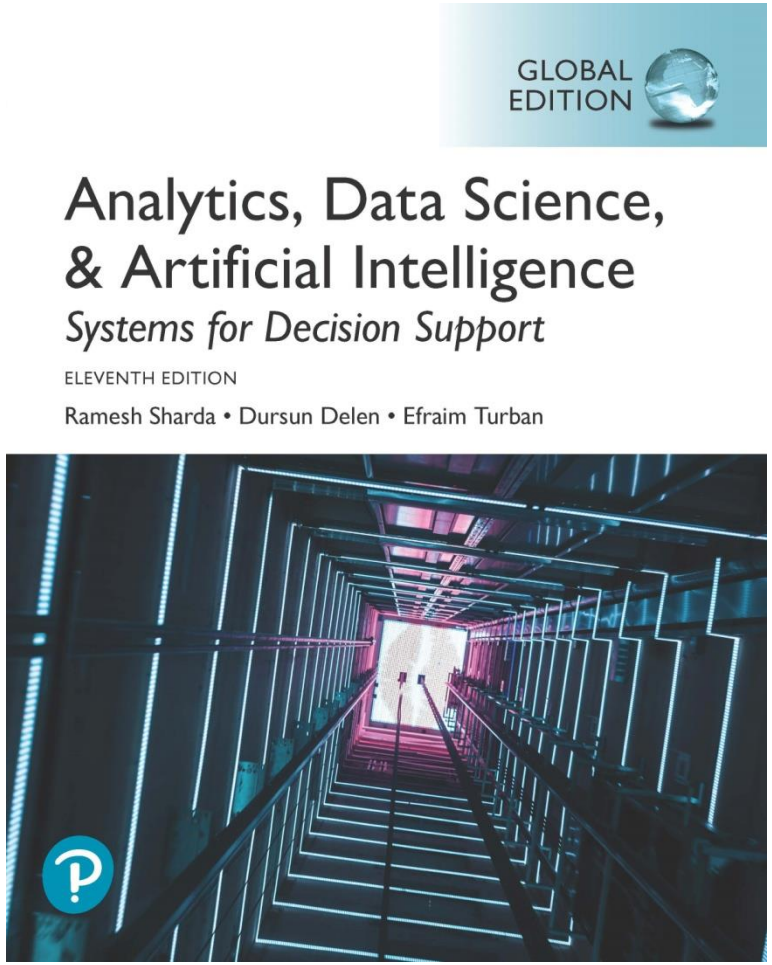
Analytics, Data Science and AI: Systems for Decision Support

Eleventh Edition, Global Edition



Chapter 11

Group Decision Making, Collaborative Systems, and AI Support

Pearson

Copyright © 2021 Pearson Education Ltd. All Rights Reserved.

Learning Objectives

11.1 Understand the basic concepts and processes of group work, communication, and collaboration

11.2 Explain the concepts and importance of the time/place framework

11.3 Explain the underlying principles and capabilities of groupware

11.4 Describe collective intelligence and its role in decision making

11.5 Define crowdsourcing and explain how it supports decision making and problem solving

11.6 Describe the role of AI in supporting collaboration, group work, decision making, and human–machine collaboration

Copyright © 2021 Pearson Education Ltd. All Rights Reserved.

Making Decisions in Groups: Characteristics, Process, and Benefits

- **Groupwork**: the work done by two or more people together
- A group performs a task
- Members may:
  - be located in different places
  - work at different times
  - work for the same organization or for different organizations
- A group can be :
  - permanent or temporary
  - at one managerial level or span several levels …

Pearson

Copyright © 2021 Pearson Education Ltd. All Rights Reserved.

Why Groupwork / Collaborate?

Make Decisions

Review

Build Trust

Synergy

Share the Vision

Share Information

Share Work

Solve Problems

Build Consensus

Socialize

Pearson

Copyright © 2021 Pearson Education Ltd. All Rights Reserved.

