Outline

Goal:
• To report on-going research into reducing operational planning cycle time using Business Process Re-engineering (BPR) & Cycle Time Reduction (CTR)

Overview:
• Introduction & motivation
• BPR & CTR
• RNLA’s Decision Making Process (DMP)
• Applying CTR to DMP
• Conclusions & further research
Introduction

Netherlands Defence Academy (NLDA):
  • Initial officer education:
    All 4 Dutch military services
    Military forming & academic education (Ba. Level)
  • Research

My appointment:
  • Professor, Operational ICT & Communications
  • Management:
    Team of 7.5 fte lecturers
  • Education:
    Bachelors-level course for signals & CIS officer cadets
  • Research:
    5 projects, 4 PhD candidates
    This paper: “Beyond SA: closing OODA loop” project
Motivation (1)

Traditional military planning processes:

- Achieve synergy by centralization
- Maximise benefits from:
  - Problem decomposition
  - De-confliction
  - Specialization
- Based on rational decision making
- Not agile enough to meet today’s challenges:
  - Globalisation & coalitions
  - Asymmetric threats
  - Increasing pace of change
  - Information age

Alberts & Hayes, 2007
Raiffa, 1968
Alberts & Hayes, 2007
Motivation (2)

What is needed:
• Speed up planning to match OODA loop:
  At least one order of magnitude
  Experience shows feasible
• Enables *planned* response to situation:
  Rather than reaction (i.e. enemy has initiative)
  Speed-up increases agility & resilience

Approach:
• **Business Process Re-engineering (BPR):**
  Cycle Time Reduction (CTR) offshoot
• **Concurrent Engineering (CE)**
BPR (1)

BPR:
• Analysis & design of workflows / processes within & between organization to improve performance

Business process:
• Collection of activities that takes inputs & creates outputs of value to customer
• Characteristics:
  Activities ordered in time & space
  Embedded in organizational structure
  Clearly defined inputs & outputs
  Adds value for customer

Davenport & Short, 1990 (adapted)

Hammer & Champy, 1993

Davenport, 1993

Reducing operational planning cycle time using BPR
BPR (2)

Performance measures in BPR:
- Efficiency
- Effectiveness
- Quality
- Cost
- Flow
- Cycle time i.e. time to transform inputs to outputs

Harrington, 1991

BPR perspectives:
- Management accounting perspective:
  Focus on improving performance measures
- Information systems perspective:
  Focus on domain objects, relationships, & behaviour
- Organizational theoretical perspective:
  Focus on people, accountabilities, & roles in domain

Valiris & Glykas, 1999
BPR (3)

Role of ICT:
- **Enabler:** Accelerating process steps (most attention in literature)
- **Facilitator:** Makes customer’s work easier; ICT in product itself
- **Initiator:** Acts as agent of change, e.g. enable new processes

Re-engineering process:
1. Establish business vision & objectives
2. Identify core business processes
3. Model & analyse business environment
4. Streamline business processes to match objectives
5. Continuous control & improvement of steps 1-4

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*Chan, 2000*

*Valiris & Glykas, 1999*
CTR (1)

Cycle Time Reduction (CTR):
• Offshoot of BPR literature
• Aim:
  To reduce cycle time to improve performance
  Not just “blinding speed”
• Key concepts:
  Cycle time, process time, delay time, lead time
  Cyclical thinking approach
  Concurrency
Cycle time, process time, delay time, & lead time:

Six Sigma definition (this paper):
- Process:
  - Process time
  - Delay time
  - Cycle time
  - Lead time

Some other definitions:
- Process:
  - Process time
  - Cycle time
Reducing operational planning cycle time using BPR

CTR (3) - Cyclical thinking approach: 

**Linear:**

Planning → Execution → Lessons learned

**Cyclic:**

Planning → Lessons learned → Execution

*Wetherbe, 1995*
CTR (4)

CTR constructs & points of leverage:
- Management / organization
- Human resource
- Product management
- Operations
- Inter-organizational:
  - Networking
  - Partnering
  - Risk-sharing
  - Outsourcing
  - Virtualizing

Wetherbe, 1995

5 constructs

Points of leverage
Improvement process using constructs & points of leverage:

Current state  \(\rightarrow\) **Improve** \(\rightarrow\) Desired state

Current state  \(\rightarrow\) **Diagnose** \(\rightarrow\) Cause known \(\rightarrow\) **Treat** \(\rightarrow\) Desired state

*Constructs & points of leverage can be used as checklist*

*No taxonomy of treatments in literature*
CTR (6)

Ways of reducing cycle time:

• Incremental:  
  Speed-up:  
    • Assigning process to faster resources  
  Time compression:  
    • Removing activities with no added value  

Simplification:
  • Replacing set of activities by simpler set

Overlapping:
  • Parallel: partial overlap
  • Concurrent: wholly overlap

• Radical:  
  Eliminating process
  Migrating process to another organizational entity
  Changing business model

ICT as enabler / facilitator

ICT as initiator
Reducing operational planning cycle time using BPR
Profusion of planning processes:
• Every nation & service has its own
• NATO has: OPP, EBAO, civ-mil … (more?)
Anyone know of comparative survey?

