

Modelling the Formal and Informal in Agile Organisations
Operating in a Network Coalition Environment

Theoretical Foundations of
Modelling Networked Operations



Australian Government

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Presentation Structure

- Introduction
- Organization-oriented approach
- Team maturity approach
- Theoretical integration of these approaches
- Conclusions



Introduction

- Information Age technologies enable collaboration at a distance, inviting military to adopt **agile mission grouping**.
- Assuming Commanders are not willing to allow total self-organisation, they will need **agile HQ organisations** as part of the wider development of Information Age C2.
- **BUT**, the HQ agility depends upon much more than shared understanding arising from information sharing
- Paper explores the underlying fundamental and practical aspects of modelling agile networked coalition organisations.



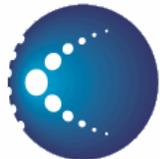
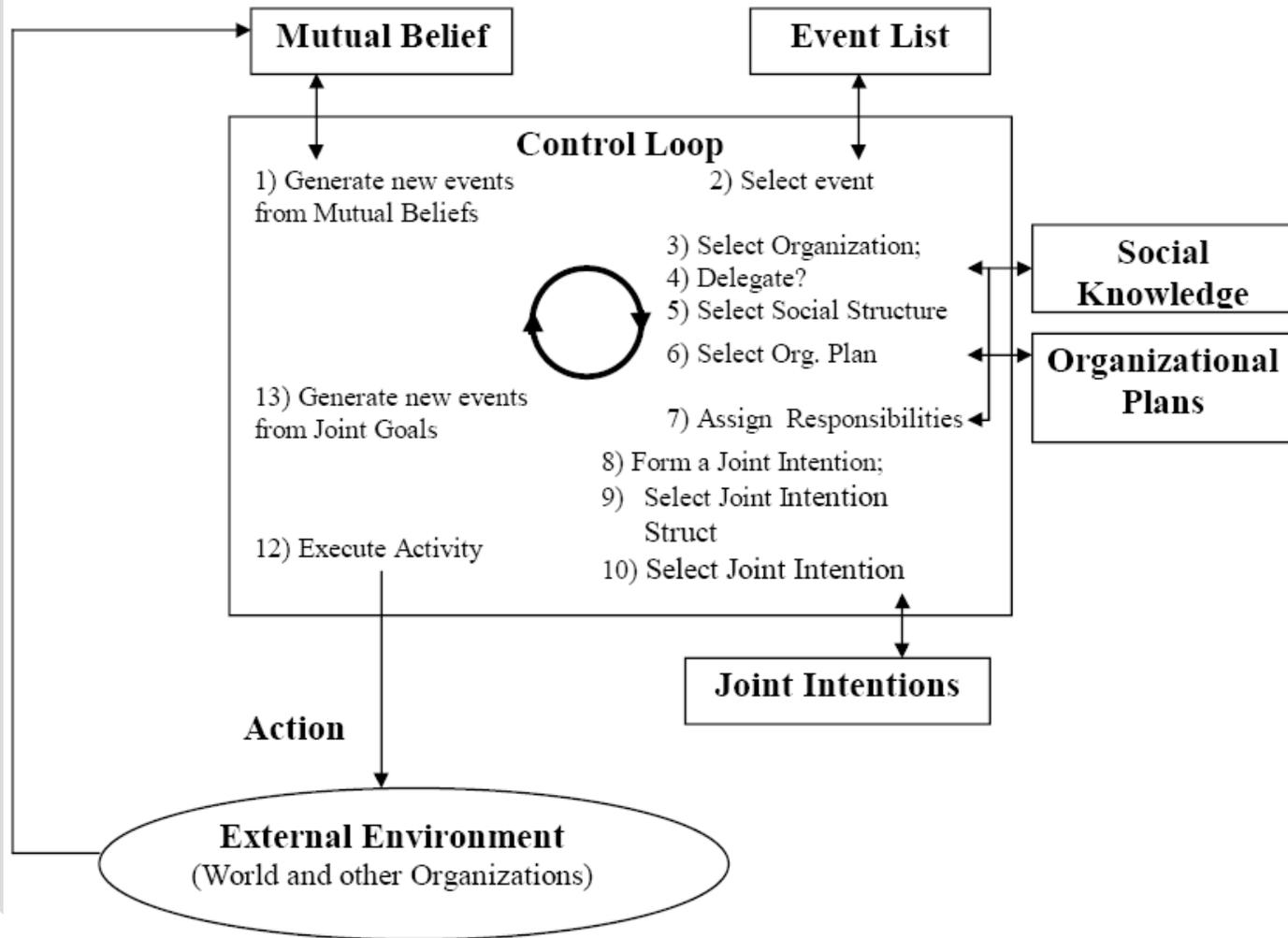
Organization-Oriented Approach

