A Framework for the Analysis of Coodination in Global Software Development

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Research Question

- "What is the significance of distribution in GSD, and how does it condition coordination in this domain?"

OR

- "*how* is coordination of GSD activities achieved in the face of distance-related, socio-cultural and technological challenges?"

Perspectives on Coordination

- A coherent framework for analyzing coordination in GSD that integrates all these diverse perspectives – interdependence, uncertainties and equivocalities, conflict and technology representations – seems to be lacking

- Earlier attempts at theorizing coordination dwelt on some of these perspectives at the neglect of the others

- Researchers have failed to identify the key dimensions of organising software development as well as the characteristics of those dimensions
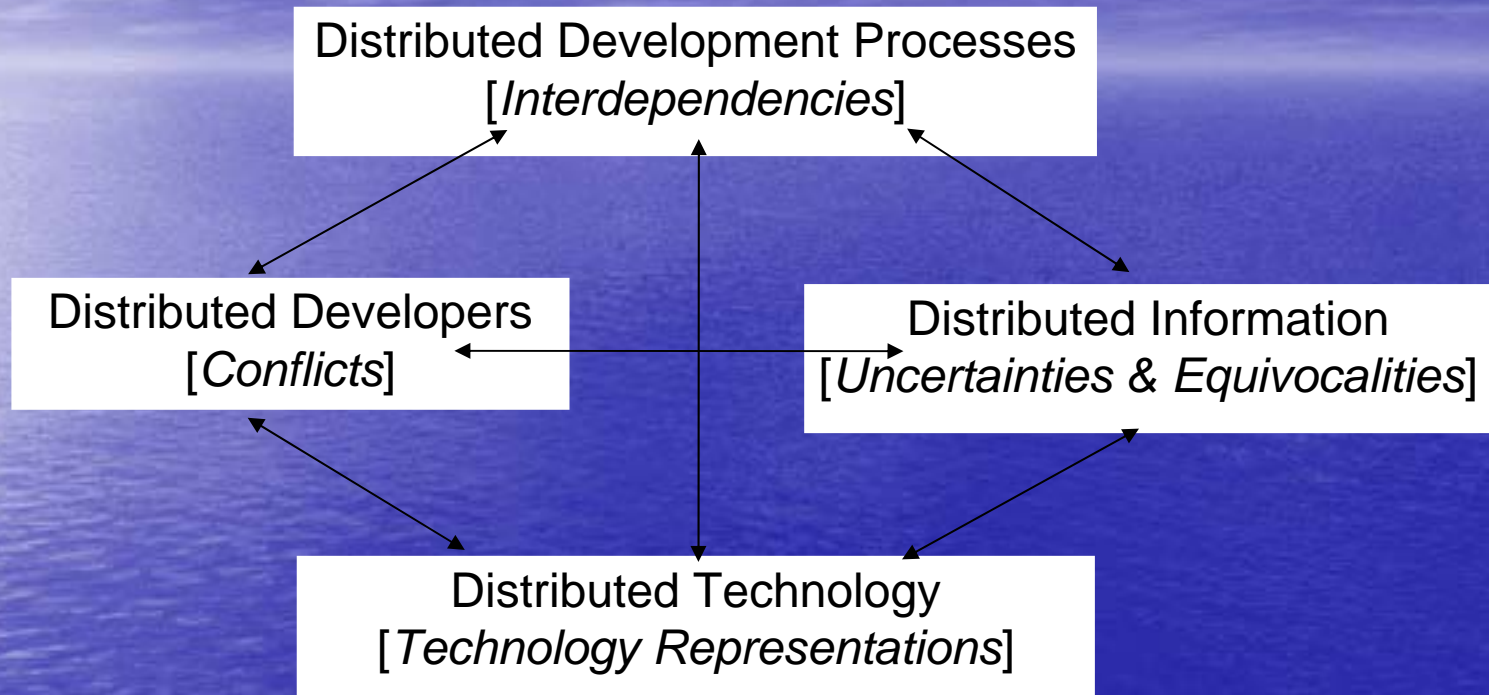
Perspectives on Coordination

- Convergence towards "Interdependencies." (e.g. Malone and Crowston 1990, 1994)
- Divergence from a unified conceptualization
  - Segregated focuses on "interdependencies," "uncertainties," "conflicts" and "technology representations."
- Same for literature on coordination in software development
- *An understanding of the key elements of distribution and how they will condition coordination in GSD to complicate coordination in the domain is a critical necessity*

Distribution-Engendered Conditioners of GSD

- Distance related
  - The distribution of the development activity and the distance between locations can be understood along the dimensions of space, time and context
  - geographic separation of developers, of development processes, of technology, and of information.
- Socio-cultural
  - the role of power and knowledge in the production and reproduction of cultural norms
  - how belief systems translate into meaning of information and nature of knowledge
  - how developers perceive reward systems and their process or outcome targets
  - and the forms of organising in terms of markets, bureaucracies or clans
- Technological
  - models of structures and processes concerning aspects such as data flows, conceptual schemes, knowledge management repositories, knowledge representations, and inscribed rules and methods
  - modes of presentation and access concerning issues such as user interface, functionality, ease of use and usability.

