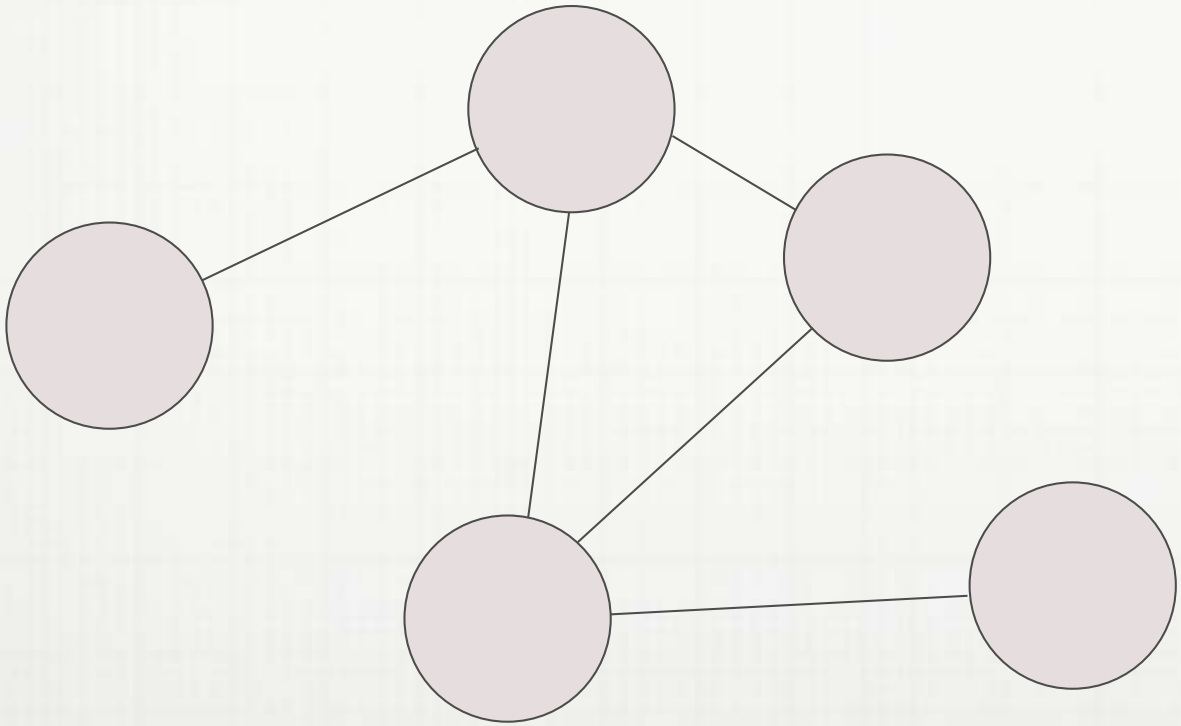
The Impact of Organisational Structure and Practices on Collaboration between members of Software Development Project Teams



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Agenda

- Introduction
- Research objectives
- Prior research
- Research methodology
- Research results
- Discussion

Introduction

- Software artefacts are a product of social interactions
- Software development as a social process [Elkjaer (1991)]
- Organisations must support the informal process of collaboration within project teams

Introduction

- Software development project teams as interdisciplinary teams [Haythornthwaite (2005)]
- Interdisciplinary teams are at the “Crossroads of formal and informal structures” [Cummings and Cross (2003)]
- These informal networks cross formal boundaries and are the primary means for knowledge sharing & problem solving [Cross & Parker (2004)]

Research Objectives

- To develop an Understanding of how formal organisational structures impact the informal collaboration within interdisciplinary software development project teams
- To identify key constructs in the relationship between organisational structure and informal collaboration

Prior Research: Communication

- Deep communication improves knowledge sharing, alignment and project outcomes. [Nelson and Cooprider (1996), Reich et al. (2000), Herzog (2001), Bassellier et al. (2003)]
- Trust improves alignment [Kendra and Taplin (2004), Abrams et al.(2003)]
- Trust improves knowledge exchange - benevolence & competence trust [Whitener et al. (1998), Abrams et al, (2003), Cross and Parker (2004)]

Prior Research: Organisational Structure

- Organisational hierarchies constrain knowledge sharing [Whitener et al. (1998), Cross et al. (2005), Wastell (1996), Taylor (2000)]
- Formal segregation between software development and support impedes software development [Taylor (2000)]
- Formal structure and leadership style fragment teams and knowledge interactions [Cross et al. (2005)]

