Understanding Structures and Affordances of Extended Teams in Global Software Development

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Objective

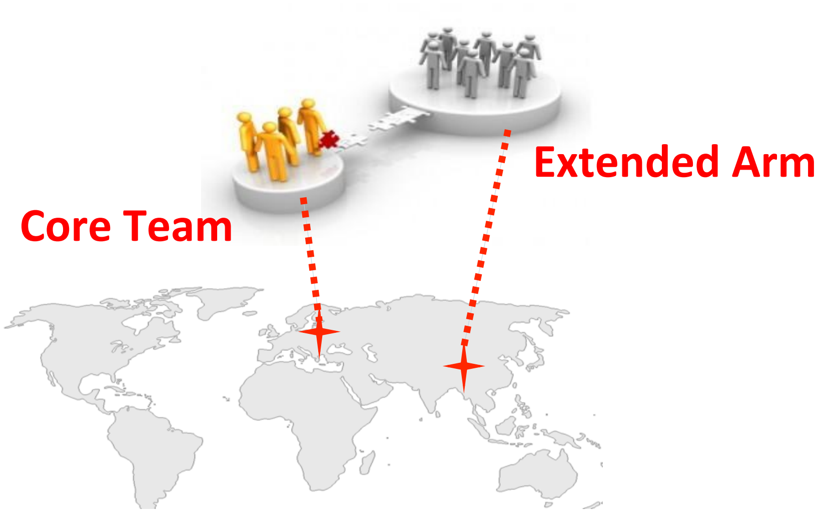
- Empirically investigating implementation of **Extended Team Model (ETM)** in GSD.
- Exploring the characteristics of work, communication and social structures within an ETM.
- Understanding the potentials and affordances of structures in place to address GSD challenges.

Outline

- Theoretical concepts
- Research design
- Findings
- Discussion, Conclusion, Future work

Extended Team Model (ETM)

- Customized offshore outsourcing model based on ***long-term*** partnership of two parties
- Emphasis on building ***unified team*** beyond client-vendor relationship
- *"Core Team"*
  - Permanent
  - Development Demands
- "Extended Arm"
  - Scalable pool of human resources
  - ***Dedicated*** to core's upcoming demands

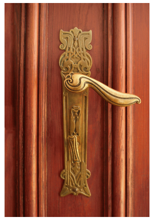


Structures

- **Work Structure**: Pattern of work dependencies
    - Results from different strategies and criteria of work distribution
    - Example: Based on modules/ components, based on processes (e.g. assigning testing to one site)
- **Communication Structure:** Pattern of communication
    - Driven by achieving effectiveness and efficiency
    - Example: hierarchical, flat, hybrid, core-periphery
- **Social Structure:** Pattern of social relationships
    - Example: dense social ties vs. structural holes

Affordances

- Relational properties between objects and actors in order to support interactions required to perform a task in a certain situation (Operational definition for our work)
- Use in HCI - Design of a door affords ways to open it



- Appropriate structures in GSD can afford different ways of social interactions for supporting collaboration and coordination
- Perceptual and Real affordances (D. Norman)

