System Development and Project Organization (BSUP)

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Working with teams

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Outline

- Different types of projects and their technological needs
- Cooperation, collaboration, coordination, communication, and awareness
- Coordination mechanisms and communicative genres

Software Engineering Arrangement	Single Site	Multiple Sites
Single Person	Individual Project	
Several People	Co-Located Team Project	Distributed Team Project

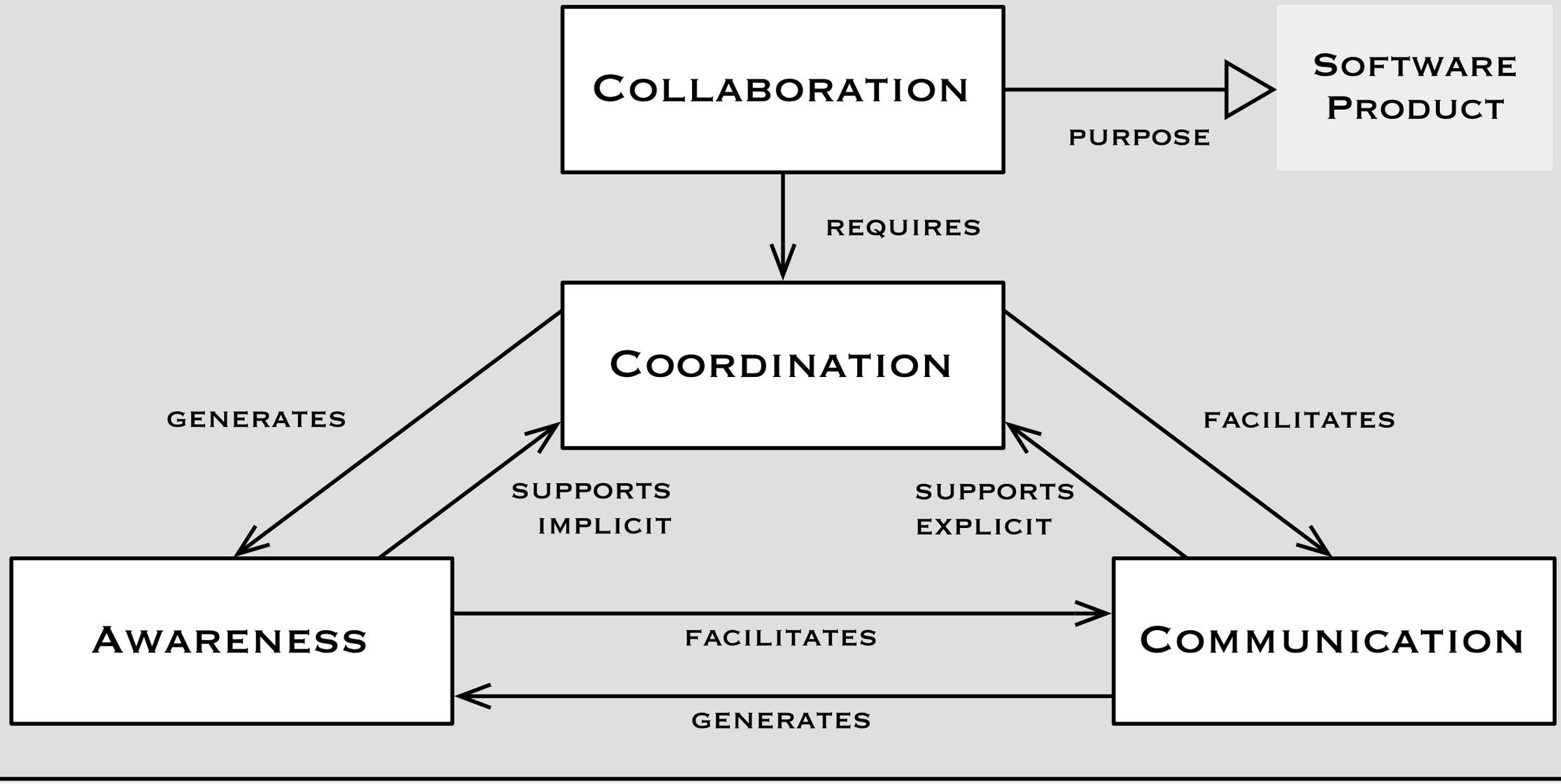
Sourcing and shoring arrangements

Sourcing	
Insourcing	The process of acquiring a service to be performed in-house. This contracting form can also be used internally across different company divisions/teams as long as there is a contractual arrangement.
Outsourcing	The process of delegating a specific task to an external company.
Shoring	
Inshoring	(or onshoring in [30]) When the client of the contract is located in the same country.
Offshoring	When the client on the contract is located in a different country.
Nearshoring	When the two parties of the contract are located in different countries (offshoring), which are geographically close.
Farshoring	When the two parties of the contract are located in different countries (offshoring), which are geographically distant.