Characteristics of Group Work

- Group member located in different places/organizations
  - Work at different times
- Group work can be permanent or temporary
- Group members can be from different managerial levels
- Group can create synergy (or not!)
  - Process gains versus process losses
- A group task may have to be accomplished very quickly.
- Physical meetings may be cost prohibitive, …. more

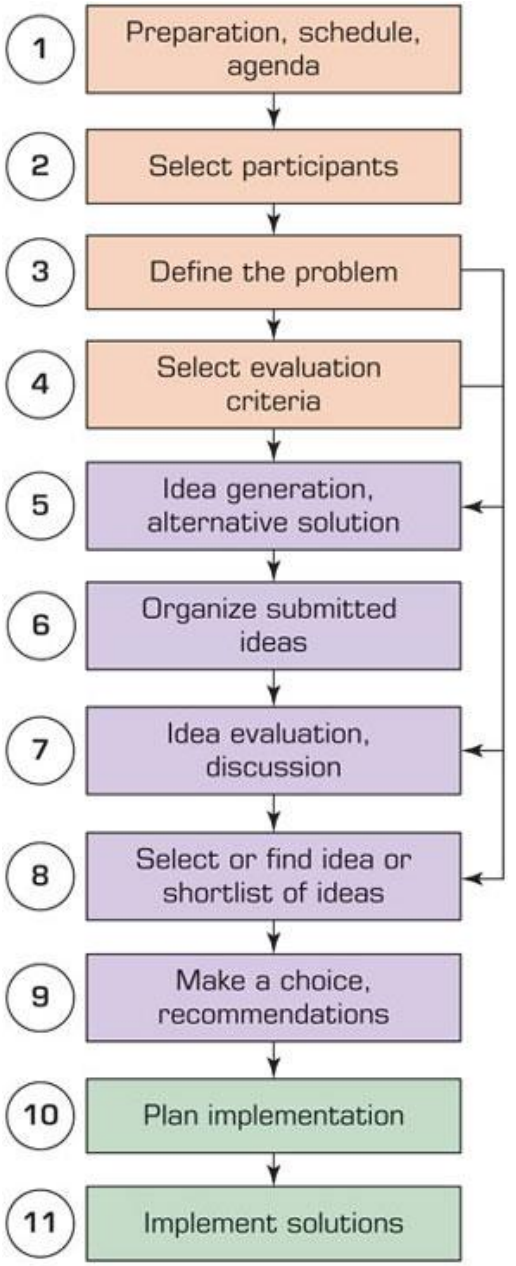
Pearson

Copyright © 2021 Pearson Education Ltd. All Rights Reserved.

Group Decision-Making Process

Types of Decisions Made by Groups

- Groups are usually involved in two major types of decision making:
    1. Making a decision together.
    2. Supporting activities or tasks related to the decision-making process. For example:
        a. the group may select criteria for evaluating alternative solutions
        b. Prioritize solutions
        c. Help design implementation strategy



Pearson

Copyright © 2021 Pearson Education Ltd. All Rights Reserved.

Overview of Group Support Systems

- **Technology that helps groups to collaborate effectively**
  - These technologies are called **GSS (Group Support Systems)**

- **Goal**: to support groupwork

- Recently communication and collaboration tools have received more attention due to
  - Their increased capabilities
  - Save time and money
  - Expedite decision making