Research Methodology

- Large public sector organisation
- Software development project: premier business application involving 100 staff across two departments and three consulting organisations
- Two phases:

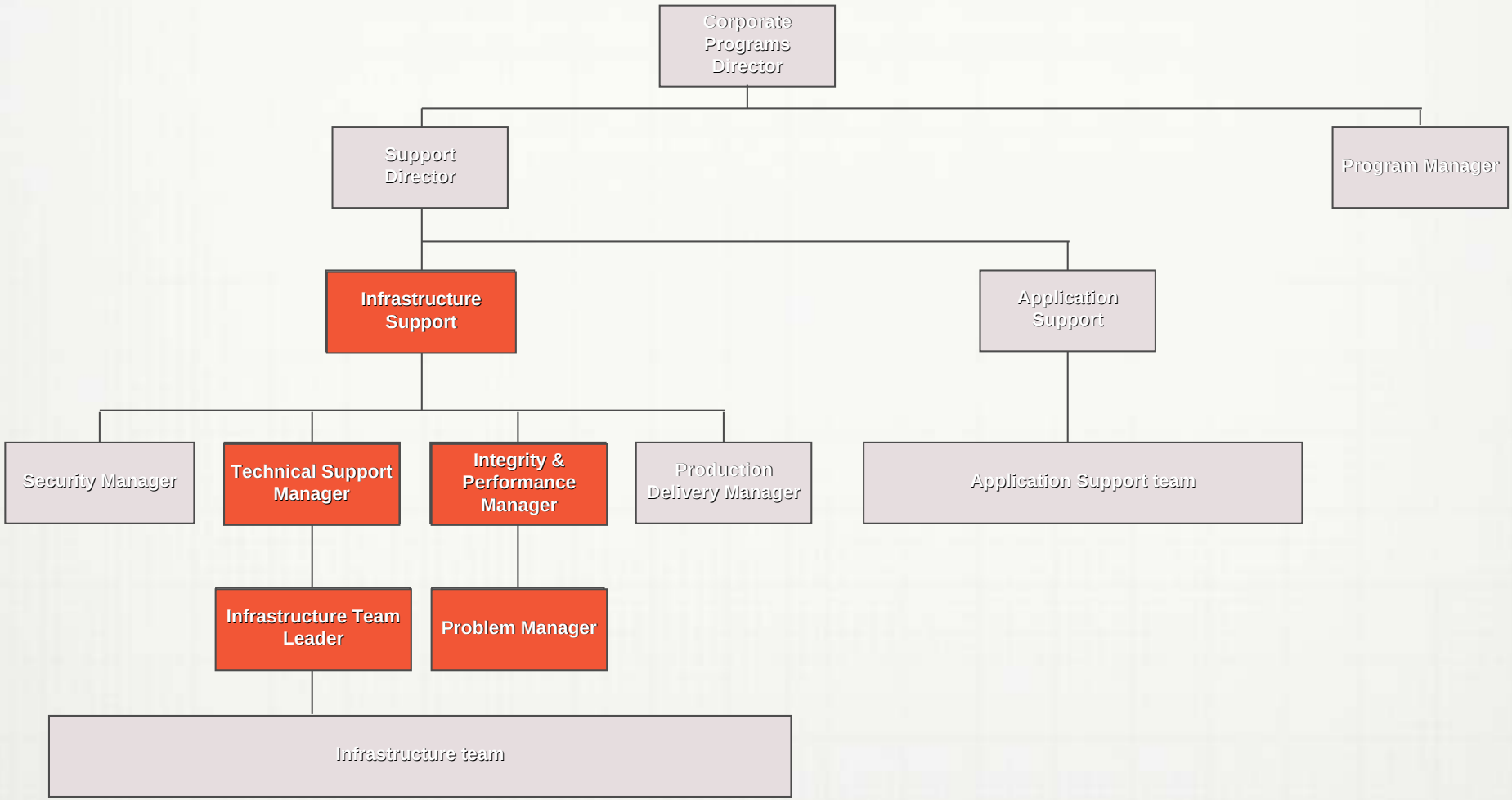
1. Social network oriented approach analysing project team at the intersection of formal structure and informal relationships [Cummings and Cross (2003)]
2. Semi structured interviews - key themes

