# How to Operationalize C2 Agility

Eva Jensen

Agility

The ability to successfully cope with changes in current circumstances

Components of Agility (Alberts)

- Responsiveness
- Versatility
- Flexibility
- Resilience
- Innovativeness
- Adaptability

Eva Jensen – How to Operationalize C2 Agility

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Operationalization

- A method to give concepts definitions
- Concepts are defined by the operations used to measure them
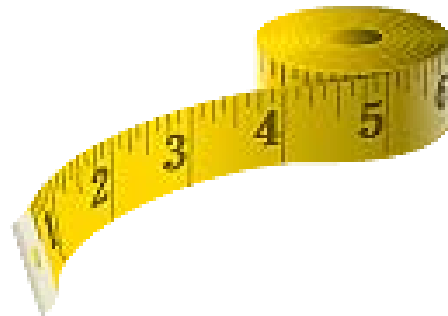
I Will Discuss

- What kinds of measurements that are required to assess C2 agility
- Principles to follow in the search for suitable measures

- But I will not present clear operational definitions of the agility components
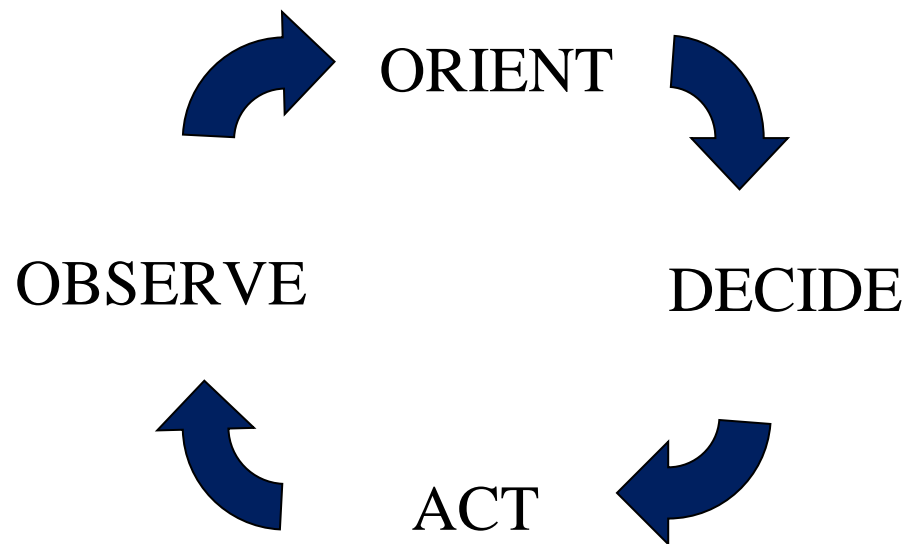- That will require more work

What is Command and Control (C2)?

Why and when is C2 needed?

What purpose does it serve?

The OODA loop (Boyd)