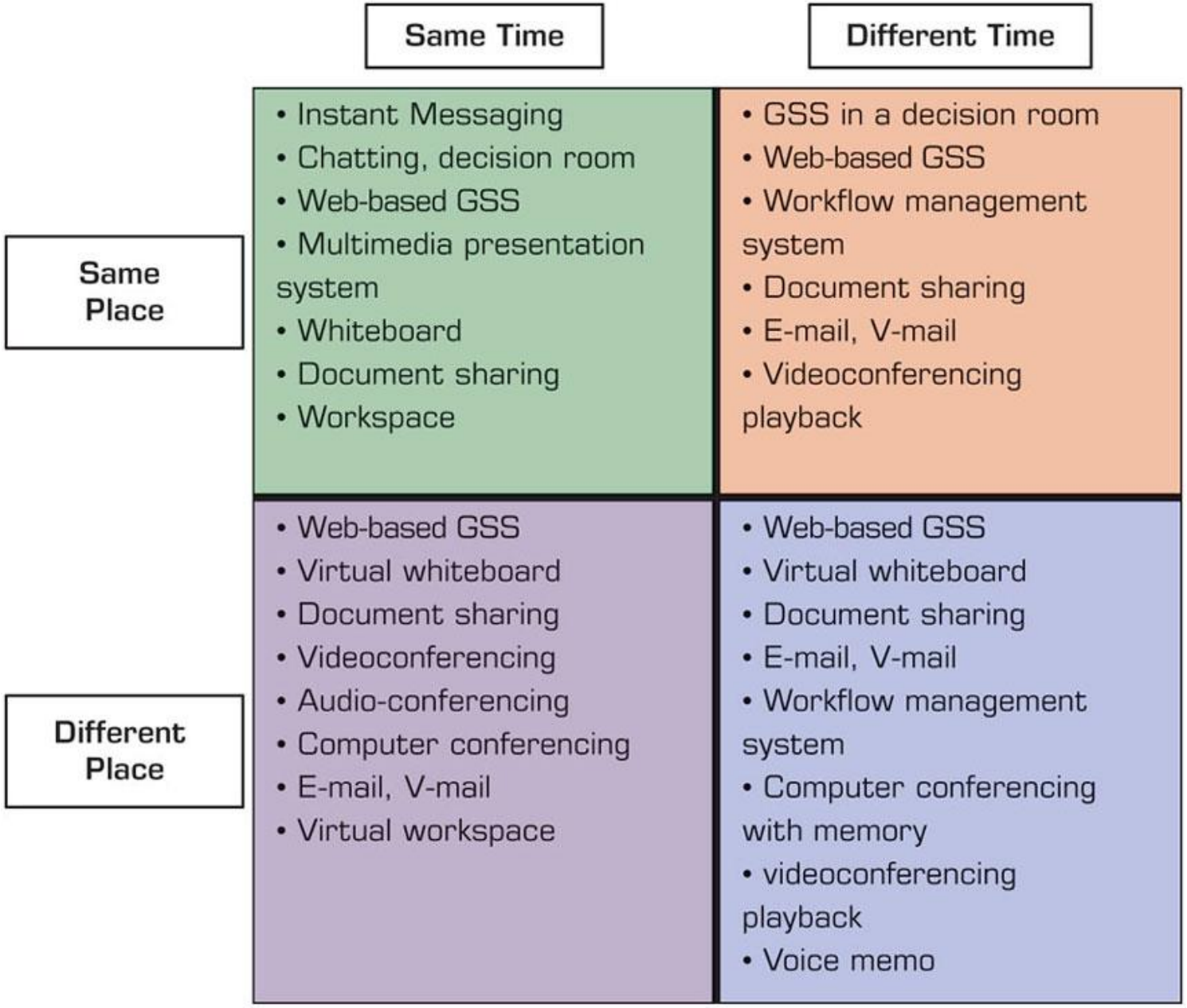
Copyright © 2021 Pearson Education Ltd. All Rights Reserved.

Time/Place Framework (1 of 2)

- **Same time / same place.**
  - Participants meet face-to-face, as in a traditional meeting, or decisions are made in a specially equipped decision room.
- **Same time / different place.**
  - Participants are in different places, but they communicate at the same time (e.g., with videoconferencing or IM).
- **Different time / same place.**
  - People work in shifts. One shift leaves information for the next shift.
- **Different time / different place**.
  - Participants are in different places, and they send and receive information at different times.

Copyright © 2021 Pearson Education Ltd. All Rights Reserved.

Time/Place Framework (2 of 2)



Pearson

Copyright © 2021 Pearson Education Ltd. All Rights Reserved.

Group Collaboration for Decision Support

- **Groups can help to**
  - identify problems,
  - assist in choosing criteria for selecting solutions, generating solutions (e.g., brainstorming),
  - Evaluating alternatives, and
  - assisting in the selection of the best solution and implementing it

- **Computerized tools and platforms**
  1. Support communication and collaboration
  2. Support of decision making

Copyright © 2021 Pearson Education Ltd. All Rights Reserved.

Electronic Support for Group Communication and Collaboration

- Groupware products provide a way for groups to share resources and opinions
- Synchronous or Asynchronous
- Examples
  - dropbox.com
  - drive.google.com
  - office.microsoft.com
  - …
- Virtual Meeting Systems
  - Webex.com, GoToMeeting.com, Skype.com, MS Teams, ZOOM…
- GroupSystems (Groupsystems.com)

Pearson

Copyright © 2021 Pearson Education Ltd. All Rights Reserved.