Research Methodology
Social Network Analysis

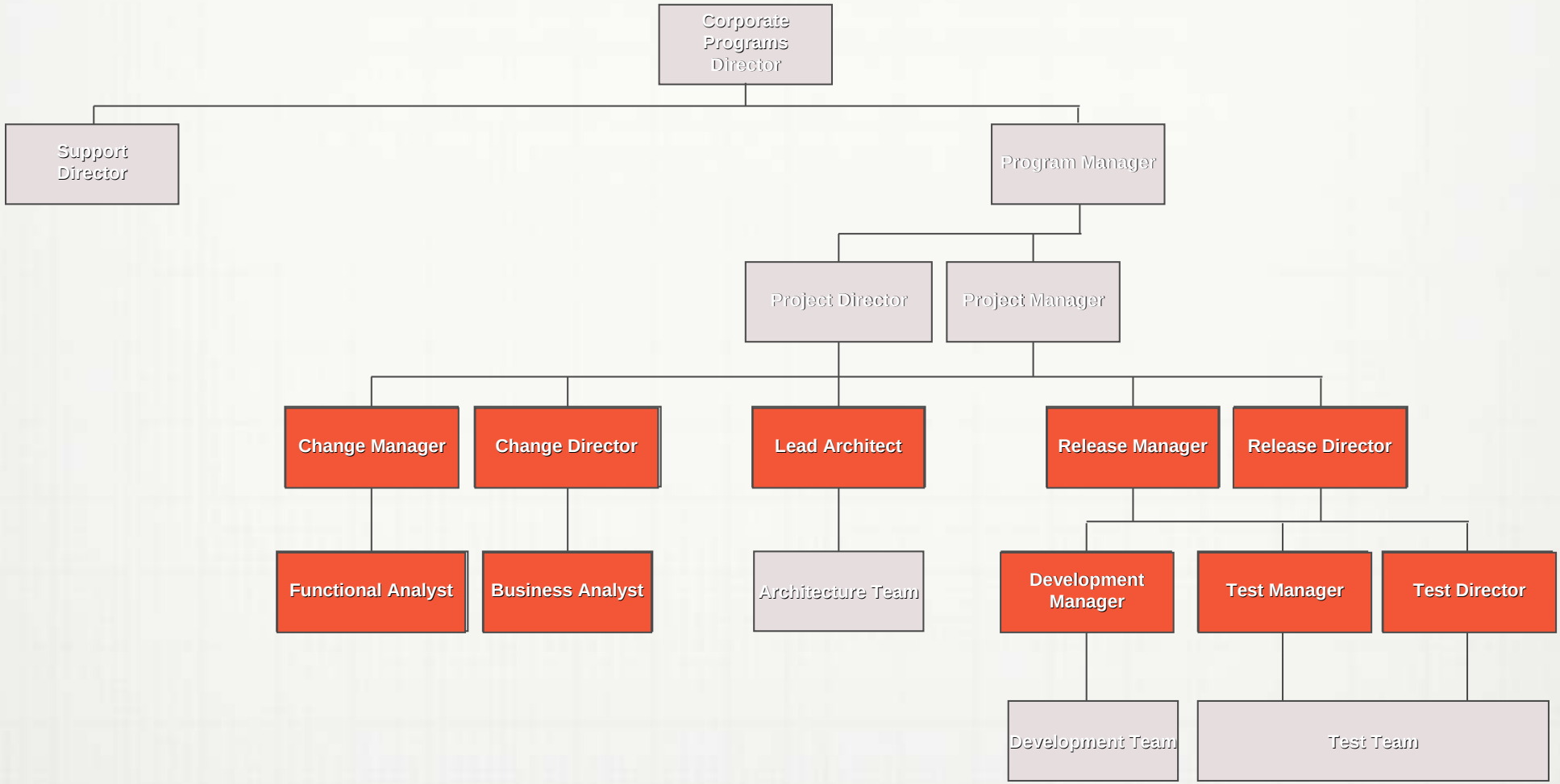
1. Social network analysis

   - 15 senior managers working at the crossroads of formal / informal interactions across 2 separate departments
   - Department senior executive excluded
   - Public servants, business staff, consultants
   - Multiple communication dimensions measured using survey tool (knowing who knows what, access, engagement, competence trust, benevolence trust)
   - Network characteristics vs individual characteristics
   - Objective to identify strengths and weaknesses in communication characteristics and any patterns of fragmentation in informal networks