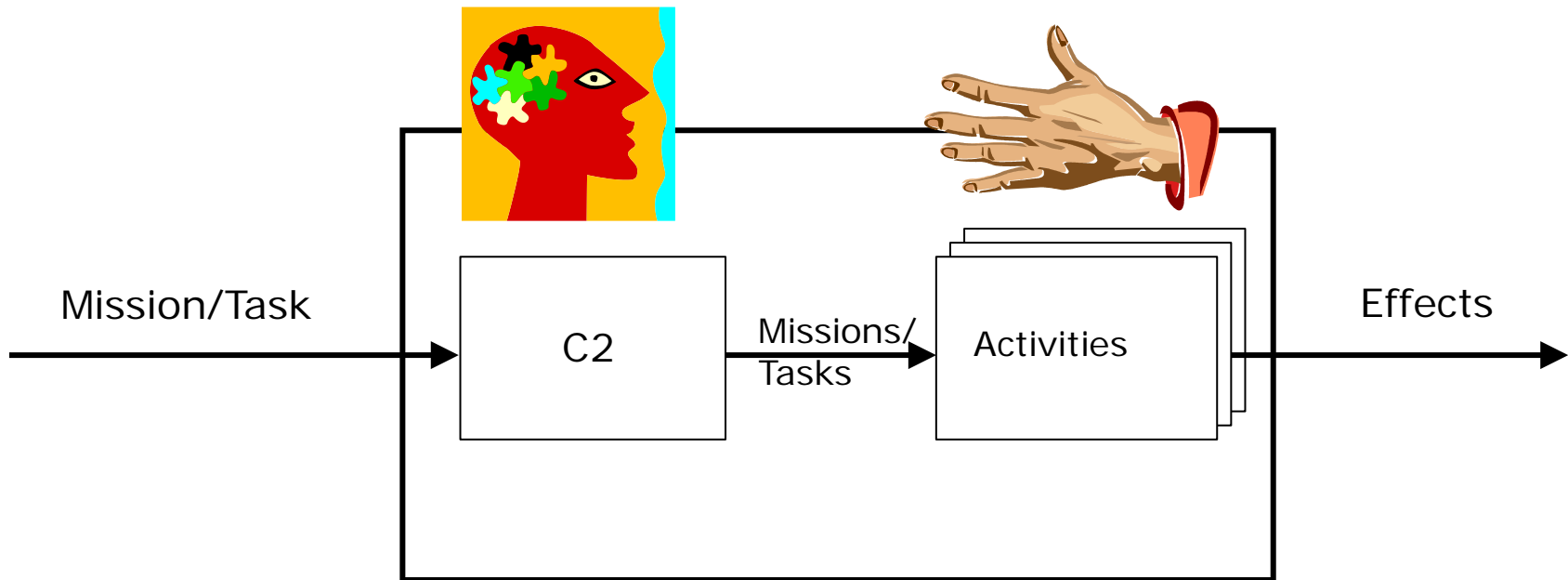Coping with changing circumstances

ORIENT

OBSERVE

DECIDE

ACT

The Need for C2

C2 is required when the actions of several units need to be coordinated to successfully cope with the change in circumstances
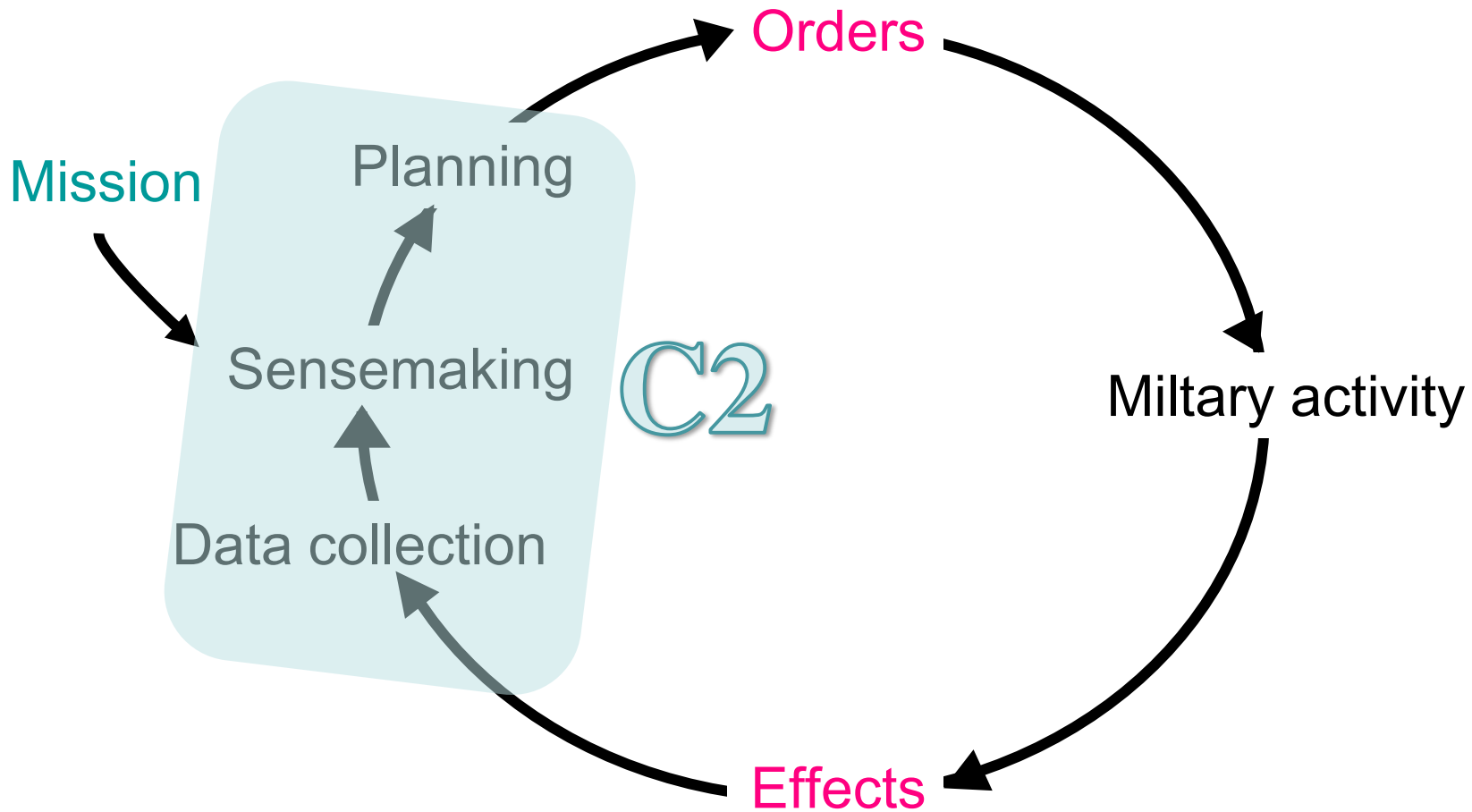
The purpose of C2 is to achieve focus and convergence (Alberts & Hayes) or direction and coordination (Brehmer)

C2 & Force

Mission/Task → C2 → Missions/Tasks → Activities → Effects

Brehmer's model of C2

Orders

Mission

Planning

C2

Sensemaking

Miltary activity

Data collection

Effects

The Functions Required for C2

- Sensemaking: Sorts out what needs to be done
  - (Orient)

- Planning: Sorts out how to do this with the available resources, and allocates tasks to the subordinate units (expressed in orders)
  - (Decide)

- Data collection: Acquires the data required
  - (Observe)

The Study of Artifacts

Brehmer	Rasmussen	This paper
Purpose (Why?)	Goals and constraints	Demands
Function (What?)	Priorities, Flow of values and products	Products
	General functions	Functions
Form (How?)	Work and equipment processes	Processes
	Material resources and configuration	Objects

Purpose and Functions of C2

Purpose (Goal)

↓

Functions

Direction and Coordination
Focus and Convergence

C2

Mission/Task

| Data Collection Sensemaking Planning |

Missions/Tasks

Activities

Effects
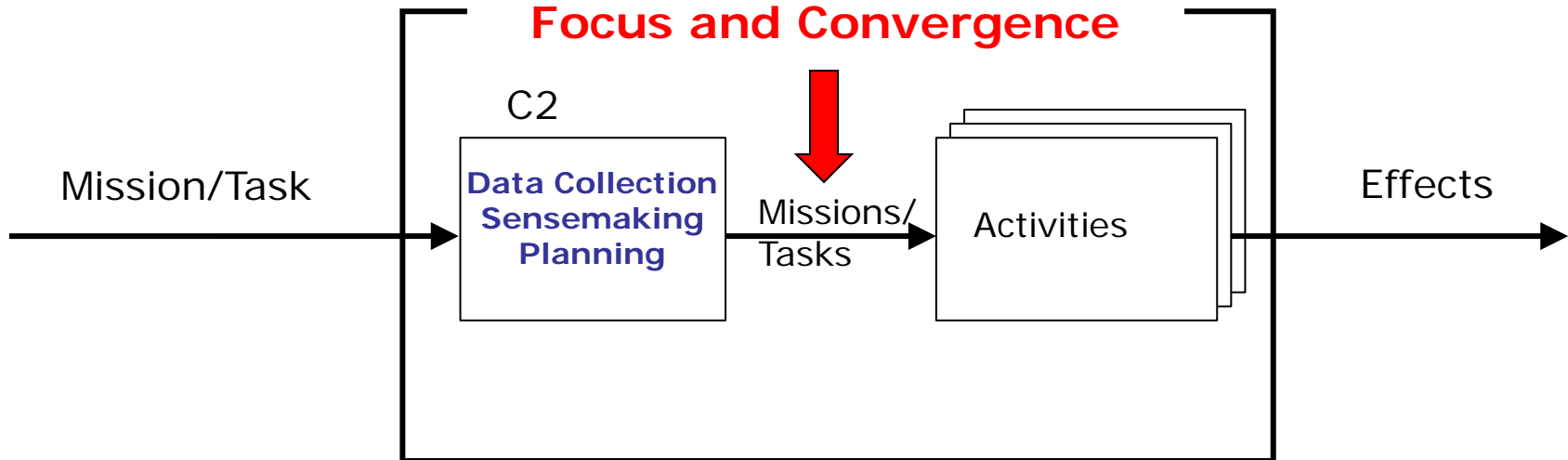
C2 Hierarchy

The Demands on C2

In a specific situation there will be

- a mission or **task** to be achieved (a goal)
- by a specified **force** (a constraint)
- in some **context** (another constraint)
- within a limited amount of **time** (a third constraint)
- perhaps together with **other actors** (a possible fourth constraints)

The demands determine the requisite agility.