Groupware Products Synchronous versus Asynchronous (1 of 3)

Table 11.1 Groupware Products and Features.

General (Can Be Either Synchronous or Asynchronous)
• Built-in e-mail, messaging system • Browser interface • Joint Web page creation • Active hyperlink sharing • File sharing (graphics, video, audio, or other) • Built-in search functions (by topic or keyword) • Workflow tools • Corporate portals for communication, collaboration, and search • Shared screens • Electronic decision rooms • Peer-to-peer networks

Pearson

Copyright © 2021 Pearson Education Ltd. All Rights Reserved.

Groupware Products Synchronous versus Asynchronous (2 of 3)

Table 11.1 Groupware Products and Features.

Synchronous (Same Time)

• IM
• Videoconferences, multimedia conferences
• Audioconferences
• Shared whiteboard, smart whiteboard
• Instant videos
• Brainstorming
• Polling (voting) and other decision support (activities such as consensus building, scheduling)
  • Chats with people
  • Chats with bots

Pearson

Copyright © 2021 Pearson Education Ltd. All Rights Reserved.

Groupware Products Synchronous versus Asynchronous (3 of 3)

Table 11.1 Groupware Products and Features.

Asynchronous (Different Times)
• Virtual workspaces • Tweets • Ability to receive/send e-mail, SMS • Ability to receive notification alerts via e-mail or SMS • Ability to collapse/expand discussion threads • Message sorting (by date, author, or read/unread) • Auto responders • Chat session logs • Electronic bulletin boards, discussion groups • Blogs and wikis   • Collaborative planning and/or design tools

Pearson

Copyright © 2021 Pearson Education Ltd. All Rights Reserved.

Collaborative Networks and Hubs

- Traditionally, supply-chain member close to each other (supplier and manufacturer; distributor and retailer) communicate to share information on product flow
  - Vertically integrated supply-chain

- Nowadays, the whole supply chain can communicate and collaborate on collaborative planning, forecasting, and replenishment
  - Multi-node, network-based integration of supply-chain

Copyright © 2021 Pearson Education Ltd. All Rights Reserved.

Social Collaboration

- Collaboration conducted within and between socially oriented groups
  - Group interactions and information/knowledge sharing to attain common goals
  - Done on social media sites, and it is enabled by the Internet, IoT, and social collaboration software

- Collaboration in Social Networks
  - Facebook – Facebook workspace
  - LinkedIn – LinkedIn Lookup

Copyright © 2021 Pearson Education Ltd. All Rights Reserved.

Popular Collaboration Software

- **Communication tools**: Yammer (social collaboration), Slack, Skype, GoToMeeting
- **Design tools**: InVision, Red Pen, Logo Maker
- **Documentation tools**: Office Online, Google Docs
- **File-sharing tools**: Google Drive, Dropbox
- **Project management tools**: Asana, Podio, WorkflowMax, Kanban Tool
- **Software tools**: GitHub, Usersnap,Workflow tools: Integrity, BP Logix

Pearson

Copyright © 2021 Pearson Education Ltd. All Rights Reserved.

Direct Computerized Support for Group Decision Making

- Decisions are:
  - Frequently made at meetings
  - Some are one-time critical/strategic decision
  - Often complex and controversial decisions

- Process dysfunctions can significant affect the decision outcomes

- **Computerized support has often been suggested to mitigate these controversies**
  - These systems are usually called group decision support systems (GDSS), group support systems (GSS), electronic meeting systems (EMS)

Copyright © 2021 Pearson Education Ltd. All Rights Reserved.

Group Decision Support Systems (GDSS)

- It is an interactive computer-based system that facilitates the solution of semi-structured or unstructured problems by a group of decision makers
- **Goal** – support group decision making
  - A specially designed IS to enhance collaborative decision processes
  - It encourages generation of ideas, freedom of expression, and resolution of conflicts
- First generation GDSS: face-to-face in the same room
  - Decision room
- Today's GDSS: virtual, over the Web

Pearson

Copyright © 2021 Pearson Education Ltd. All Rights Reserved.