Integrated Coordination Model

Distributed Development Processes
[*Interdependencies*]

Distributed Developers
[*Conflicts*]

Distributed Information
[*Uncertainties & Equivocalities*]

Distributed Technology
[*Technology Representations*]

Distributed People

- Project Managers
- Architects
- Developers
- Testers
- Functional Analysts, etc
- *Possible interpersonal and interunit conflicts between distributed people*

Distributed Development Processes

- Modelling and Designing
- Requirements elicitation, analysis and specification
- programming and testing
- modes of interactions between developers, including human-technology interactions
- information generation, processing and transmission tasks
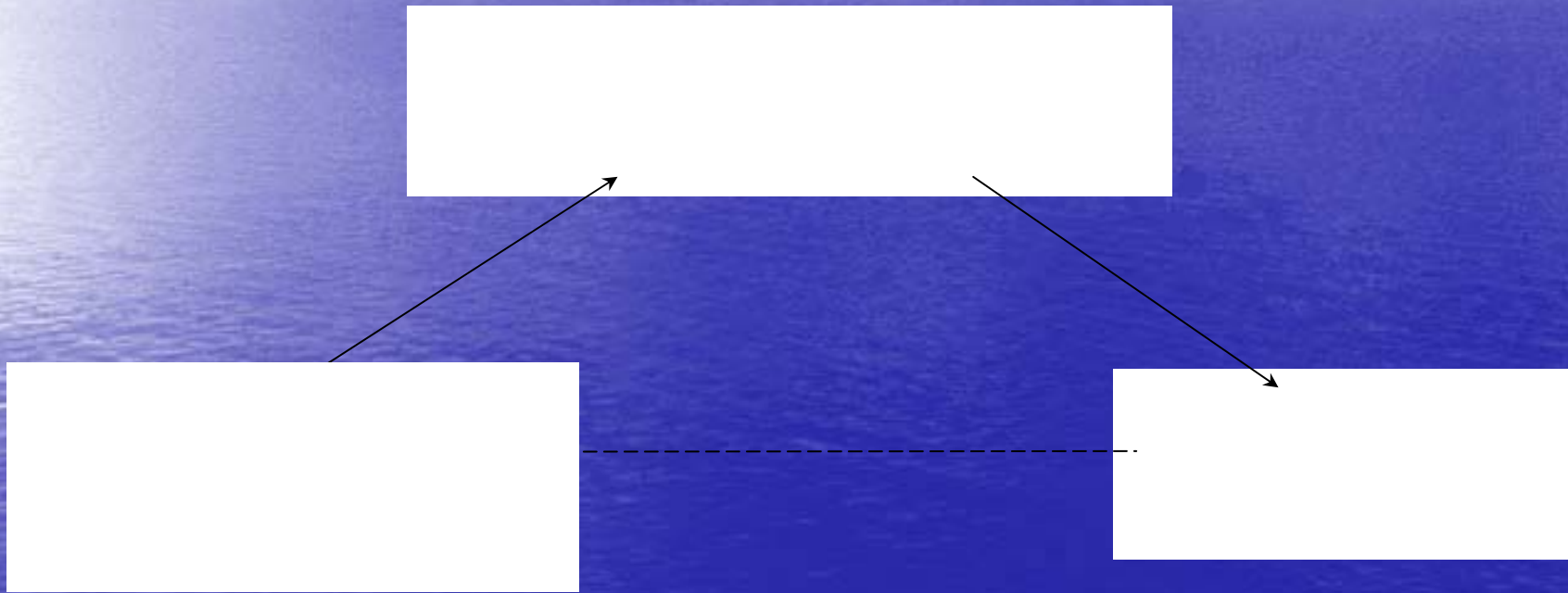- *Possible problems with interdependencies between distributed processes*

Distributed Information

- information representations
- information strategies
- knowledge repositories and sharing modes
- modes of information capture, processing and transmission
- what information is being transmitted across development sites
- different interpretations of information by distributed developers
- how information shapes developers' decision making
- *Possible information uncertainties and equivocalities among distributed people*

Distributed Technologies

- <u>Essential technologies</u>: development tools, languages and platforms, bug tracking systems and knowledge repositories (essential technologies)

- <u>Conditional technologies</u>: information and communication technologies such as various information generation, processing, and interaction systems

- *Possible problems with functional representations of distributed technologies*

Coordination Challenge in GSD

The Framework

Management of:		Distribution-engendered Conditioners		
		Distance-related • Distance (spatial, temporal, contextual, etc) • Mobility (spatial, temporal, contextual, etc) • Etc	**Socio-Cultural** • Cultural norms (power, knowledge) • Belief systems • Reward systems • Context-bound meanings of information • Etc	**Technological** • Remote interaction technologies • Inscriptions • Computer-based coordination mechanisms • Etc
	Interdependencies • Actions (what) • Methods (how) • Locations (where) • Times (when) • Contexts(in what circumstances) • Etc	General Research Question: *In what ways do distance, socio-culture and technology condition the management of process interdependencies, interpersonal and interunit conflicts, information uncertainties and equivocalities, and technology representations?*		
	Conflicts • Antecedents • Consequences • Circular causality • Etc.			
	Uncertainties and Equivocalities • Information generation • Information processing • Circular causality • Etc.			
	Technology Representations • Functional assignment • Rules inscriptions • Technology as actant • Etc.			