Requisite C2 Agility

The Study of Artifacts

Requirements

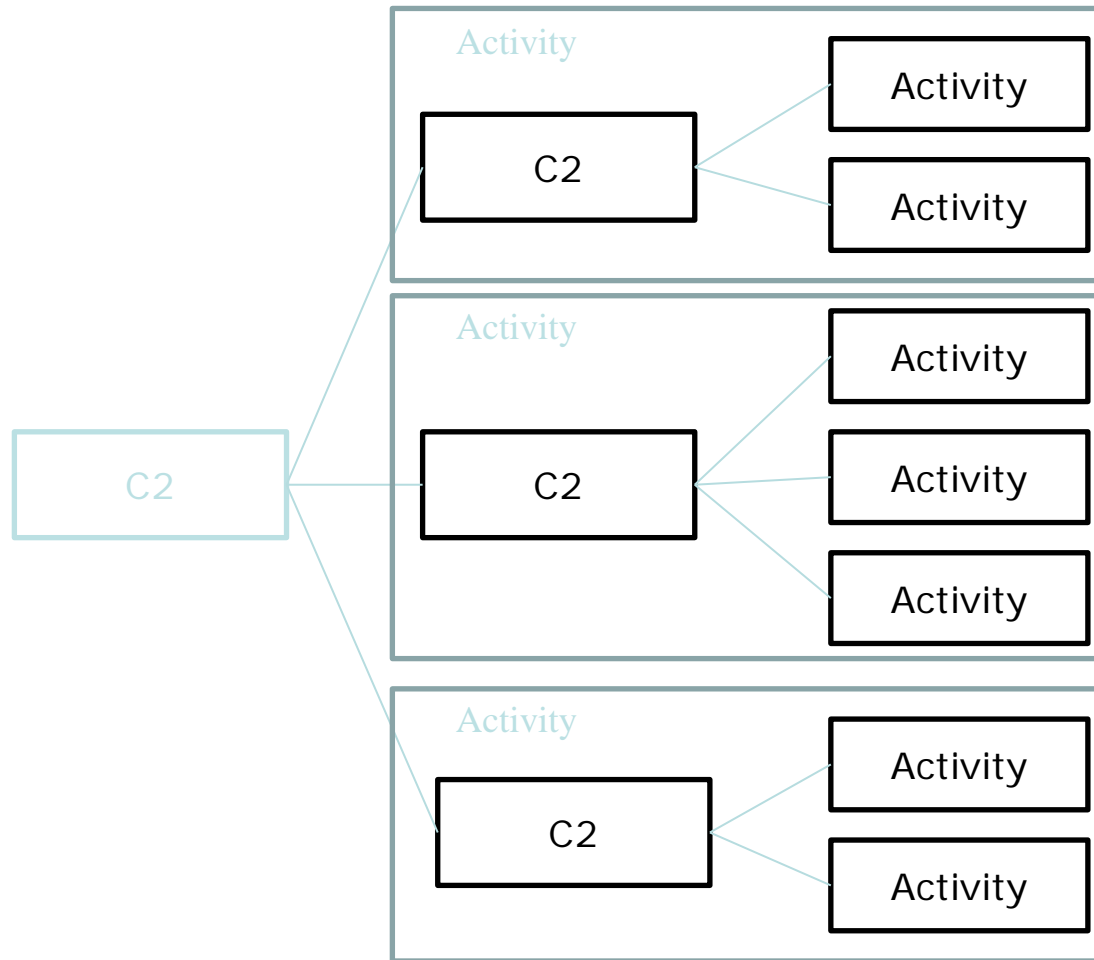| Brehmer	Rasmussen	This paper
Purpose (Why?)	Goals and constraints	Demands
Function (What?)	Priorities, Flow of values and products	Products
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Demands and Products of the Functions

| Context | Task | Time | Force | Other Actors | Demands |

Data   Required Actions (What)   Requests for Action (Who/How)   Products

Data Collection   Sensemaking   Planning   Functions

Responsiveness

					Demands
Context	Task	Time	Force	Other Actors	

Data	Required Actions (What)	Requests for Action (Who/How)	Products

Data Collection	Sensemaking	Planning	Functions

Responsiveness is the ability to meet the demands of time

Versatility

Context	Task	Time	Force	Other Actors	Demands

Data   Required Actions (What)   Requests for Action (Who/How)   Products

Data Collection   Sensemaking   Planning   Functions

Versatility is the ability to deal with significant changes in the nature of the mission or task

Flexibility

Context   Task   Time   Force   Other Actors   Demands

Data   Required Actions   Requests for Action   Products
              (What)   (Who/How)

Data Collection   Sensemaking   Planning   Functions

Flexibility is the ability to adapt the response to the situation if
necessary

Resilience
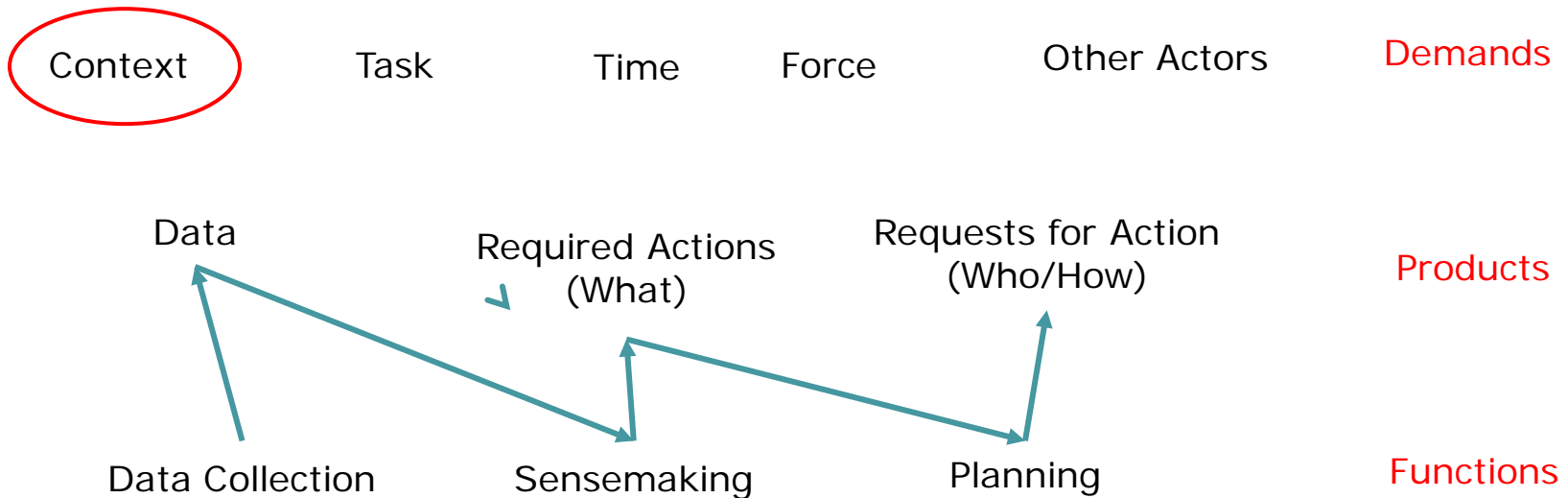
Context · Task · Time · Force · Other Actors · Demands

Data · Required Actions (What) · Requests for Action (Who/How) · Products

Data Collection · Sensemaking · Planning · Functions

Resilience is the ability to withstand threats of destruction, interruption, or degradation

Coordination (Added)