GDSS – Gains and Losses

- Gains:
  - Parallelism
  - Anonymity
  - Triggering
  - Synergy
  - Structure
  - Record keeping
- Loses:
  - Free-riding
  - Flaming

Pearson

Copyright © 2021 Pearson Education Ltd. All Rights Reserved.

Decision Rooms

- Expensive, customized, purposeful facilities
- 12 to 30 networked computers
- Usually recessed into the desktop
- Server and special software
- Large-screen projection system
- Breakout rooms
- Need a trained facilitator for success

Limitations:

- Historically, GDSS used to deal with contradictory decisions.
- Lack of indirect support.

Source:

- https://twitter.com/i_pulles/status/824629094029656064
- https://www.lessons-from-history.com/page/decision-making-and-skills

Pearson

Copyright © 2021 Pearson Education Ltd. All Rights Reserved.

Supporting the Entire Decision-Making Process - Stormboard (1 of 2)

https://www.youtube.com/watch?v=hveT564yNIg&t=67s

- Provides support for different brainstorming and group decision-making configurations
- Sequence of activities
  1. Define the problem and the users' objectives
  2. Brainstorm ideas
  3. Organize the ideas in groups of similar flavor, look for patterns, and select only viable ideas
  4. Collaborate, refine concepts, and evaluate (using criteria) the meeting's objectives…

Copyright © 2021 Pearson Education Ltd. All Rights Reserved.

Supporting the Entire Decision-Making Process - Stormboard (2 of 2)

- Sequence of activities (cont.)
  5. The software enables users to prioritize proposed ideas by focusing on the selection criteria. It lets all participants express their thinking and directs the team to be cohesive.
  6. It presents a short list of superior ideas
  7. The software suggests the best idea and recommends implementation
  8. It plans the project implementation.
  9. It manages the project.
  10. It periodically reviews progress.

Copyright © 2021 Pearson Education Ltd. All Rights Reserved.

Brainstorming for Idea Generation and Problem Solving

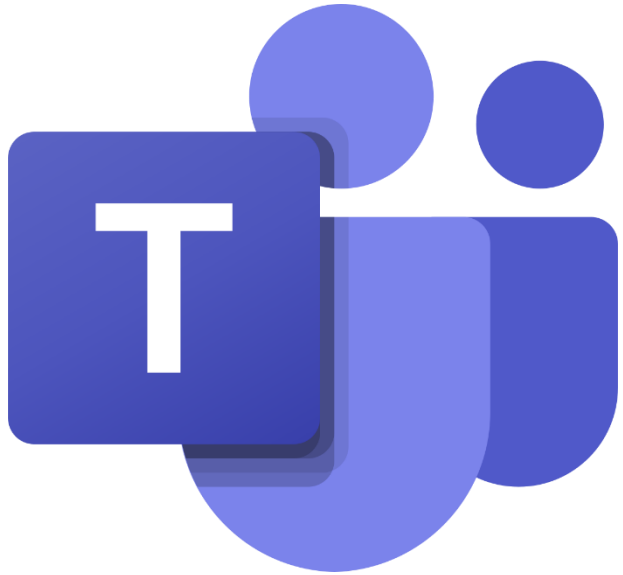
- **Brainstorming is the process for generating creative ideas**
- Involves:
  - freewheeling group discussions and spontaneous contribution of ideas for solving problems and making strategy and resource allocation
- Contributors' ideas are discussed by the members
- **Goal** - generate as many ideas as possible, no matter how bizarre they look
- Ideas are discussed and evaluated by the group
- **To mitigate the potential dysfunctions, computer support is frequently recommended**

Pearson

Copyright © 2021 Pearson Education Ltd. All Rights Reserved.

Group Support Systems (GSS)

- **GSS – Generic Term.**
- **Includes all forms of communication and collaborative activities including collaborative computing**
- It used to be a specialize software, now it is embedded into standard IT productivity tools
  - Microsoft Office 365 includes Microsoft Teams (opening vignette)
- **How GSS improves group work?**
  - Improve productivity and effectiveness
  - Streamline and speed-up the process
  - Improving the quality of the outcomes
  - Increase process gains and reduce process losses
- Helps in working simultaneously and with anonymity



Copyright © 2021 Pearson Education Ltd. All Rights Reserved.