[30] - D. Smite and C. Wohlin. A Whisper of Evidence in Global Software Engineering. Software, IEEE, 2011.

Computer-Mediated Support Necessary for Given SE Arrangement	Single Site	Multiple Sites
Single Person	CASE Tools Automation Tools	
Several People	+ Collaboration Tools	+ Coordination Tools + Communication Tools + Awareness Tools

Cooperative Software Engineering



Definitions of forms of Cooperative Work

Cooperative work	General and neutral designation of multiple persons working together to produce a product or service.
Collaborative work	A special stress is given to a particular "collaborative" or complying spirit among the cooperators, as evident, for example, in the expression "collaborating" with an enemy.
Collective work	Cooperative work where the cooperating ensemble is sharing the responsibility for accomplishing the task. The emphasis of the concept is on the fusion of the members of the ensemble into a whole, a "collective". That is, the term is conceptually close to "group" and "team" work.

Source: L. J. Bannon and K. Schmidt. Cscw-four characters in search of a context. DAIMI Report Series, 1989.

Operational definitions from a tool perspective

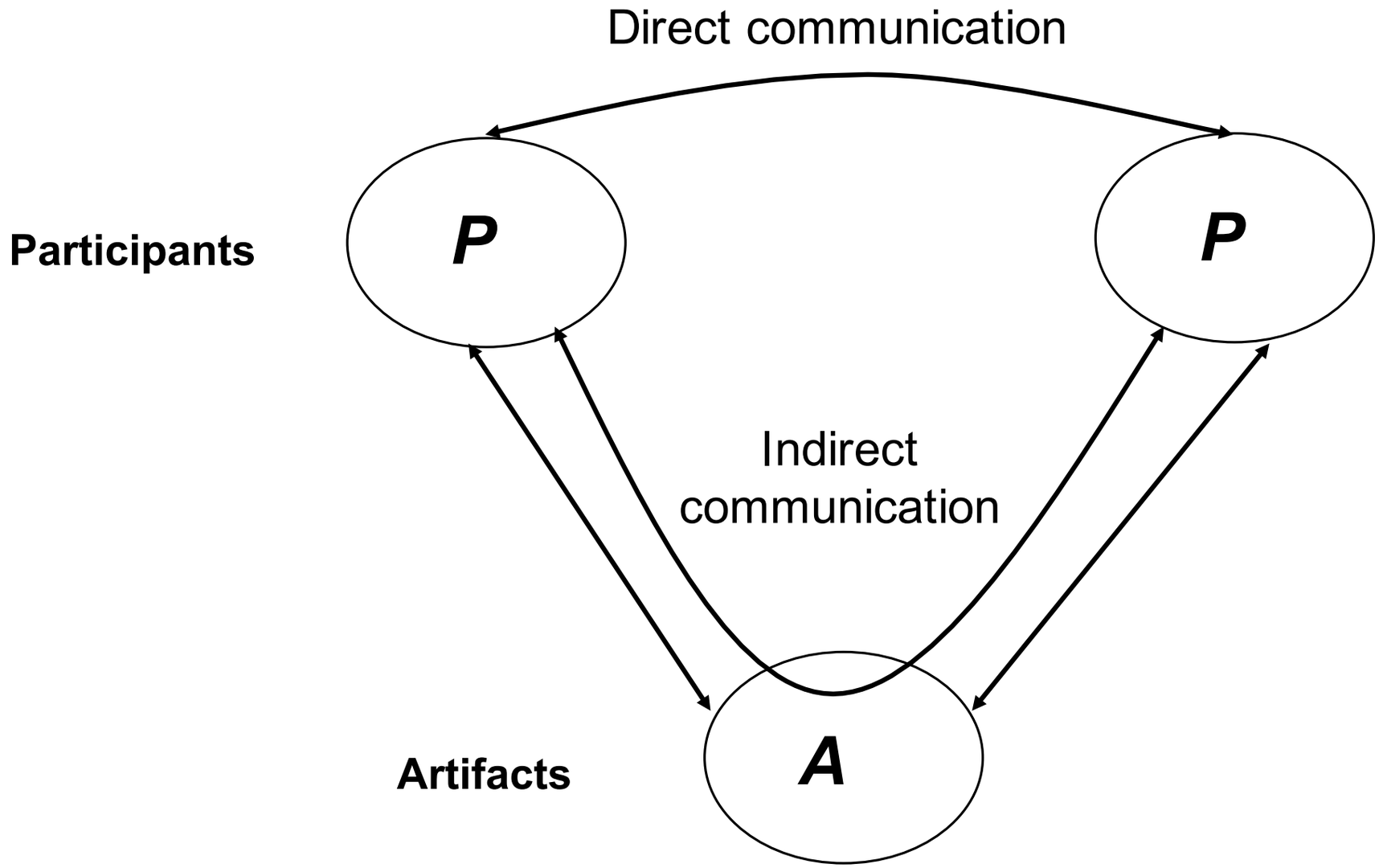
Collaboration	When the technology brings improvements to the shared space or to the way users interact with shared artifacts synchronously or asynchronously.
Coordination	When the technology brings improvements to the support offered for people managing themselves, or themselves within a team.
Communication	When the technology brings improvements to the way messages and information are exchanged among people, reducing gaps, ambiguity, or the effort needed to understand, establish, or continue a conversation.
Awareness	An understanding of the activities of others, which provides a context for your own activity.