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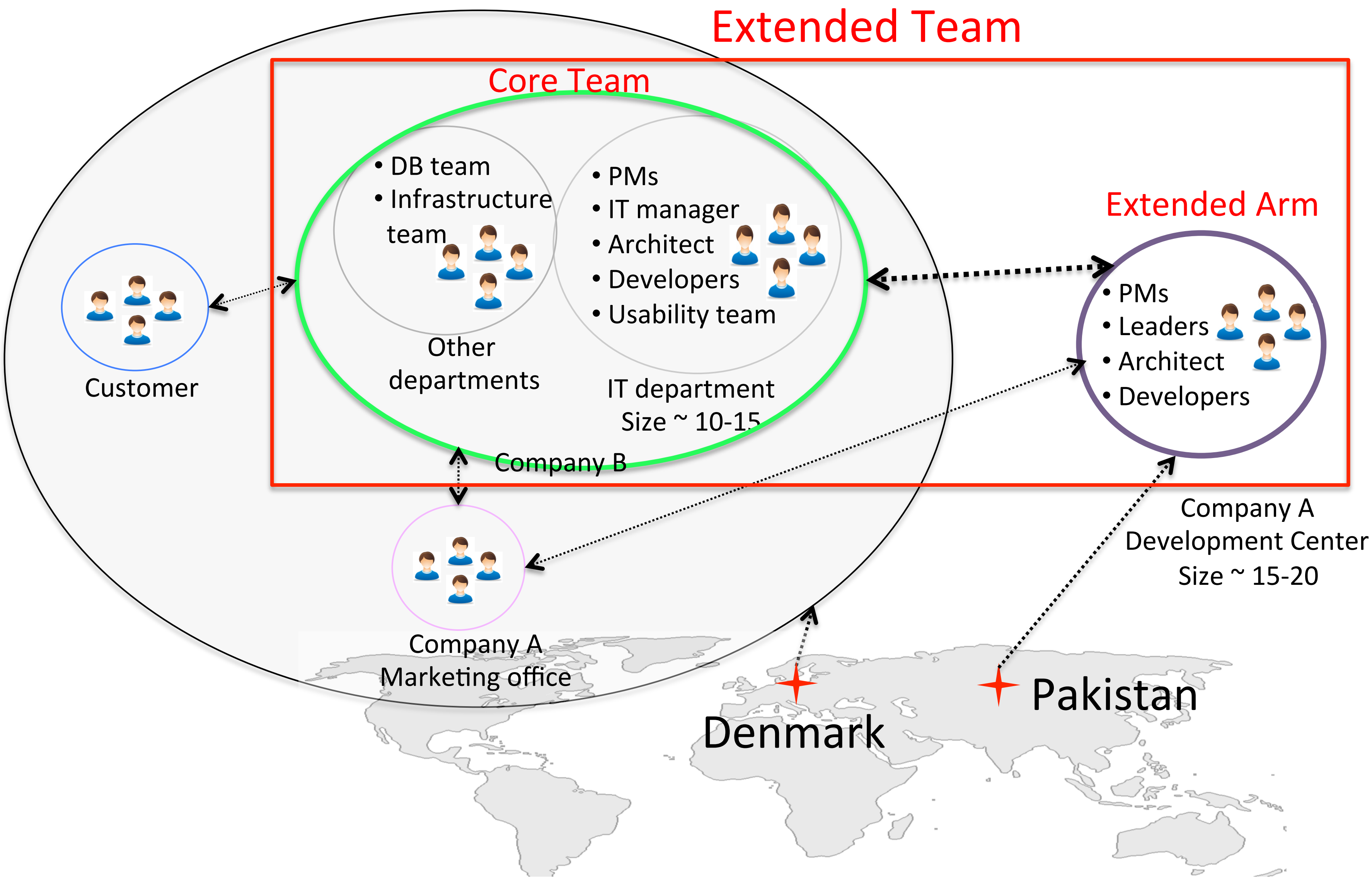
Research Design

- Exploratory Case study
  - *Case*: ETM-based software development team distributed between Denmark and Pakistan
- Data Collection
  - 3 weeks of field study in Pakistan
  - 12 semi-structured interviews
  - 7 participants from offshore and 5 from onshore
- Data Analysis
  - Inductive coding approach inspired by grounded-theory techniques

Context



Extended Team
Core Team
• DB team
• Infrastructure team
Other departments
• PMs
• IT manager
• Architect
• Developers
• Usability team
IT department
Size ~ 10-15
Company B
Customer
Extended Arm
• PMs
• Leaders
• Architect
• Developers
Company A
Development Center
Size ~ 15-20
Company A
Marketing office
Denmark
Pakistan

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Work Structure in ETM

- Dynamic

Multiple projects run in parallel, resources are assigned to more than one project at the same time.

- Interdependent Tasks

Assigning tasks based on availability and skill sets, not loose-coupling.

- Formal hierarchies

Task coordination and decision making through formal roles (e.g. leaders, PMs)

Communication Structure in ETM

• Flat and Frequent	Everybody talks to everybody across the extended team.
• Different Media	Variety of communication media is used (e.g. IM, Audio/Video call, Sharing screen)
• Facilitator Role	Senior PM at offshore, accelerating getting responses.