Context   Task   Time   Force   Other Actors   Demands

Data   Required Actions (What)   Requests for Action (Who/How)   Products

Data Collection   Sensemaking   Planning   Functions
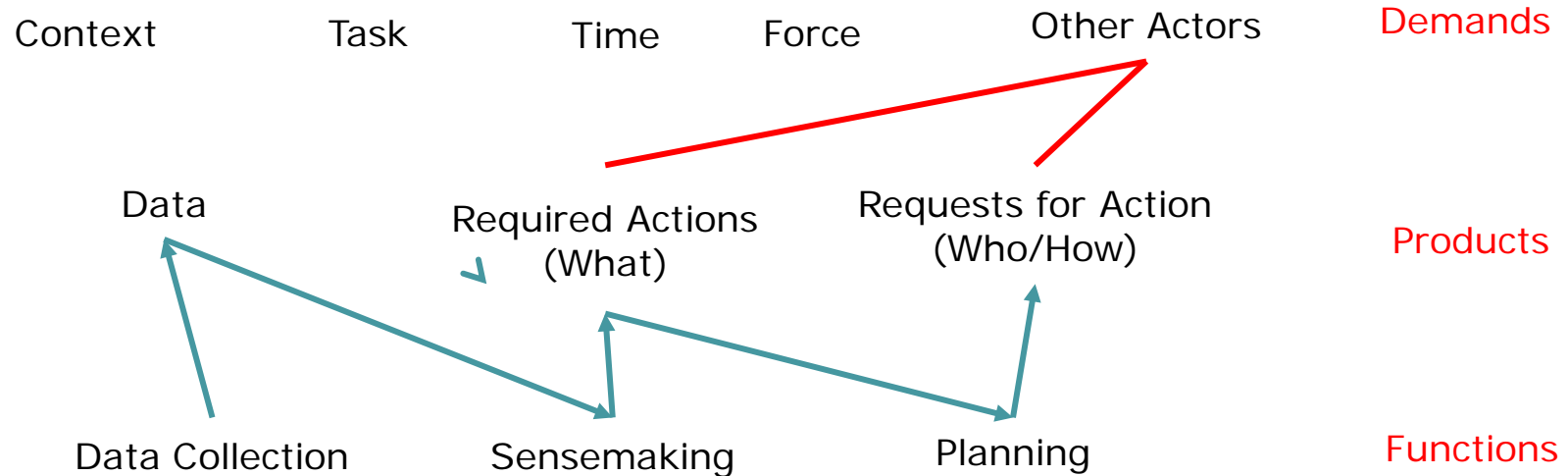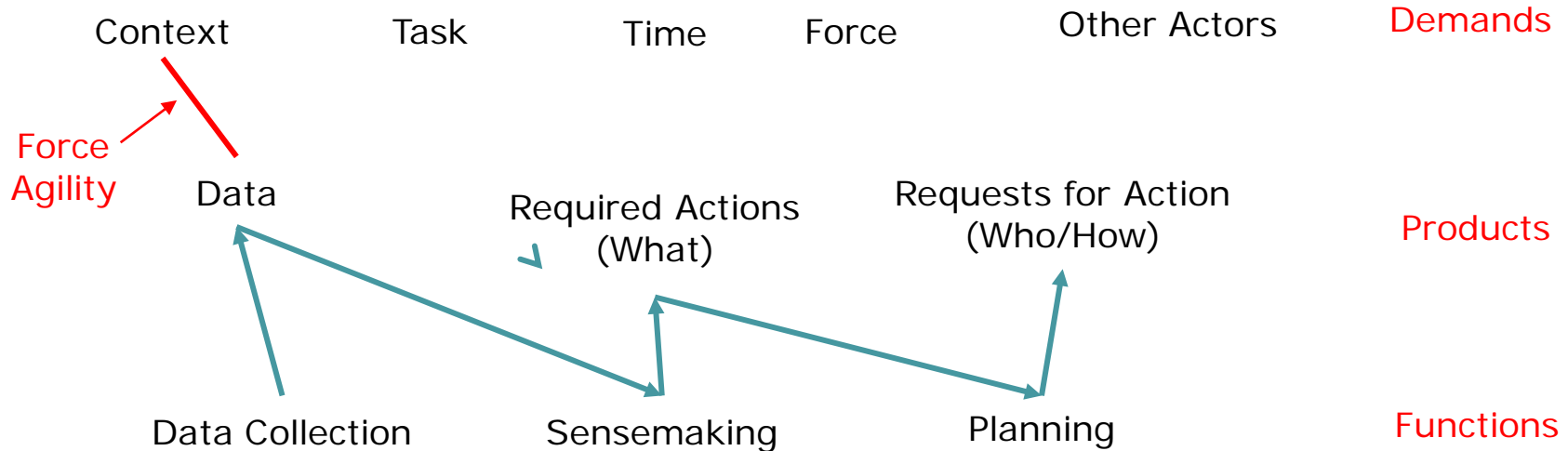
Coordination of the own activities with the activities of other actors may be required

Information (Added)

Context   Task   Time   Force   Other Actors   Demands

Force
Agility

Data   Required Actions
(What)   Requests for Action
(Who/How)   Products

Data Collection   Sensemaking   Planning   Functions
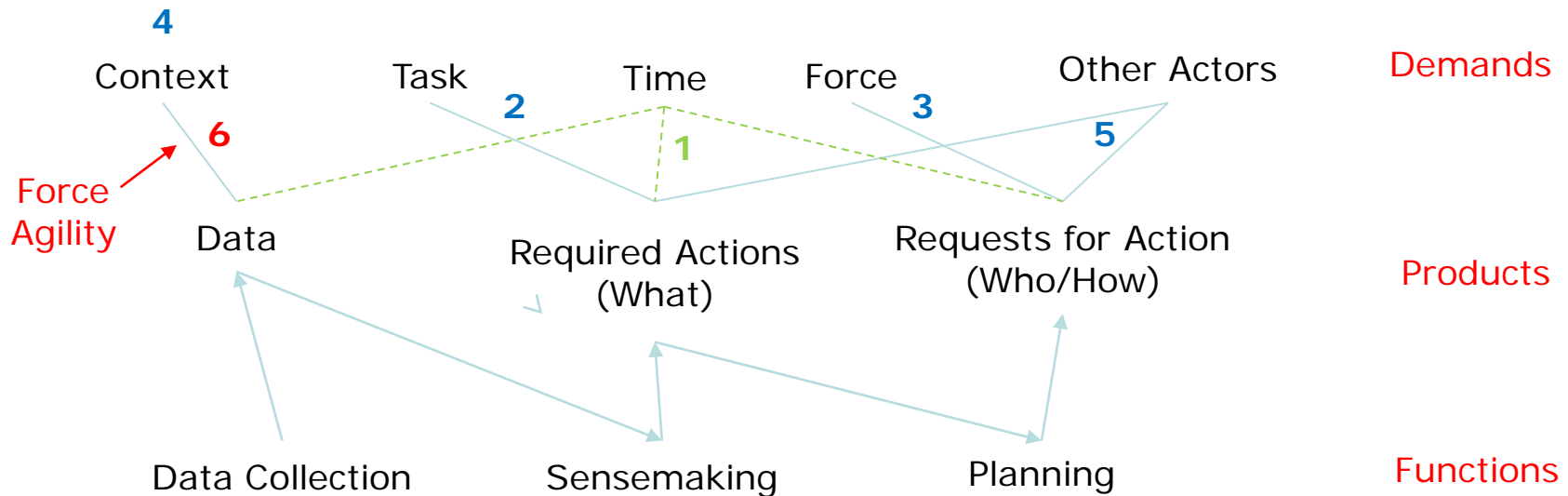
Information about the context with relevance for the force's agility is required