- Computational framework for approaches from Organisation and Management Theory and C3 Theories
- Organisations include a mutual belief knowledgebase (MB), set of joint goals (JG), & a set of joint intentions (JI)
- ...referred to as the mental state of the organisation
- Architecture also includes: Social structures (SS), organisational plans (OP), social knowledge base* (SK)

* social mental attitudes that the organisation is aware of for itself & between other organisations



Organization



Organization-Oriented Approach

Main organisational processes performed:

- Adding a triggering event
- Selecting an organisation
- Delegating a responsibility
- Selecting a social structure
- Selecting an organisational plan
- Adopting a social structure
- Forming a joint intention
- Adding a joint intention to a joint intention structure
- Selecting a set of joint intentions
- Selecting a joint intention
- Selecting an activity
- Executing a joint intention



Team Maturity Approach

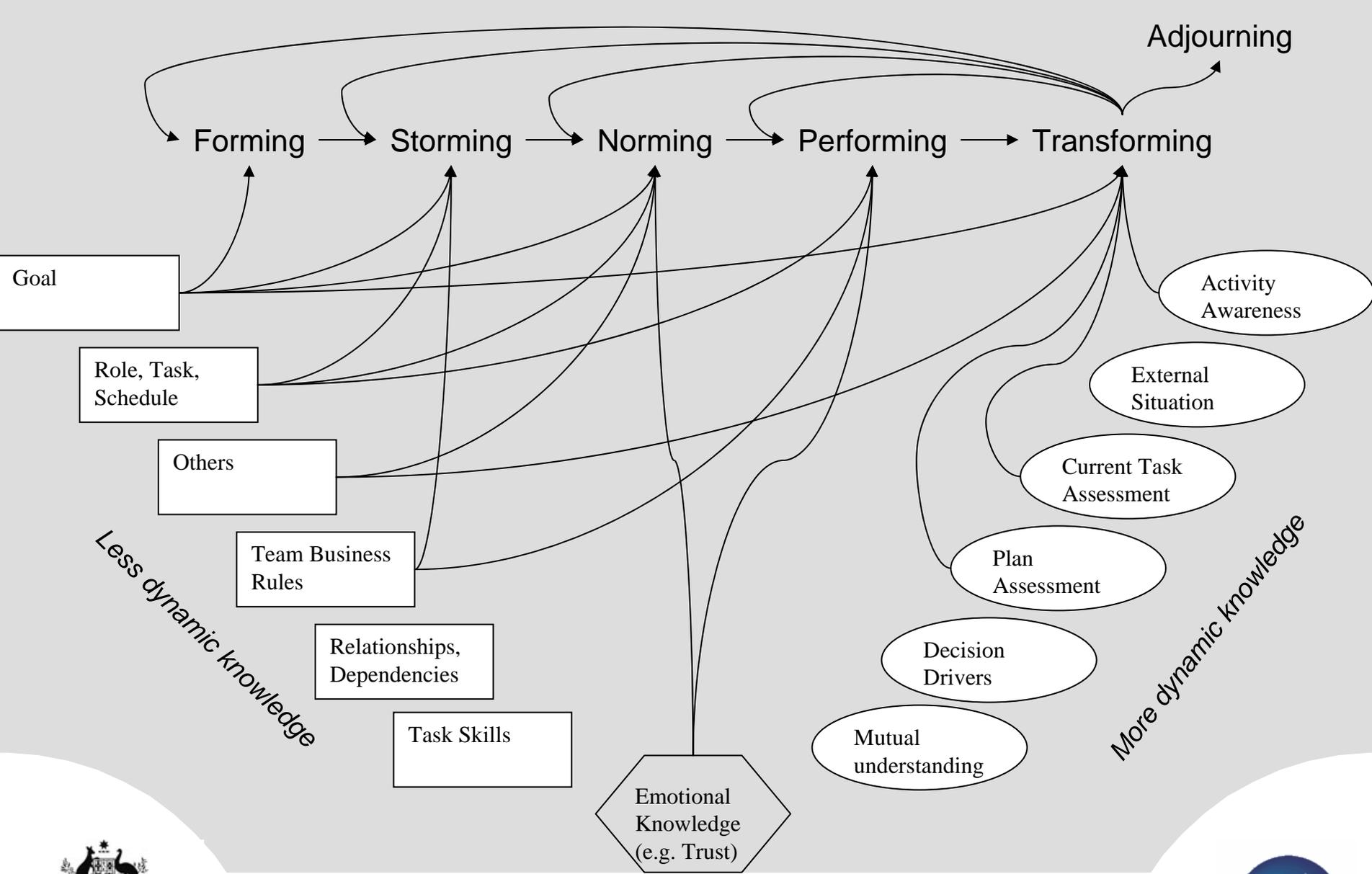
- Socio-cultural Teamworking for OR Models (STORM)
- Developed in response to a need for a model capable of dealing with agile, ad hoc team formation associated with Agile Mission Grouping
- A representation of the impacts of social and cultural factors on team performance in a coalition NEC context
- Designed to create a trade-space for multiple Lines of Development, including equipment, training, organisation
- Based on a flexible architecture covering a wide (we believe requisite) range of social and cultural phenomena relevant to military HQ operation