Collective Intelligence and Collaborative Intelligence

- Collective intelligence (CI) refers to the total intelligence of a group.
  - It is also refers to as the *wisdom of the crowd*
  - MIT center for collective intelligence (cci.mit.edu)
  - Benefits of CI, see 50Minutes.com

Source: https://unanimous.ai/is-collective-intelligence-a-safer-form-of-a-i/

- Types of Collective Intelligence
  - Cognition
  - Cooperation, and
  - Coordination
- Computerized support to collective intelligence

Pearson

Copyright © 2021 Pearson Education Ltd. All Rights Reserved.

Crowdsourcing as a Method for Decision Support

- **Crowdsourcing - outsourcing tasks to a large group of people (crowd).**
- **Goal** – to leverage the *wisdom of a crowd*
- Viewed as a method of *collective intelligence*
- Essentials of crowdsourcing…
  - Tutorial on crowdsourcing and examples, watch the video youtube.com/watch?v=lXhydxSSNOY
- Examples
  - 2005, Doritos Inc. has run a “Crash the Super Bowl”
  - See other examples on page 669 in the book

HERSHEY THE HERSHEY COMPANY PEPSICO P&G

Pearson

Copyright © 2021 Pearson Education Ltd. All Rights Reserved.

Major Types of Crowdsourcing

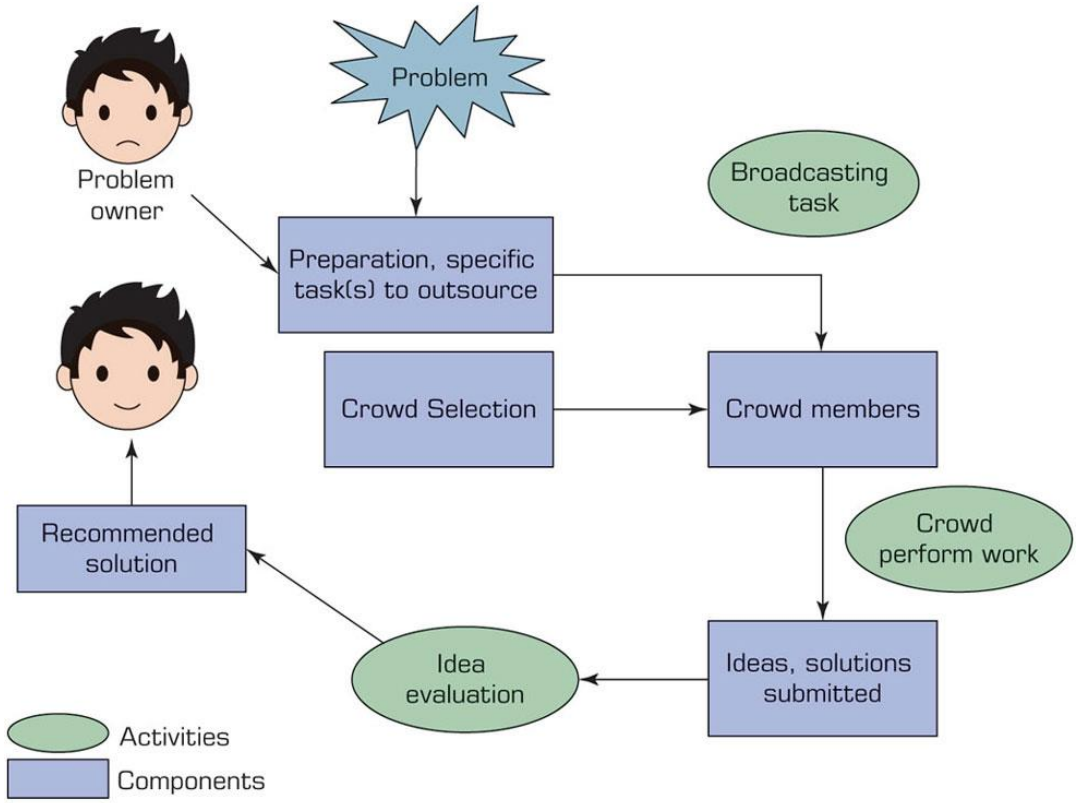
- **Collective intelligence (or wisdom).** People in crowds are solving problems and providing new insights.
- **Crowd creation.** People are creating various types of content and sharing it with others (for pay or free).
- **Crowd voting.** People are giving their opinions and ratings on ideas, products, or services, as well as evaluating and filtering information presented to them.
- **Crowd support and funding.** People are contributing and supporting endeavors for social or business causes, such as offering donations, and micro-financing new ventures.