Requisite C2 Agility

4

Context   Task   Time   Force   Other Actors   Demands

2   **3**   **5**

6   **1**

Force Agility

Data   Required Actions (What)   Requests for Action (Who/How)   Products

Data Collection   Sensemaking   Planning   Functions

1. Responsiveness	4. Resilience
2. Versatility	5. Coordination
3. Flexibility	6. Information

Innovativeness & Adaptability

Excluded

- Innovativeness is the ability to invent a course of action in a situation where there is no known adequate response
- Adaptability is the ability to perform tasks for which the established organization and processes are unfeasible.
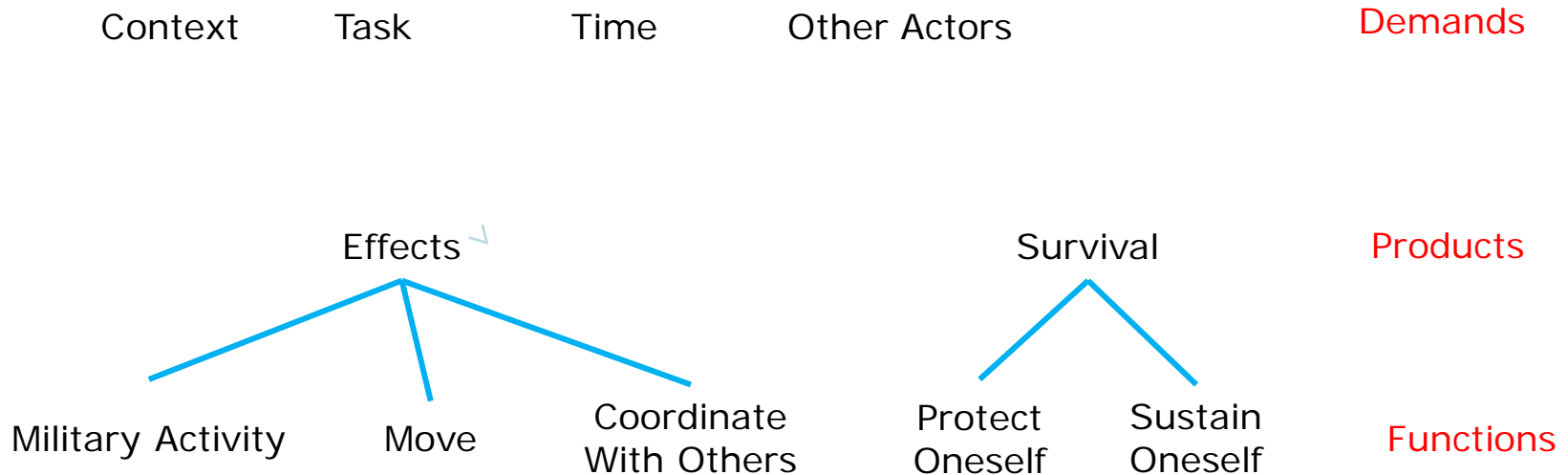- Covered by the demands for versatility and flexibility

Requisite Force Agility

Demands and Products of the Functions

Context   Task   Time   Other Actors   **Demands**

Effects   Survival   **Products**

Military Activity   Move   Coordinate With Others   Protect Oneself   Sustain Oneself   **Functions**

Responsiveness

Context	Task	Time	Other Actors	Demands

Effects — Survival — Products

Military Activity | Move | Coordinate With Others | Protect Oneself | Sustain Oneself — Functions

Responsiveness is the ability to meet the demands of time

Versatility

Context   Task   Time   Other Actors   Demands

Effects   Survival   Products

Military Activity   Move   Coordinate With Others   Protect Oneself   Sustain Oneself   Functions

Versatility is the ability to deal with significant changes in the nature of the mission or task
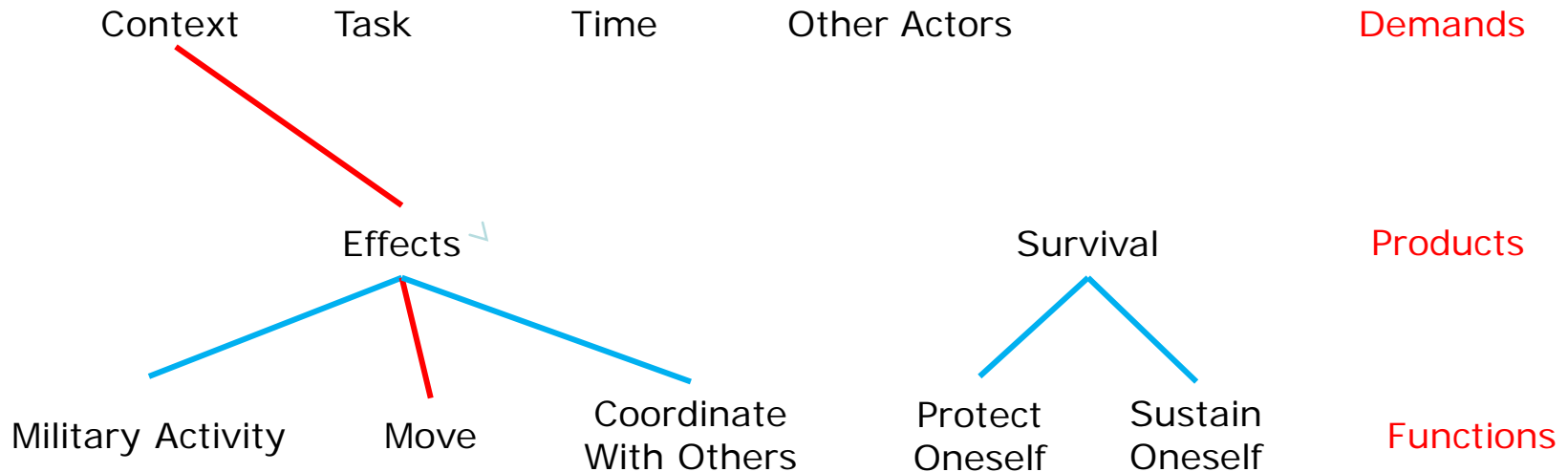
Flexibility