Inspired or taken from:

- P. Dourish and V. Bellotti. Awareness and coordination in shared workspaces. In Pro- ceedings of the 1992 ACM conference on Computer-supported cooperative work. ACM, 1992.
- C. A. Ellis, S. J. Gibbs, and G. Rein. Groupware: some issues and experiences. Commu- nications of the ACM, 1991.
- I. Steinmacher, A. Chaves, and M. A. Gerosa. Awareness Support in Distributed Software Development: A Systematic Review and Mapping of the Literature. Computer Supported Cooperative Work (CSCW), 2013.

Communication

Direct vs Indirect communication



Source: A. Dix, J. Finley, G. Abowd, R. Beale, Human-computer interaction, 3° Ed, Prentice-Hall, 2003.

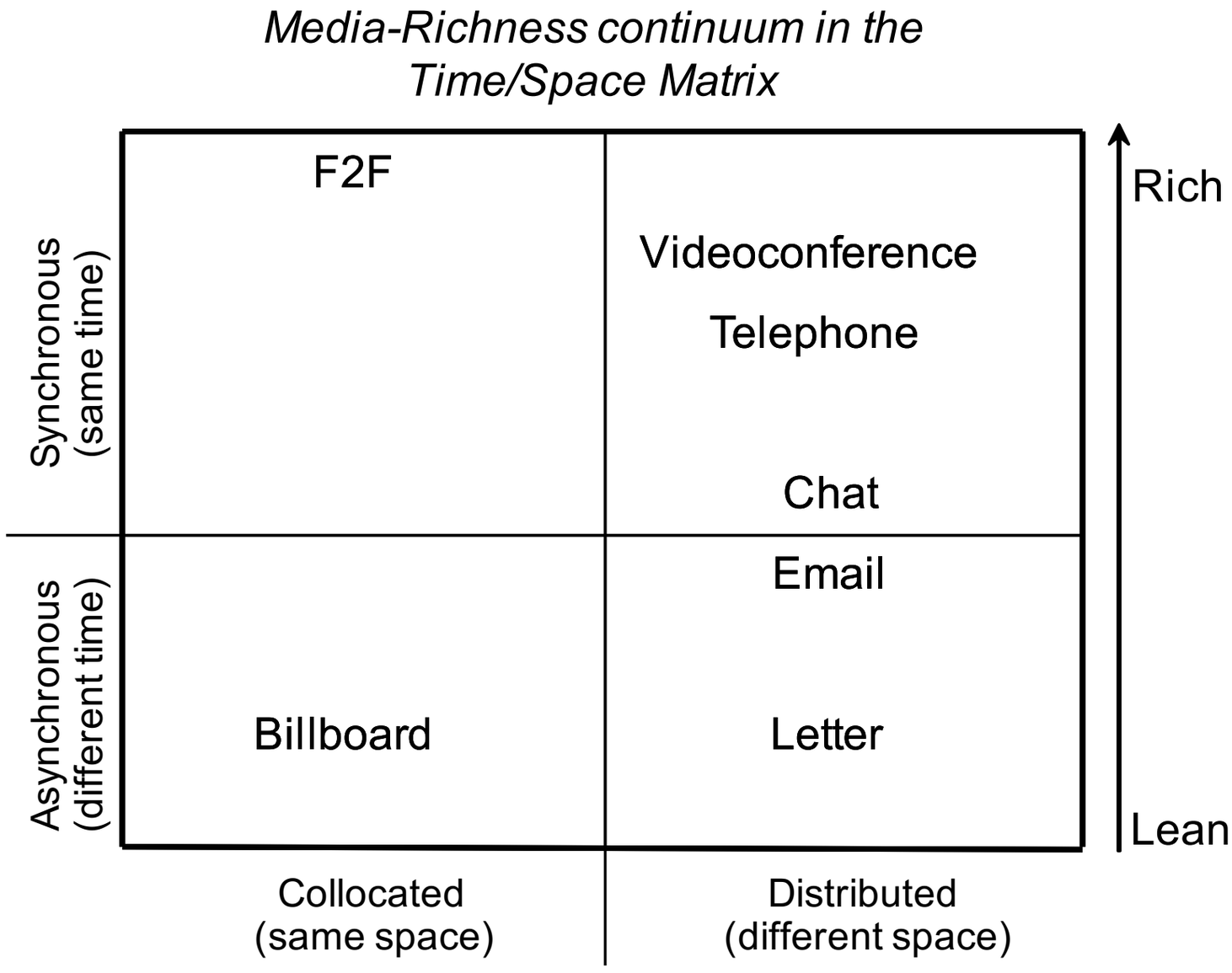
Formal vs Informal communication

	Formal	Informal
Message	*Planned*	*Spontaneous*
Content	*Work-related*	*Relational*
Purpose	*Organizational*	*Personal*
Location / channels	*Official*	*Random*

Computer-Mediated Communication (CMC)

Media can be characterized along three dimensions of information exchange:

- Time (when)
- Space (where)
- Richness (how much)



Main theories on CMC

- Social Presence Theory (Short et al.,1976)
  - Lean single-channel media have low sense of presence (inability to convey non-verbal cues)
  - Lean media better for task-focused communication, rich media for relational communication

- Media Richness Theory (Daft & Lengel, 1984)
  - The more complex the task, the richer the media to use
  - Lean media better for uncertain tasks, rich media better for equivocal tasks

- Common Ground Theory (Clark & Brennan, 1991)
  - Argues that communications is not simply the sending of messages
  - There is no best medium in absolute

Main theories on CMC

- Channel Expansion Theory (Goodhue et al., 1995)
  - Factors other than channel characteristics affect CMC effectiveness
  - Group's shared experience and media use experience

- Media Synchronicity Theory (Dennis & Valacich, 1998)
  - Highly synch media when convergence is the key process to task accomplishment
  - Lowly synch media when conveyance is the key process to task accomplishment