Social Structure in ETM

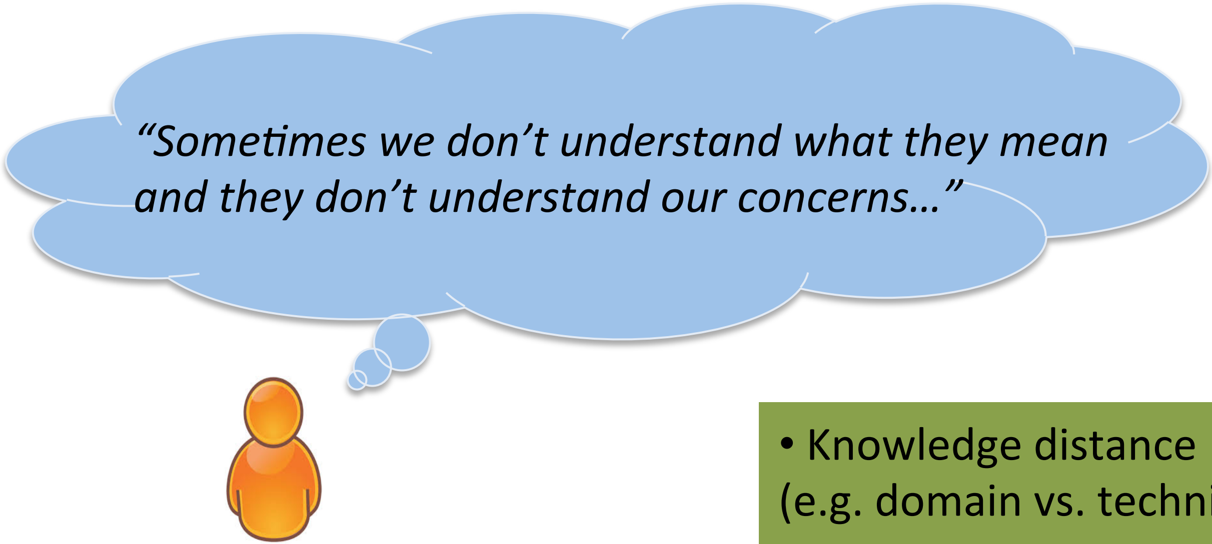
• Pre-existing backbone	Few key roles (at onshore and offshore) knew each other beforehand.
• Cooperative Culture	Introducing and implementing "Equality Model", "No Blame" to develop social ties.
• Socialization initiatives	Socialization is derived by individual initiatives.

Challenges

- Communication gap
- RE-related challenges
- Delayed feedback and context switching
- Socio-cultural issues

Challenges - Example

- Communication gap



Offshore developer

- Knowledge distance
(e.g. domain vs. technical knowledge)

- Socio-cultural distance
(e.g. language, mental approaches)

- Media shortcomings
(e.g. lack of collaborative design tool)

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Structures and Affordances

- Can the implemented structures afford mechanisms to address well-known GSD challenges?
  - Consulted with the literature (E.g., Agerfalk et al, 2005)
- The implemented communication and social structures afford different mechanisms to distributed teams to:
  - Maintain informal communication
  - Initiate contact with remote colleague
  - Improve trust and team spirit
  - Increasing awareness of working context

Recommendations (1/2)

- Affordances of communication structure should have alignment with communication needs of work and social structures.
  - Example: Real-time automated translation to support direct communication of end-users and offshore.
- The work structure needs to be adjusted to reduce unnecessary interdependencies.
  - Example: No direct contact of offshore team with onshore infrastructure people.

Recommendations (2/2)

- Systematically gathering or sharing data about available resources to avoid context switching due to *“over commitment”.*
- Drawing balance between work and social structures to certain level of cultural understanding but avoiding extra burden of reconciling views on belief systems.

Implications

Implications for Practice

- Strategies to support formation of appropriate structures based on their appropriateness and weaknesses for addressing GSD challenges.

Implications for Research

- Exploring social networking technologies (e.g. LinkedIn) on work structure and productivity of ETM.
- Support for selecting appropriate GSD technologies for different types of structures in ETM.