Social Network Analysis Participants



Social Network Analysis Participants

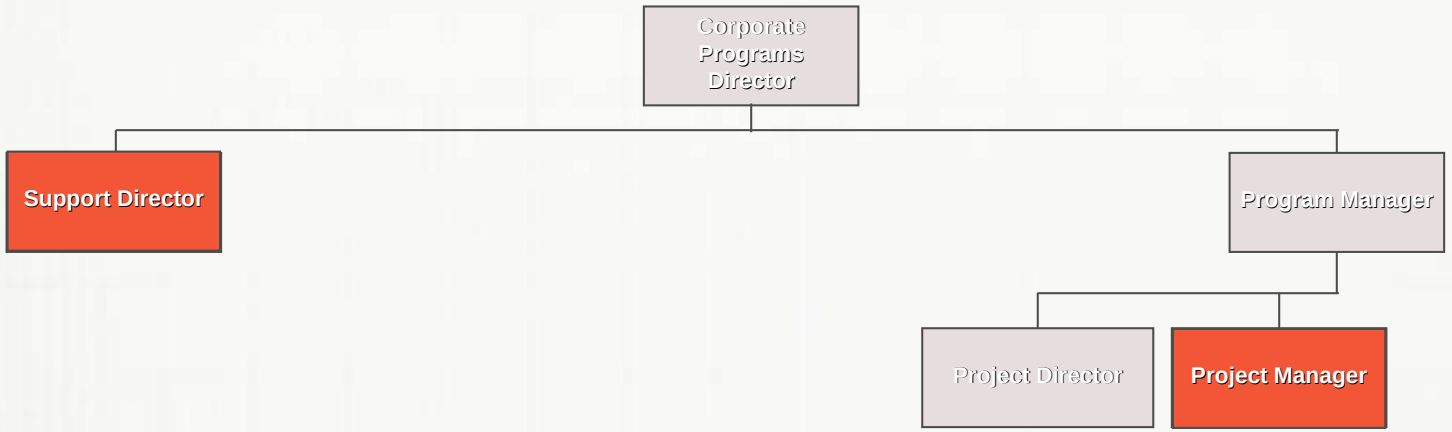


Research Methodology
Semi-Structured Interviews

2. Semi-structured interviews

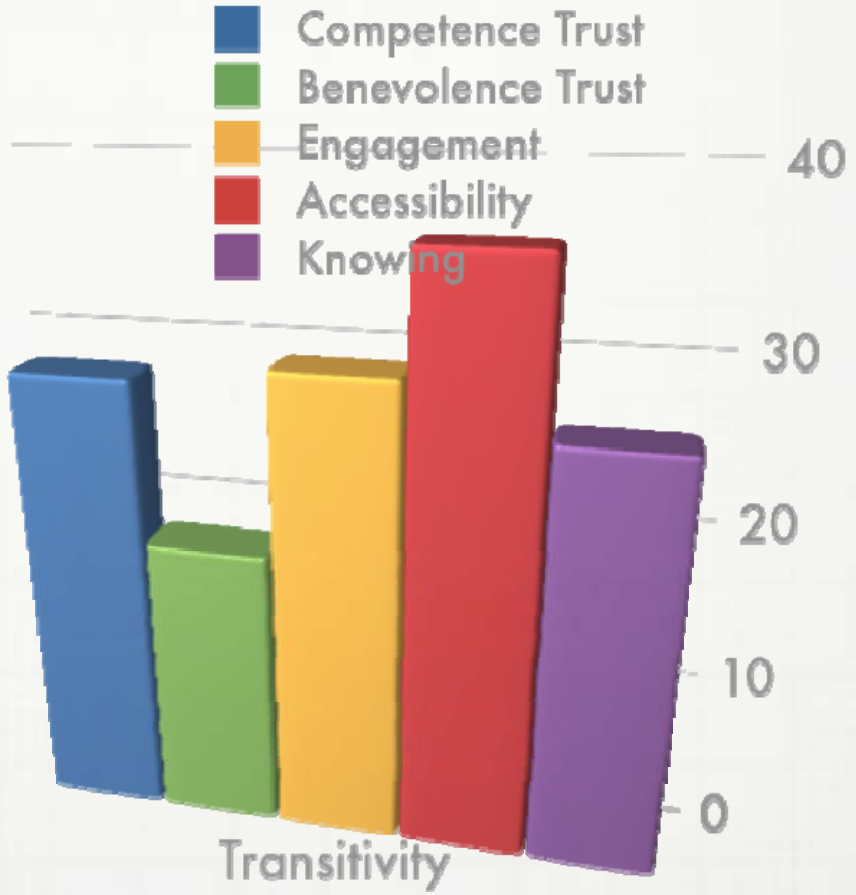
- 6 senior managers working at the crossroads of formal / informal interactions
- Department senior executive included
- Public servants, business staff, consultants
- 2 separate departments
- Multiple constructs identified, coded and analysed
- Objective to identify constructs that may explain network patterns identified in the social network analysis