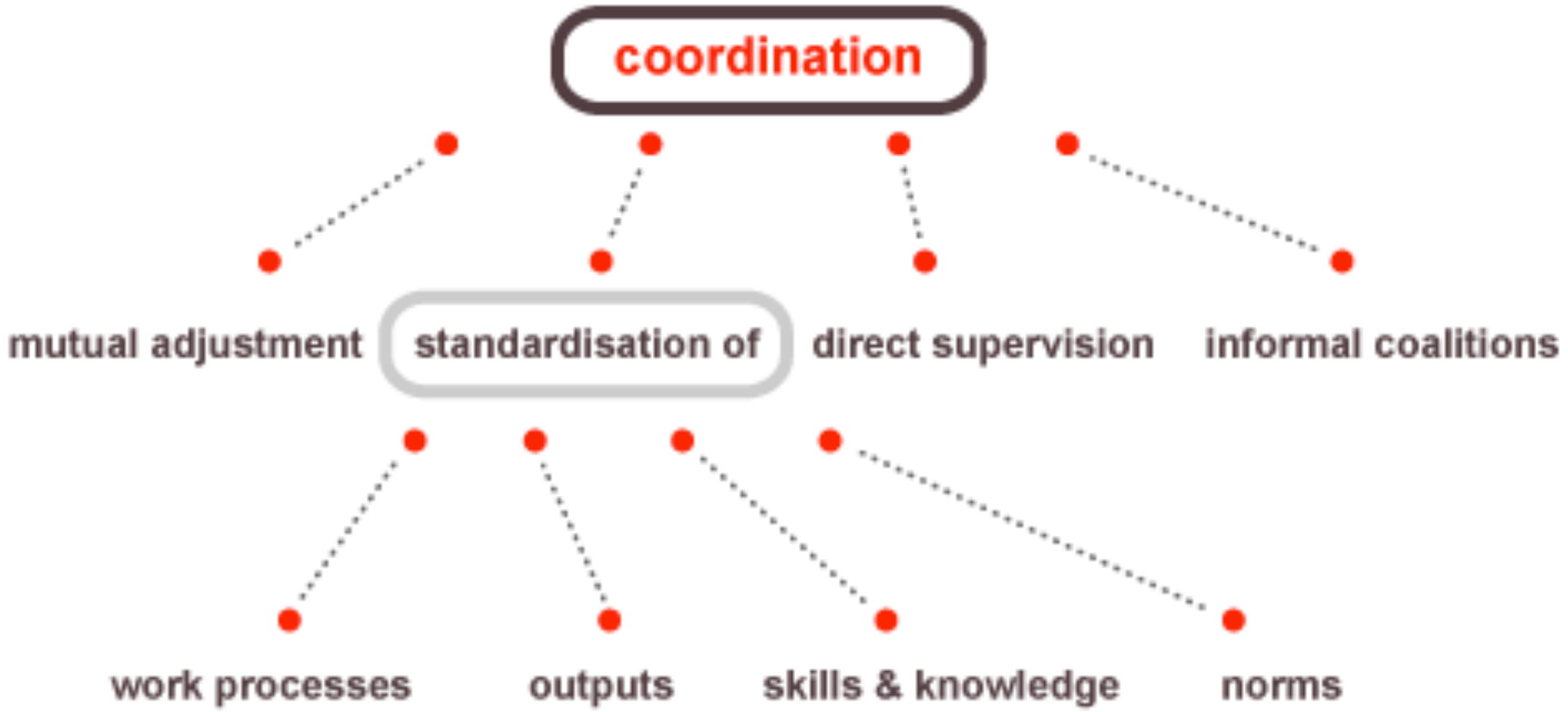
- Cognitive-Based View (Robert & Dennis, 2005)
  - Sense of presence not as vital as the ability to process information
  - Media Richness Paradox: The richer the media, the harder to properly process information

Task/Technology Fit (TTF)

- Effectiveness of CMC varies on the type of task
  - Differences in tasks and media generate differences in group performance

- Rich media do not always provide the best solution for any given task
  - Too much or too few media richness for a given task represents a poor TTF

- Good TTF only when information richness required by task is proportional to that conveyed by media
  - TTF theories suggest how to appropriately match task characteristics to medium properties



Coordination

Mintzberg's coordination mechanisms

1. Mutual adjustment
   Coordination of work is made possible by a process of informal communication between people conducting interdependent work.

2. Direct supervision
   Coordination is achieved by one individual taking responsibility for the work of others.

3. Standardisation of work processes
   Coordination is made possible by specifying the work content in rules or routines to be followed. Coordination occurs before the activity is undertaken. Mintzberg adopted Taylorism: procedures are usually specified by work-study analysis.

4. Standardization of output
   Coordination is obtained by the communication and clarification of expected results. The individual actions required to obtain a goal are not prescribed. This goal setting method is closely related to Drucker's Management by Objectives.

5. Standardization of skills and knowledge
   Coordination is reached through specified and standardised training and education. People are trained to know what to expect of each other and coordinate in almost automatic fashion.

6. Standardisation of norms
   Norms are standardized, socialization is used to establish common values and beliefs in order for people work toward common expectations. Mintzberg added this cultural based mechanism at a later stage.

H. Mintzberg. Mintzberg on Management: Inside Our Strange World of Organizations. Free Press, New York, 1989.

"an understanding of the activities of others,
which provides a context for your own activity"
— Dourish and Bellotti

Awareness

Sources:

- P. Dourish and V. Bellotti. Awareness and coordination in shared workspaces. In Proceedings of the 1992 ACM conference on Computer-supported cooperative work, pages 107–114. ACM, 1992.