Baseline for analysis:
• RNLA’s Decision Making Process (DMP):
  In current operational use
  Well documented (Dutch & English)
  NATO-derived
• Three elements:
  Leadership = influencing others
  Decision making = generating plans
  Control = executing those plans
PHASE 1: MISSION ANALYSIS
- Step 1: A new situation?
- Step 2: Analyze mission
- Step 3: Commander’s guidelines

PHASE 2: EVALUATION OF FACTORS
- Step 4: Intelligence preparation of battlefield
- Step 5: Friendly assets

PHASE 3: CONSIDER COURSES OF ACTION
- Step 6: Develop Courses of Action
- Step 7: Consider Courses of Action

PHASE 4: COMMANDER’S DECISION
- Step 8: Commander’s decision

Contingency planning
- Develop Op Order

IB = Information briefing
DB = Decision briefing

“9th” step

Op order triggers
Op order despatches

Reducing operational planning cycle time using BPR
Reducing operational planning cycle time using BPR

Organizational level

- Initial trigger
- Time remaining at J
- Planning time at J
- Planning cycle time
- Time remaining at J+1
- Time remaining at J+2

- Planning
- OpOrd$_j$
- OpOrd$_{j+1}$
- OpOrd$_{j+2}$

Start planning

Finish planning

Start operation

Ministry of Defence
Applying CTR to DMP (1)

Vision: To reduce planning cycle time to integrate planning into OODA loop

Reducing operational planning cycle time using BPR
Applying CTR to DMP (2)

Streamlining (1 of 3):

• Incremental:
   Already achieved:
   • Using ICT in enabler role to reduce sub-processes
   • Warning orders enable partial overlapping
   Under discussion:
   • Using simulation to automate “war-gaming” (Step 7)
   • Using IP&S to automate COA construction (Step 6)
   • Removing levels in organizational hierarchy
Applying CTR to DMP (3)

Streamlining (2 of 3):

• Radical:

  Eliminate need to write Operation Order:
  • Maintain Operation Order as data-structure:
    = GIS overlays & associated data
  • Distribute Operation Order in data form (eg XML):
    » Eliminates “Step 9” using anytime generation
    » Eliminates need to “parse” Operation Order

Deconfliction by peer-to-peer self-synchronisation

Remove key constraints:

• Hierarchical organization
• Planning as top-down linear decomposition & analytic DM
• Employ ICT in initiator role

Re-partition IPB (Step 4):

• Battlefield area evaluation (4.1) as part of Step 2

Remove organizational separation between C2/C4I & ISTAR
Applying CTR to DMP (4)

Streamlining (3 of 3):

- Applying 5 constructs & 46 points of leverage:
  - Already applied:
    - Operations: automating, anticipatory scheduling, standardizing
    - Product management: time-boxing
  - NEC covers additional points of leverage:
    - Management / organization: transforming
    - Human resource: empowering
    - Product management: prototyping
    - Operations: informing
    - Inter-organizational: networking, partnering, risk-sharing
  - Points of leverage addressed earlier in this paper:
    - Management / organization: front-ending, flattening
    - Operations: challenging, eliminating, integrating, paralleling, simplifying
  - Treatments suggested by points of leverage:
    - Product management: platforming, deriving, re-using
    - Inter-organizational: outsourcing, virtualizing
Conclusions & further research (1)

Contributions:
• Applying BPR & CTR constructs to reducing cycle time in military operational planning: Emphasis on radical measures
• Candidate taxonomy of CTR treatments

Limitations:
• Just one, pre-NEC planning process analysed
• No concept development & experimentation
Conclusions & further research (2)

Further research needed:

• Survey & compare multiple planning processes
• CDE into:
  • Operation Order as data-structure
  • Tools for deconfliction by self-synchronisation
  • Prototyping planning system using Concurrent Engineering
  • Applying modelling, simulation, & gaming to Step 7
  • Applying intelligent planning & scheduling to Step 6

• Further study:
  • Radical reduction by removing key constraints
  • Repartitioning planning process
  • Removing organizational separation C2 & ISTAR
  • Explore maintaining repository of COA segments
  • Outsourcing & virtualizing C2 process

Masters student

RTO SCI-187 paper & 2nd Masters
Any questions?