Context   Task   Time   Other Actors   Demands

            Effects   Survival   Products

Military Activity   Move   Coordinate   Protect   Sustain   Functions
                                With Others   Oneself   Oneself
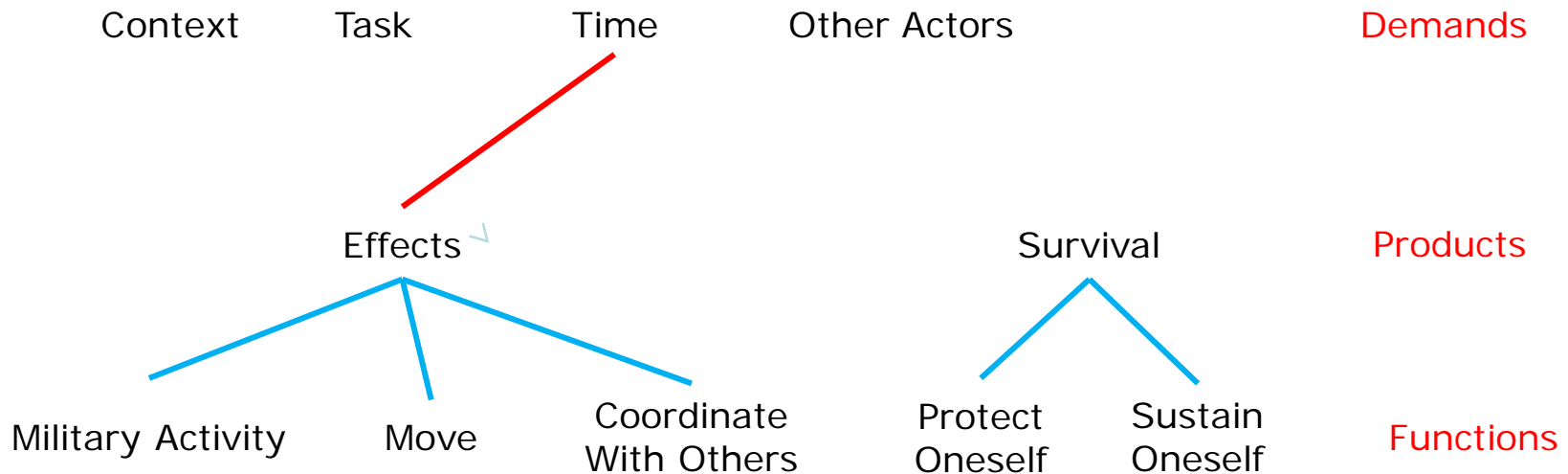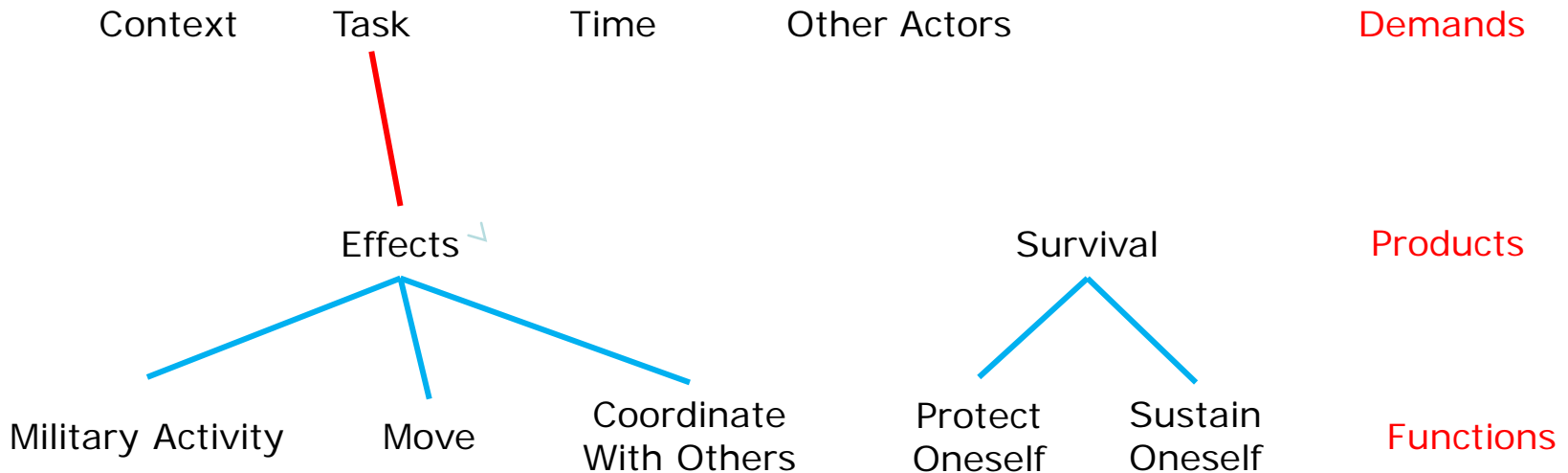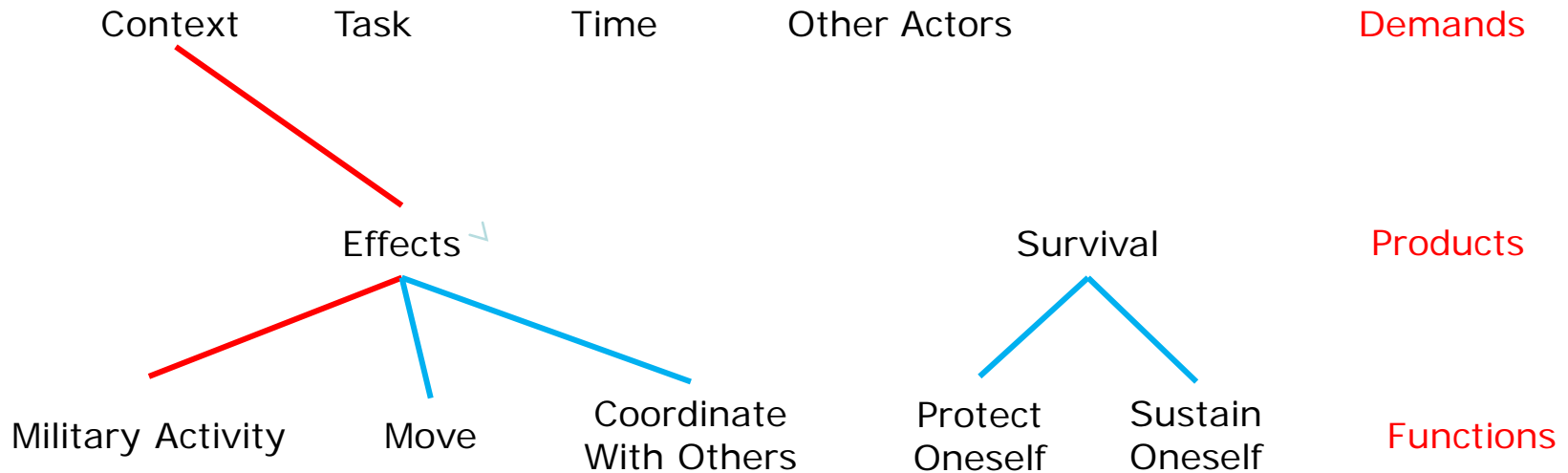
Flexibility is the ability to adapt the response to the situation if necessary

Mobility (Added)

Context   Task   Time   Other Actors   **Demands**

Effects   Survival   **Products**

Military Activity   Move   Coordinate With Others   Protect Oneself   Sustain Oneself   **Functions**

Mobility is the ability to move to the proper location fast enough

Resilience
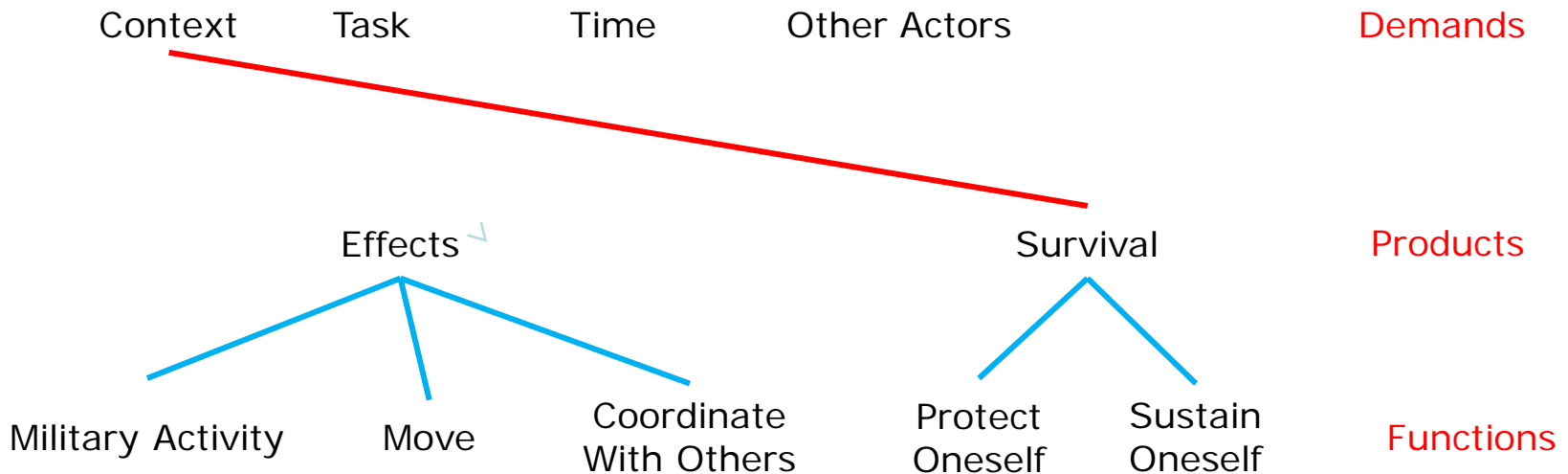
Context   Task   Time   Other Actors   Demands

