineering, and cryptography.

- Also, people must be willing to design blockchain-based collaborations within the frame of existing regulations to enable adoption.

BUSINESS MANAGEMENT ACTIVITIES:
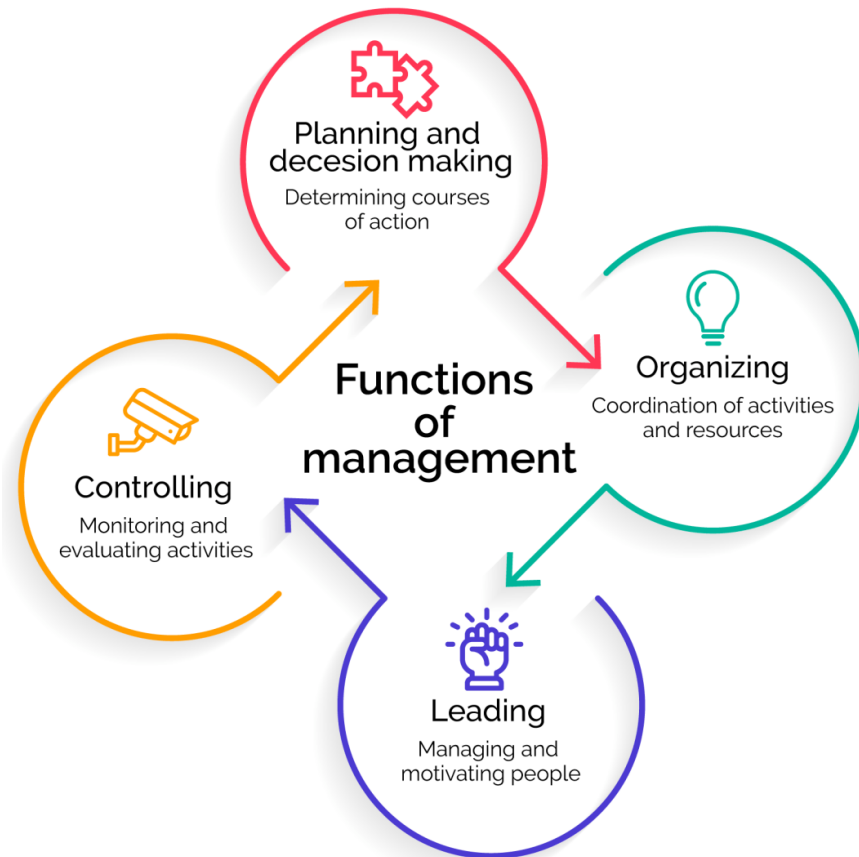
1. Planning;

2. Organizing;

3. Leading;

4. **Controlling**.

4. CONTROLLING

- Control is a primary goal-oriented function of management in an organization. It is a process of comparing the actual performance with the set standards of the company to ensure that activities are performed according to the plans and if not then taking corrective action.

- Blockchain technology provides levels of security, trust, and transparency between multiple participants in a business environment.

- Smart contracts create real-time auditing for business processes and workflows. The developer of the contract can code some guidelines and check the quality of a process.

BIBLIOGRAPHY:

1. Cardinal, D. (2012). "Warehouse robots come of age". Access: http://www.extremetech.com/extreme/%0B123765-automation-warehouse-robots-come-of-age-as-amazon-buys-kiva

2. Carson, B., Giulio Romanelli, G.,Walsh, P., Zhumaev, A., (2018) "Blockchain beyond the hype: What is the strategic business value?". Access: https://www.mckinsey.com/business-functions/mckinsey-digital/our-insights/blockchain-beyond-the-hype-what-is-the-strategic-business-value#

3. Dumas, M., La Rosa, M., Mendling, J., Reijers, H.A. (2018). "Fundamentals of Business Process Management". Second Edition. Springer. Access: https://www.springer.com/gp/book/9783662565087

4. Dumas, M., La Rosa, M., Mendling, J., Reijers, H. A. (2013). „Fundamentals of business process management". Vol.1, p.24, Chapter 1. Springer.

5. International Organization for Standardization (ISO) "The process approach in ISO 9001:2015". https://www.iso.org/files/live/sites/isoorg/files/archive/pdf/en/iso9001-2015-process-appr.pdf

6. Lucey, T. (2004) „Management Information Systems", 9th Ed.

7. Magal, S. R., Word, J. (2009). „Essentials of Business Processes and Information Systems". Chapter 1. , pp.1-27. Wiley. Access: www.wiley.com/college/magal.