Semi-Structured Interview Participants

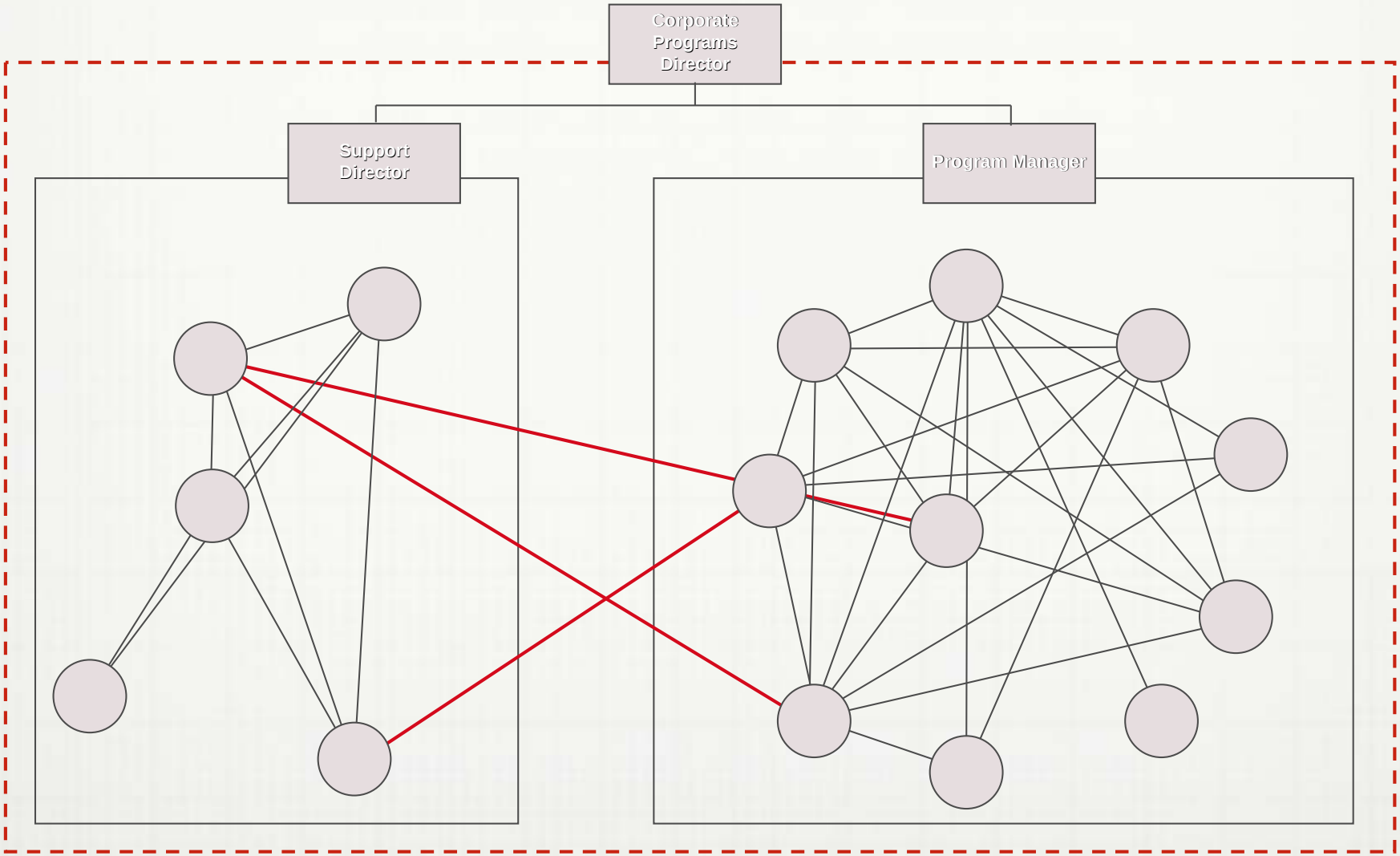


Social Network Analysis Research Results

- Statistical analysis performed using UCINET
- Transitivity examines connections between 3 nodes
- Identifies triads where there are balanced tie strengths between all 3 actors
- Benevolence trust identified as the weakest communication characteristic
- Consistent results achieved for network density & network cohesion



Social Network Analysis Research Results



Social Network Analysis Research Results

- Social networks for interdisciplinary software development project teams fragmented along formal organisation structures
- Weak tie relationships exist across formal organisation boundaries
- Benevolence trust weakest communication dimension
- What were the organisational constructs that impacted the structure of these informal networks?