Awareness, the CSCW perspective

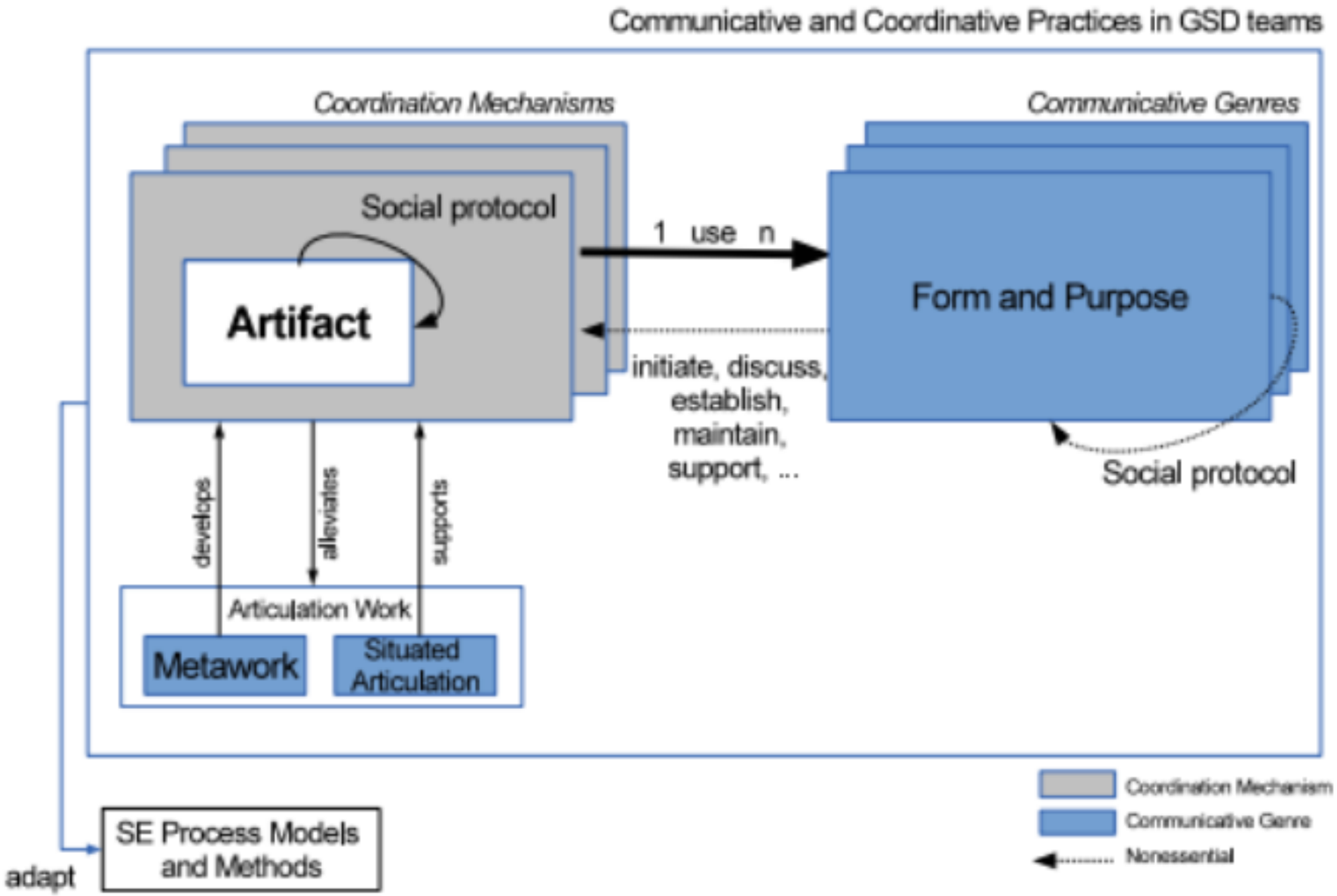
- Workspace Awareness — "the up-to-the-minute knowledge of other participants interactions with the shared workspace";
- Informal Awareness — "the general sense of who's around and what they are up to";
- Group-Structural Awareness — "knowledge about such things as peoples roles and responsibilities, their positions on an issue, their status, and group processes";
- Social Awareness — "information that a person maintains about others in a social or conversational context"

Sources:

- C. Gutwin, S. Greenberg, and M. Roseman. Workspace awareness in real- time distributed groupware: Framework, widgets, and evaluation. People and Computers, pages 281–298, 1996.

Analysing communicative and coordinative practices

An example of a framework



Rosalba Giuffrida, Yvonne Dittrich, A conceptual framework to study the role of communication through social software for coordination in globally-distributed software teams, Information and Software Technology, Volume 63, July 2015, Pages 11-30,