Effects   Survival   Products

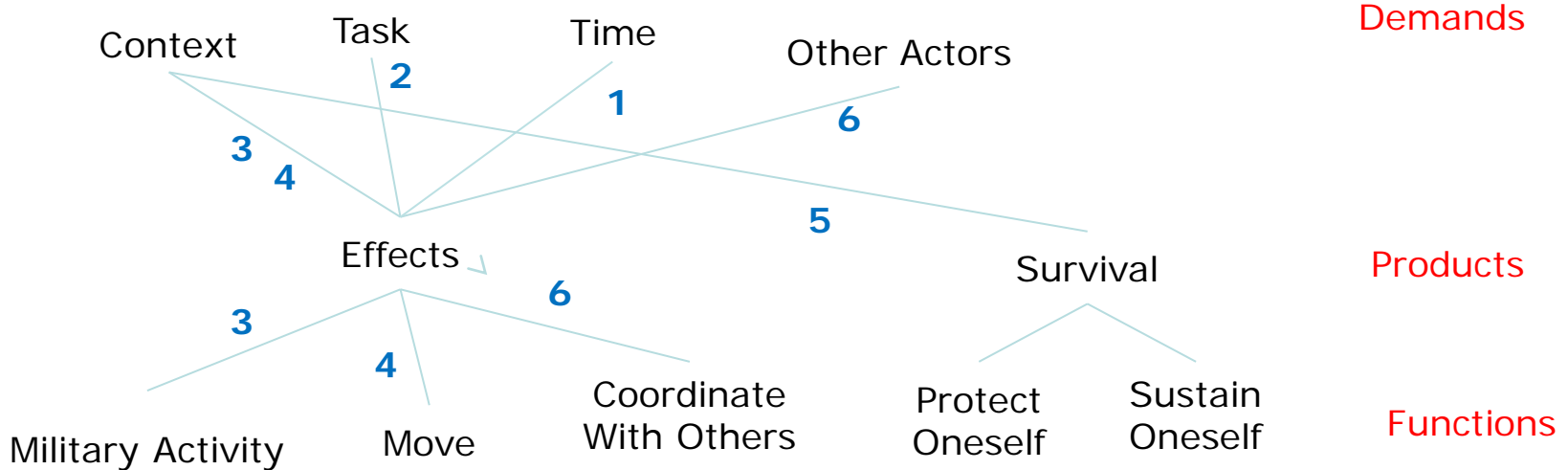Military Activity   Move   Coordinate With Others   Protect Oneself   Sustain Oneself   Functions

Resilience is the ability to withstand threats of destruction, interruption, or degradation

Coordination

Context   Task   Time   Other Actors   Demands

Effects   Survival   Products

Military Activity   Move   Coordinate With Others   Protect Oneself   Sustain Oneself   Functions
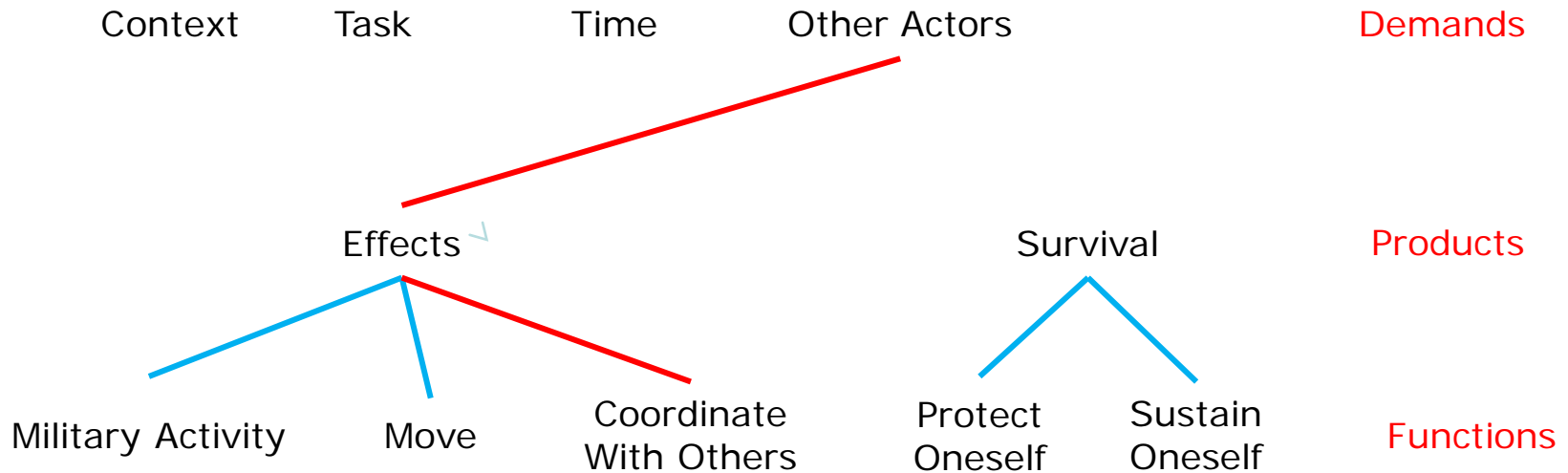
Coordination of the own activities with the activities of other actors may be required

Requisite Force Agility

Context   Task   Time   Other Actors   Demands

2
1
3
4   6

5

Effects   Survival   Products

3   6

4

Military Activity   Move   Coordinate   Protect   Sustain   Functions
                             With Others   Oneself   Oneself