Pearson

Copyright © 2021 Pearson Education Ltd. All Rights Reserved.

The Process of Crowdsourcing

1. Identify the problem and the task(s) to be outsourced.
2. Select the target crowd (if not an open call).
3. Broadcast the task to the crowd.
4. Engage the crowd in accomplishing the task (e.g., idea generation, problem solving).
5. Collect user-generated content.
6. Have the quality of submitted material evaluated by the management, by experts, or by a crowd.
7. Select the best solution (or a short list).
8. Compensate the crowd (e.g., the winning proposal).
9. Implement the solution.



Pearson

Copyright © 2021 Pearson Education Ltd. All Rights Reserved.

AI Support of Group Decision Making

- A major objective of AI is to automate decision making and/or to support its process.
- With groups, it is about supporting the decision-making process.

- AI can help in the following steps in the process:
  - Meeting preparation
  - Problem identification
  - Idea generation
  - Idea organization
  - Group interaction and collaboration
  - Predictions
  - Multilingual group communications

Pearson

Copyright © 2021 Pearson Education Ltd. All Rights Reserved.

AI Supports Team Collaboration

- Findings of the Cisco Systems sponsored a global survey, AI Meets Collaboration
  1. Virtual assistants increase employees' productivity, creativity, and job satisfaction. Bots also enable employees to focus on high-value tasks.
  2. Bots are accepted as part of workers' teams.
  3. Bots improve conference calls. They also can take meetings notes and schedule meetings.
  4. AI can use facial recognition to sign in eligible people to meetings.
  5. Personal characteristics are likely to influence how people feel about AI in the workplace…

Copyright © 2021 Pearson Education Ltd. All Rights Reserved.

Swarm Intelligence and Swarm AI

- **Swarm intelligence refers to the collective behavior of decentralized, self organized systems, natural or artificial**
  - Such systems consist of things (e.g., ants, people) interacting with each other and their environment
  - A swarm's actions are not centrally controlled, but they lead to intelligent behavior
- In contrast with animals and other species whose interactions among group members are natural, people need technology to exhibit swarm intelligence
- Swarm AI technology
  - https://www.youtube.com/watch?v=G1t4M2XnIhI
  - https://www.youtube.com/watch?v=k8IsYb31He8

Pearson

Copyright © 2021 Pearson Education Ltd. All Rights Reserved.

Human-Machine Collaboration and Teams of Robots (1 of 2)

- Human–Machine Collaboration in Cognitive Jobs
  - https://www.youtube.com/watch?v=XnhhoR_nisc

- **Robots as coworkers – Challenges:**
  - Designing a human–machine team that capitalizes on the strength of each partner.
  - Exchanging information between humans and robots.
  - Preparing company employees for the collaboration
  - Changing business processes to accommodate human–robot collaboration
  - Ensuring the safety of robots and employees that work together.

Copyright © 2021 Pearson Education Ltd. All Rights Reserved.

Human-Machine Collaboration and Teams of Robots (2 of 2)

- Blending humans and AI to best serve customers
- "Artificial Intelligence with the Human Touch"
  - Watch it at youtube.com/watch?v=NP2qqwGTNPk
- Collaborative robots (Co-Bots)
  - https://www.youtube.com/watch?v=PtncirKiBXQ
- Team of collaborative robots
  - Example: Teams of Robots to Explore Mars
  - Example: Alibaba.com is using teams of robots in its smart warehouses. Watch it at https://www.youtube.com/watch?v=FBl4Y55V2Z4

Copyright © 2021 Pearson Education Ltd. All Rights Reserved.

Q & A

Pearson

Copyright © 2021 Pearson Education Ltd. All Rights Reserved.