Thank you

Challenges

- Requirement engineering issues

" We don't have the visibility of the whole requirements and have to start with partial set that has the risk to create rework…"

- Lacking the whole picture
- Late offshore involvement

Offshore project manager

Challenges

- Delayed feedback and context switching

"It is hard to focus and very de-motivating, switching from a project when you […] get stuck and you know you would not get the reply at least until tomorrow…"

Offshore developer

- Uncertain requirements
- Utilizing resources

Challenges

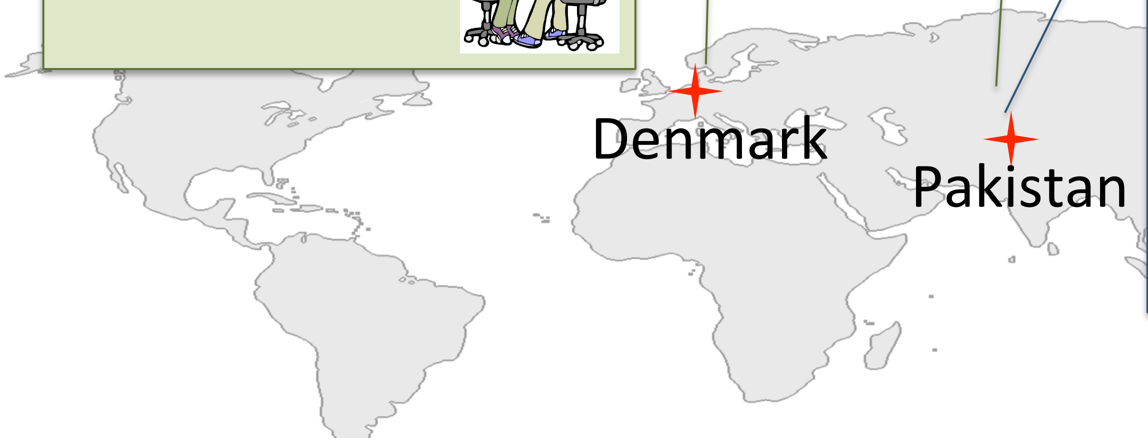
- Socio-cultural issues

" [Sometimes] we need the offshore team to be not eager to please... I mean tell me if what you have is not good enough for you to work on instead of saying 'we will manage' "

- Not saying "*NO*"
- Not thinking out of box
- Different authority concept

Onshore project manager

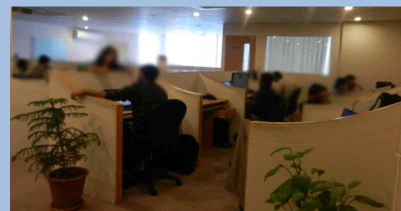
Data Collection



- 5 semi-structured interview
- IT manager, Architect, PM, Developer, UX

- 7 semi-structured interview
- PMs, Developers, Leads, Architect

3 Weeks Field study
- Observations
- Informal chats



Sample Questions

- General investigations:
  - Roles, Responsibilities
  - Flow of the work (e.g. RE, design)
  - Challenges
- Particular questions:
  - How does the work distribution happen?
  - What criteria is used for distribution of the work?
  - How is the communication pattern?
  - Who are the people you communicate with more frequently?
  - What communication media is being used?
  - And, open ended discussions about social climate (e.g. socializations, knowing about culture, socio-cultural challenges)

Data Analysis

- Inductive coding approach inspired by grounded-theory
- Emerging codes

1st round

- Open coding all the interviews
- Highlighting the data fragments about work, communication, social structures and challenges
- Embedding the aspect within the code (e.g. “work_ the code”)

2nd round

- Organizing the codes based on aspect (e.g. all work-related codes
  in one sheet)
- Refining the codes given the broader understanding
- Categorizing the codes

- Finalizing the categories against whole data
- Consulting with relevant literature for final discussions

Affordances

- Initiatives to apply the concept in context of GSD
- How certain design of structures in GSD arrangement can afford actors to deal with situation and challenges
- Example:
  - Flat communication pattern, different media and developing social ties may afford distributed team members to collaboratively work in dynamic and interdependent work structure.
- Insights for practitioners on appropriate design of structures