1. Responsiveness   4. Mobility
2. Versatility   5. Resilience
3. Flexibility   6. Coordination

Requisite, Potential and Manifest Agility
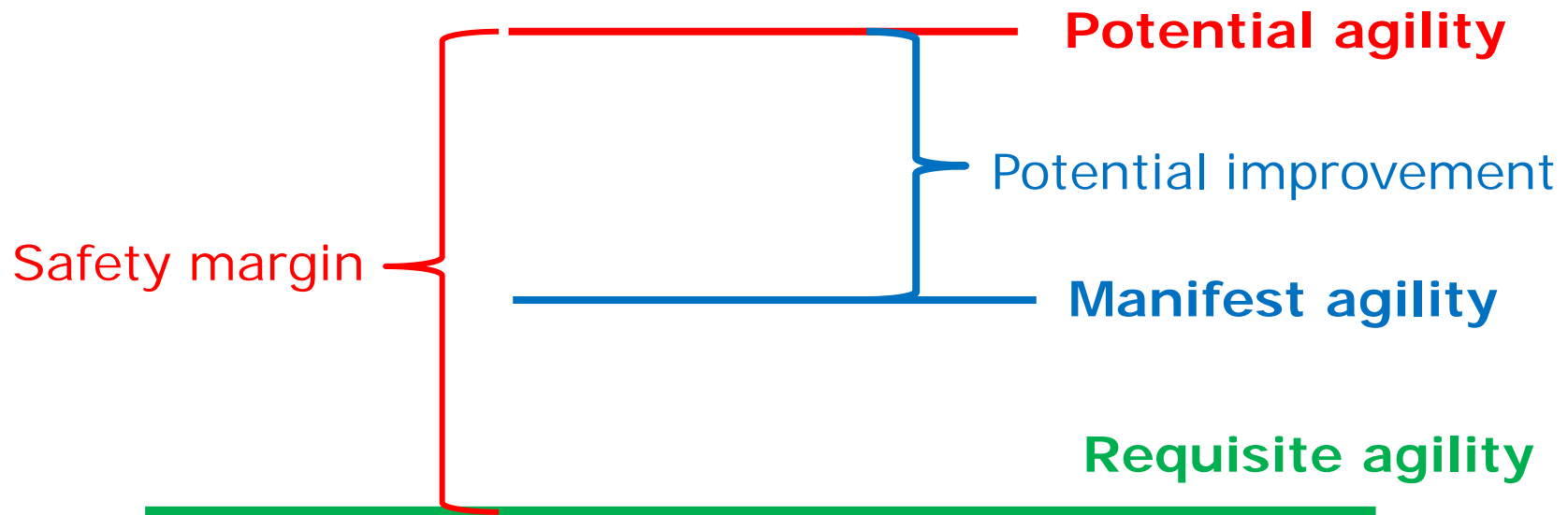
Potential C2 Agility

The Study of Artifacts

Potential Performance

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Purpose (Why?)	Goals and constraints	Demands
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Potential To Meet Requirements?
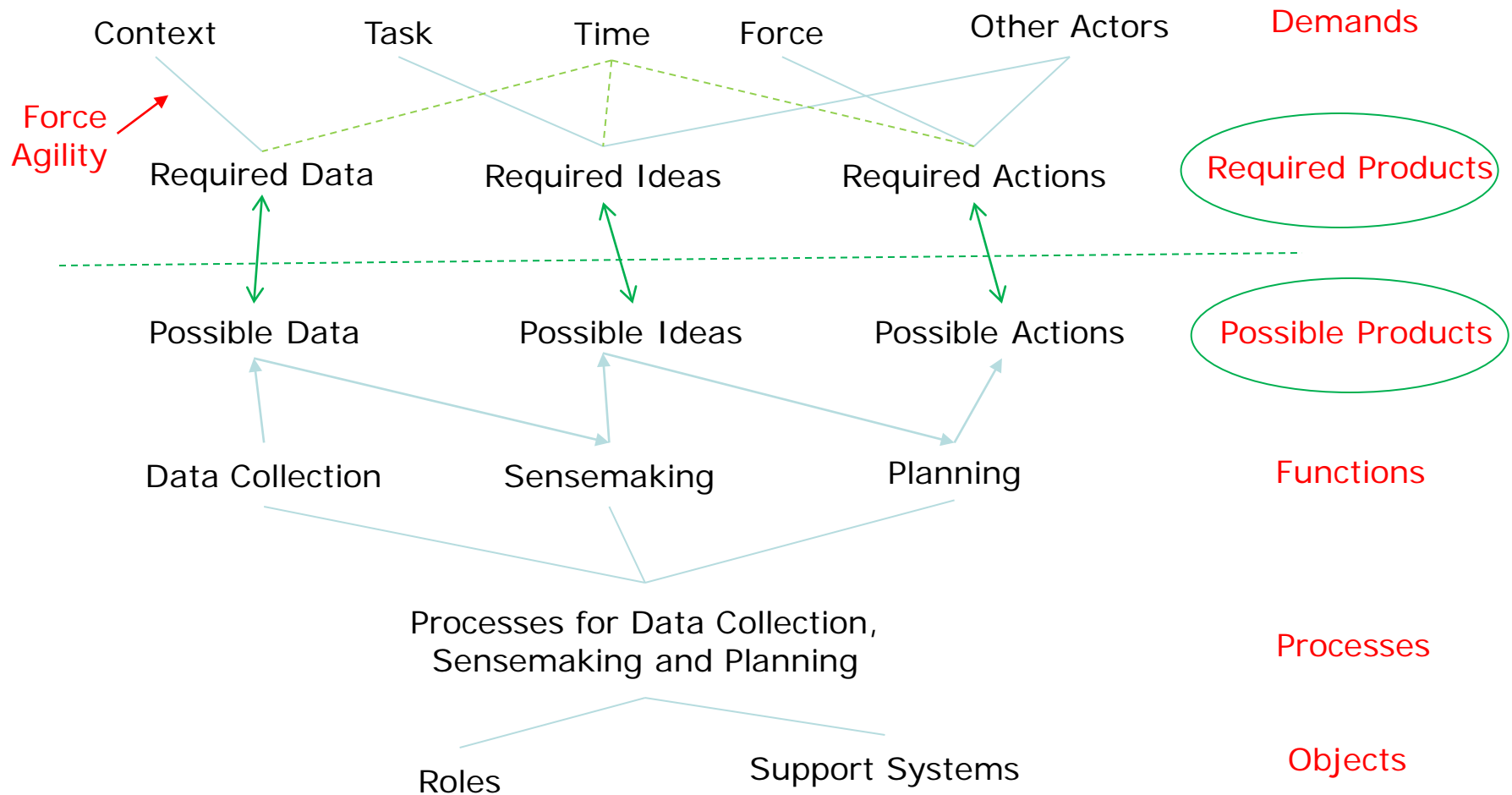
Context   Task   Time   Force   Other Actors   **Demands**

Force Agility

Required Data   Required Ideas   Required Actions   **Required Products**

Possible Data   Possible Ideas   Possible Actions   **Possible Products**

Data Collection   Sensemaking   Planning   **Functions**

Processes for Data Collection, Sensemaking and Planning   **Processes**

Roles   Support Systems   **Objects**

Manifest
C2 Agility

Performance Meets Requirements?

Context   Task   Time   Force   Other Actors   **Demands**

Force Agility

Required Data   Required Ideas   Required Actions   **Required Products**

Acquired Data   Created Ideas   Performed Actions   **Produced Products**

Data Collection   Sensemaking   Planning   **Functions**

Processes for Data Collection, Sensemaking and Planning   **Processes**

Roles   Support Systems   **Objects**

Conclusions

- Performance measures (operational definitions) related to actual circumstances (demands)

- Separate analyses of C2 Agility and Force Agility

- A slightly different set of components

- The C2 functions (and the Force functions) need to be broken down into sub-functions

- The search for more detailed measures ought to follow the principles outlined here.

Thank you!

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