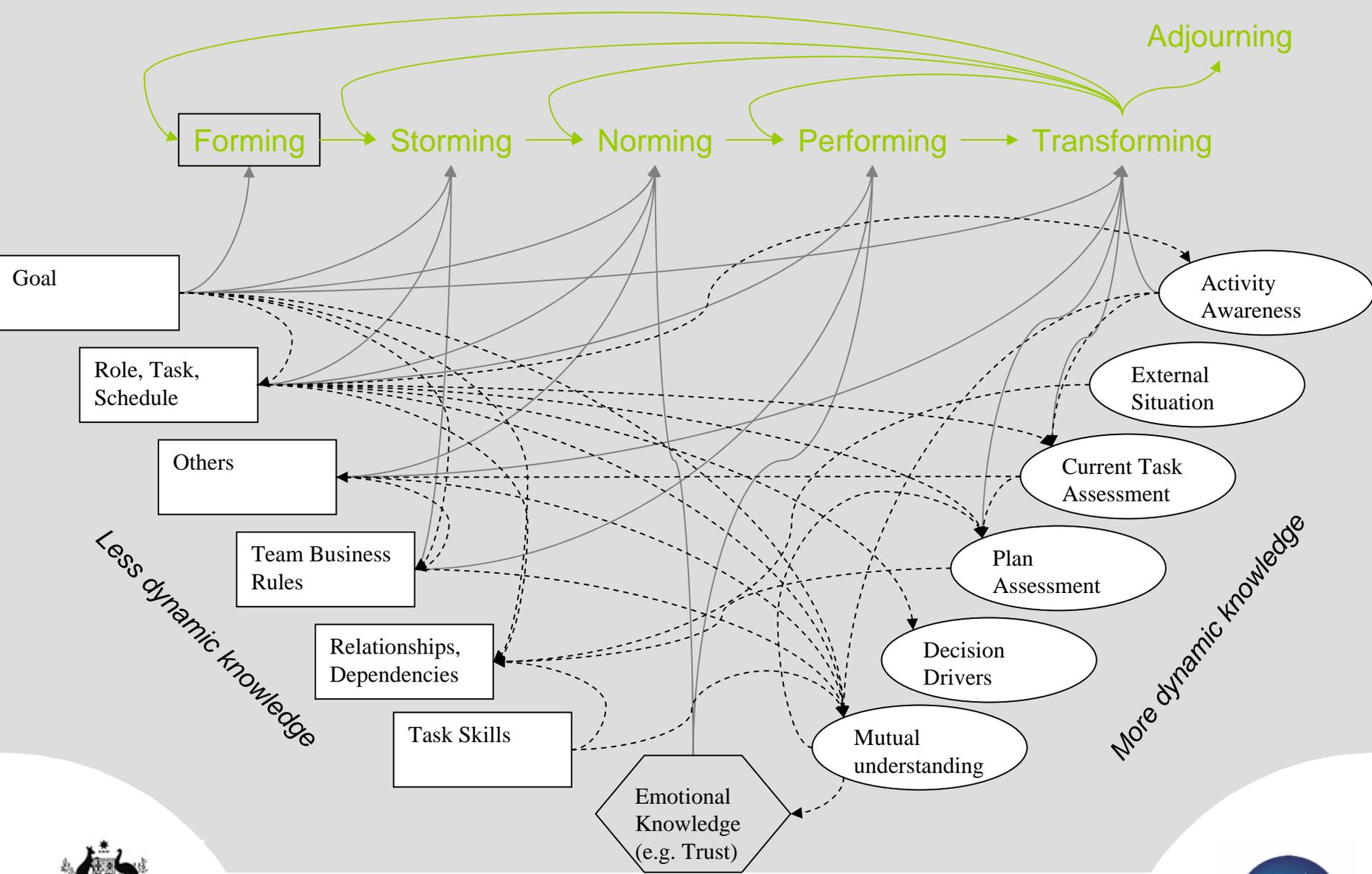


Team Maturity Approach

- Focuses on team performance based on team composition, context and maturity
- STORM is a synthesis of transactional memory & team maturity theories
- Based predominantly in 2 theories:
 - 1) **Tuckman & Jenson's team maturity theory**
 - 5 stage model of team maturity through the lifespan of a team: Forming, Storming, Norming, Performing & Adjourning (+ transforming)
 - 2) **Noble's agent/team representation of team performance based on transactive memory theory**
 - 12 Knowledge Enablers required by teams to perform effectively; 6 of which are based on team preparation, 6 on status assessment & decision making







Organisational Oriented Systems Approach

- Models formal organisational behaviour embedded in a dynamic environment
- BUT doesn't include informal influences related to team behaviour

Team Maturity Approach

- Provides a framework for determining the maturity level of an organisation based on internal and external influences
- BUT doesn't include the operational behaviour of the organization, the interaction with its environment and the way it is influenced by its organisational structures



DARNSTORMS

- **Background**

- The UK have developed the STORM algorithm, capable of representing a wide range of social and cultural variables inherent in the adaptive teamworking typically required here.
- AUS have developed [DARNOS](#), a model capable of representing agile teamforming as part of a wider network centric approach to operations.

- **Goals**

- **UK goal** to demonstrate STORM algorithm is practical & effective, opening the way for wider exploitation in emerging UK simulations. Also will obtain valuable insights from DARNOS into how to represent agility in C3I assessment studies.
- **AUS goal** to gain a key improvement in modelling capability, allowing a wider range of social & cultural issues to be addressed by DARNOS.



Modelling the Formal & the Informal

- Model aim: Develop a model that captures the formal and informal aspect of agile organisations
- 2 aspects:
 - 1) A specification of the Knowledge Enablers as function of the organisation
 - 2) The influence of the Maturity Level on the organisational process