8. McKinsey (2015). „Industry 4.0: How to navigate digitization of the manufacturing sector". McKinsey & Company.

9. Mendling, J., et al. (2018). „Blockchains for Business Process Management - Challenges and Opportunities"ACM Transactions on Management Information Systems, Vol. 9, No. 0. Acess: https://www.infosys.tuwien.ac.at/Staff/sd/papers/Zeitschriftenartikel_2018_S_Dustdar_Blockchains.pdf

10. International Organization for Standardization (ISO) "The process approach in ISO 9001:2015". https://www.iso.org/files/live/sites/isoorg/files/archive/pdf/en/iso9001-2015-process-appr.pdf

11. Weber, I., Xu, X., Riveret, R., Governatori, G., Ponomarev, A., Mendling, J. (2016). "Untrusted Business Process Monitoring and Execution Using Blockchain". In Business Process Management - 14th International Conference, BPM 2016, Rio de Janeiro, Brazil. Proceedings (Lecture Notes in Computer Science), Vol. 9850. Springer, 329–347. Access: https://www.researchgate.net/publication/303996559_Untrusted_Business_Process_Monitoring_and_Execution_Using_Blockchain

12. Zuboff, S. (1985). „Automate/informate: The two faces of intelligent technology". Organizational Dynamics, 14(2), pp.5–18. Access: https://doi.org/10.1016/0090-2616(85)90033-6
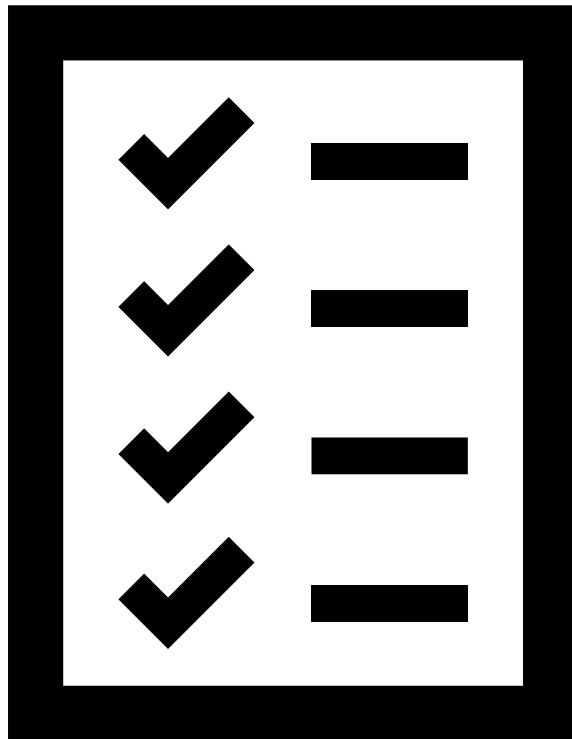
QUIZ:

- Follow the link to the quiz :

  - Moodle block
    "Business acitivities and processes"
    ➡️ Quiz #2 "The closing quiz".

SELF-REFLECTION QUESTIONS:

1. What are business processes (BPs) and why they are 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?

FURTHER READING:

1. Magal, S. R., & Word, J. (2009). Essentials of Business Processes and Information Systems. Chapter 1. "Organizations, Business Processes, and Information Systems". PAGES:1-27.

2. Dumas, M., La Rosa, M., Mendling, J., Reijers, H.A. (2018) "Fundamentals of Business Process Management". Second Edition. Springer. Access: https://www.springer.com/gp/book/9783662565087. Chapter 1. "Introduction to Business Process Management". PAGES:1-34.

3. Carson, B., Giulio Romanelli, G.,Walsh, P., Zhumaev, A., (2018) "Blockchain beyond the hype: What is the strategic business value?". Access: https://www.mckinsey.com/business-functions/mckinsey-digital/our-insights/blockchain-beyond-the-hype-what-is-the-strategic-business-value#

VIDEO MATERIALS

1. Mick Mountz The hidden world of box packing 3 min (6:00-9:00) ttp://www.ted.com/talks/mick_mountz_the_hidden_world_of_box_packing

2. What is a Workflow? (2:36) https://www.youtube.com/watch?v=04hnuyZWhAA

3. Definition of Management (2:38) https://www.youtube.com/watch?v=_OBqwhYLEJo