Semi-Structured Interviews Research Results

- Many constructs were identified and analysed using nud*ist:
  - Physical spaces
  - HR practices
  - Leadership style
  - Contracts
  - Process & methodology
  - Culture
  - Organisational structure
  - Mutual understanding

Semi-Structured Interviews Research Results

- Organisational structure and culture of this organisation was identified as one construct that fragmented the project team's informal networks:
  - The "up and down communication tends to stifle the cross communication" [Support Director]
  - It is "a feeling that it is us and them" [Support Director]
  - The way that there is "equal power all the way to the head means that project work and support work conflict directly" [Technical Support Manager]
  - "I am not actually sure what they (the Support Team) do, they certainly don't do much for us - and they don't seem very keen to do much for us, and most of the time they push back on things we suggest" [Project Development Manager]
  - "There is a disconnect between the command structure and the management of it" [Team Leader Infrastructure Provider]

Semi-Structured Interviews Research Results

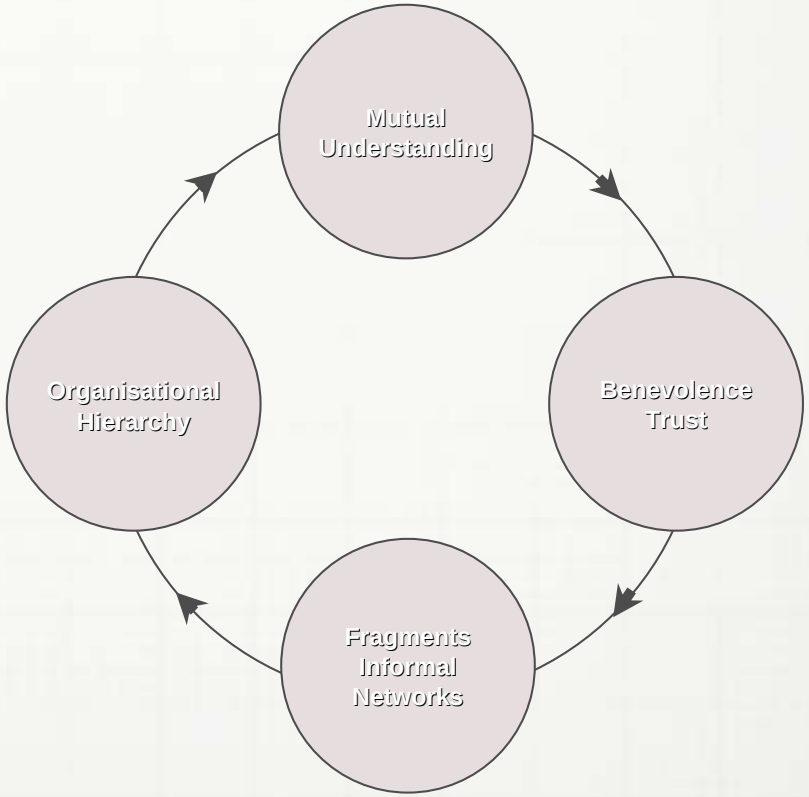
- A lack of mutual understanding across this organisation was identified as a second major construct that fragmented the project team's informal networks:
  - "I think the trust element is not the issue, its just that trust seems to be the issue because it is compounded by a lack of understanding between the two groups" [Program Manager]
  - "I don't know if it is trust or its really an understanding of each others focus" [Support Director]
  - "There needs to be on both sides more of an acceptance of knowledge and skill set of the other party" [Support Director]

Discussion

- Informal networks of benevolence trust fragmented by formal organisational structure
- Formal organisational structure constrains mutual understanding
- Hierarchies and command & control culture generates conflicts in priorities and political tension
- Emerging concept of the importance of an independent communication broker: I.t. consultants acting as independent boundary spanners to bridge the formal divide between organisational structure. [Pawlowski and Robey (2004)]
- What is needed is an “I.t. partner” to work alongside business representatives to “allow the cross communication as well as the command and control directives to exist” [Support Director]

Discussion

- Reinforcing relationship between organisational structure and benevolence trust



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