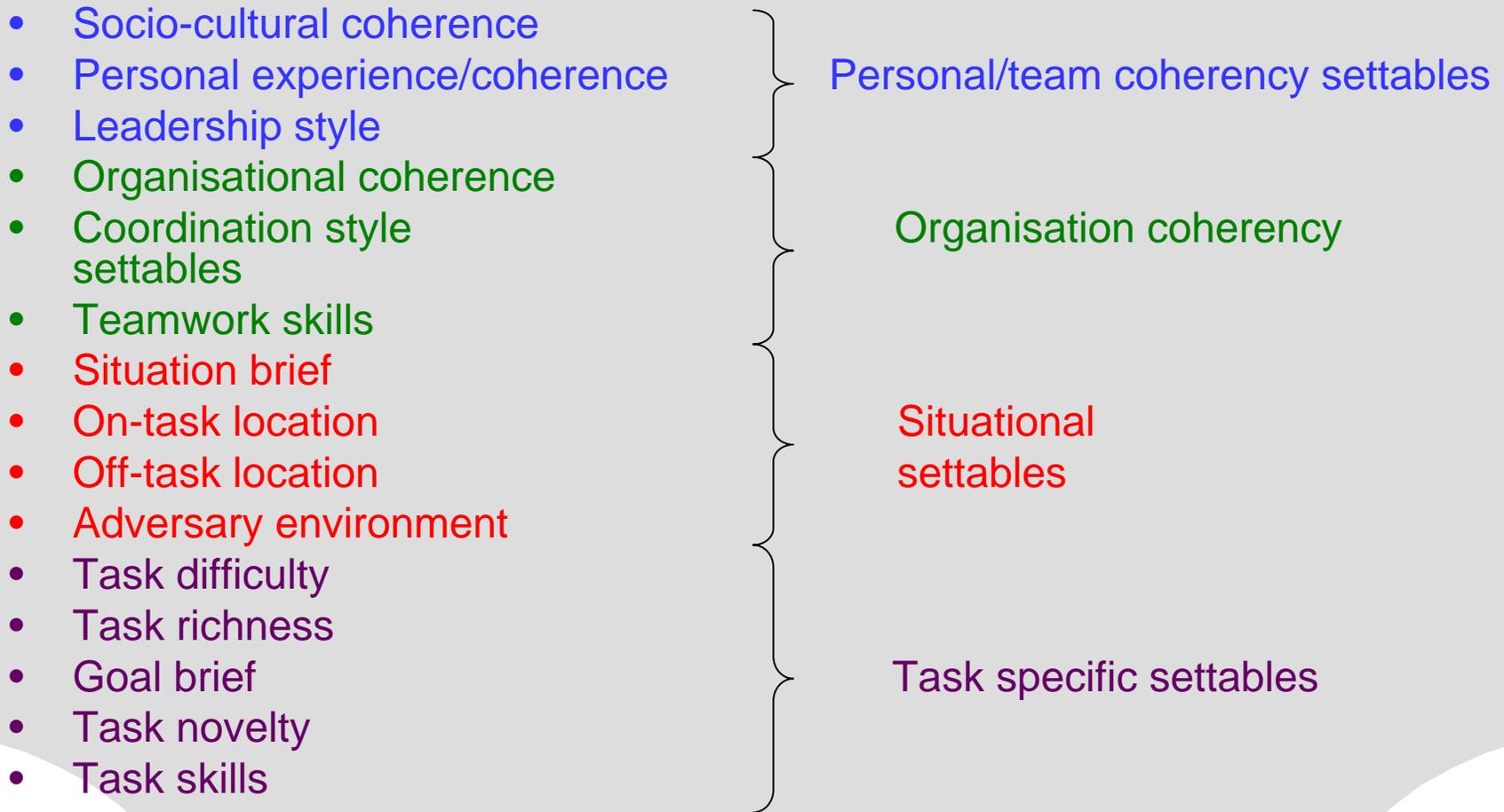


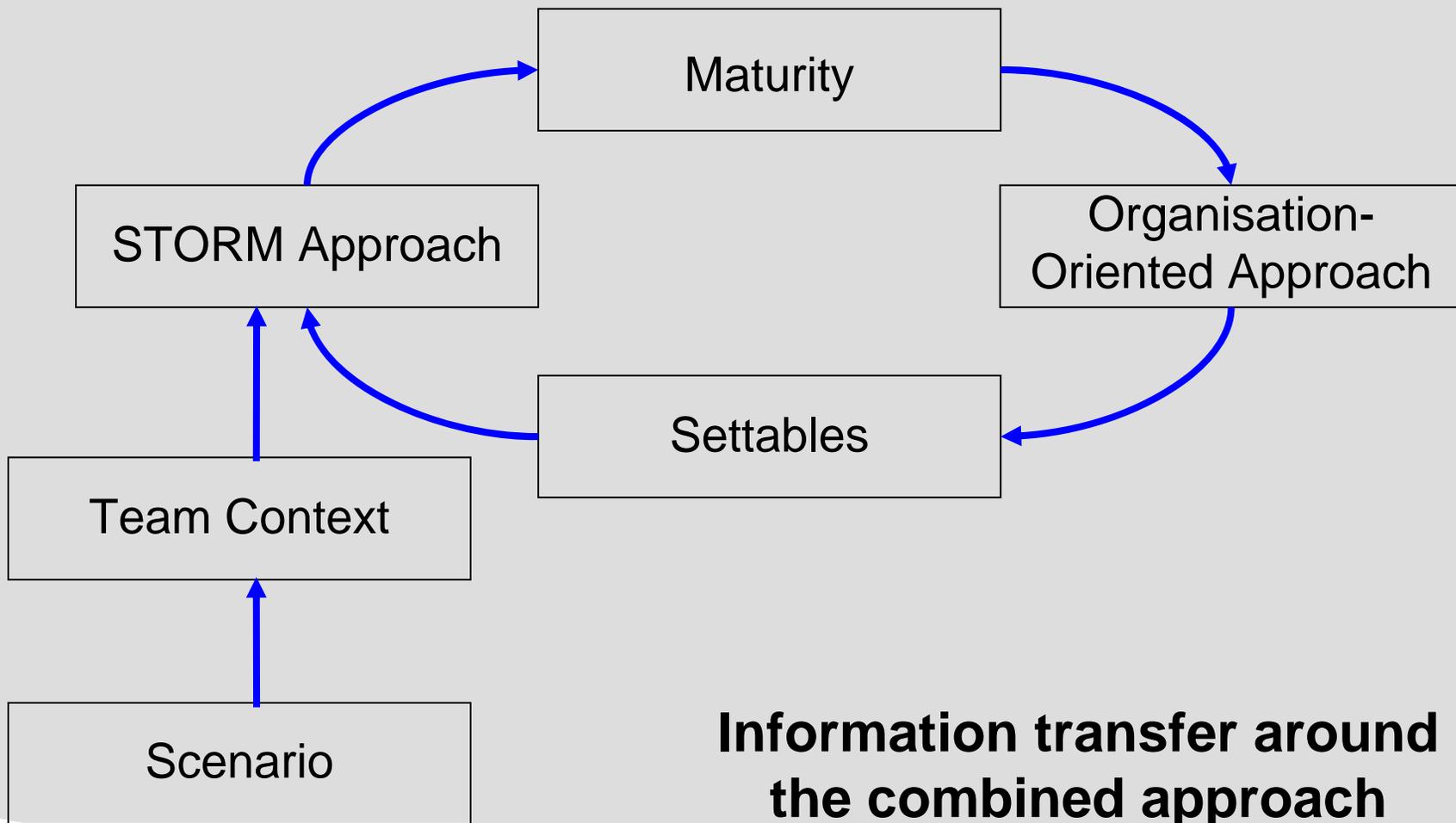
Settables

- A set of variables (settables) were built as part of the interface between the two approaches
- 15 settables provide the context within which the team performs and matures
- Changes in the settables can alter knowledge and maturity levels of an established team
- 4 categories of settables:
 - Personal/team coherency settables
 - Organisation coherency settables
 - Situational settables
 - Task-specific settables



Settables





Team Maturity & Organisational Process

- Selecting an organisation
- Selecting a social structure
- Selecting organisational plan
- Adopting a social structure
- Forming a joint intention
- Adding a joint intention to joint intention structure
- Selecting a set of joint intentions



Conclusions

- This is a first attempt to produce a model combining formal organisational modelling with a conceptual model of team maturity to determine performance
- The theoretical work discussed provides the foundation of DARNSTORMS modelling and simulation system
- The outcome of this implementation will test the boundaries and limitations of the theory and approach presented here

