Enterprise architecture beyond IT
- an Australian view

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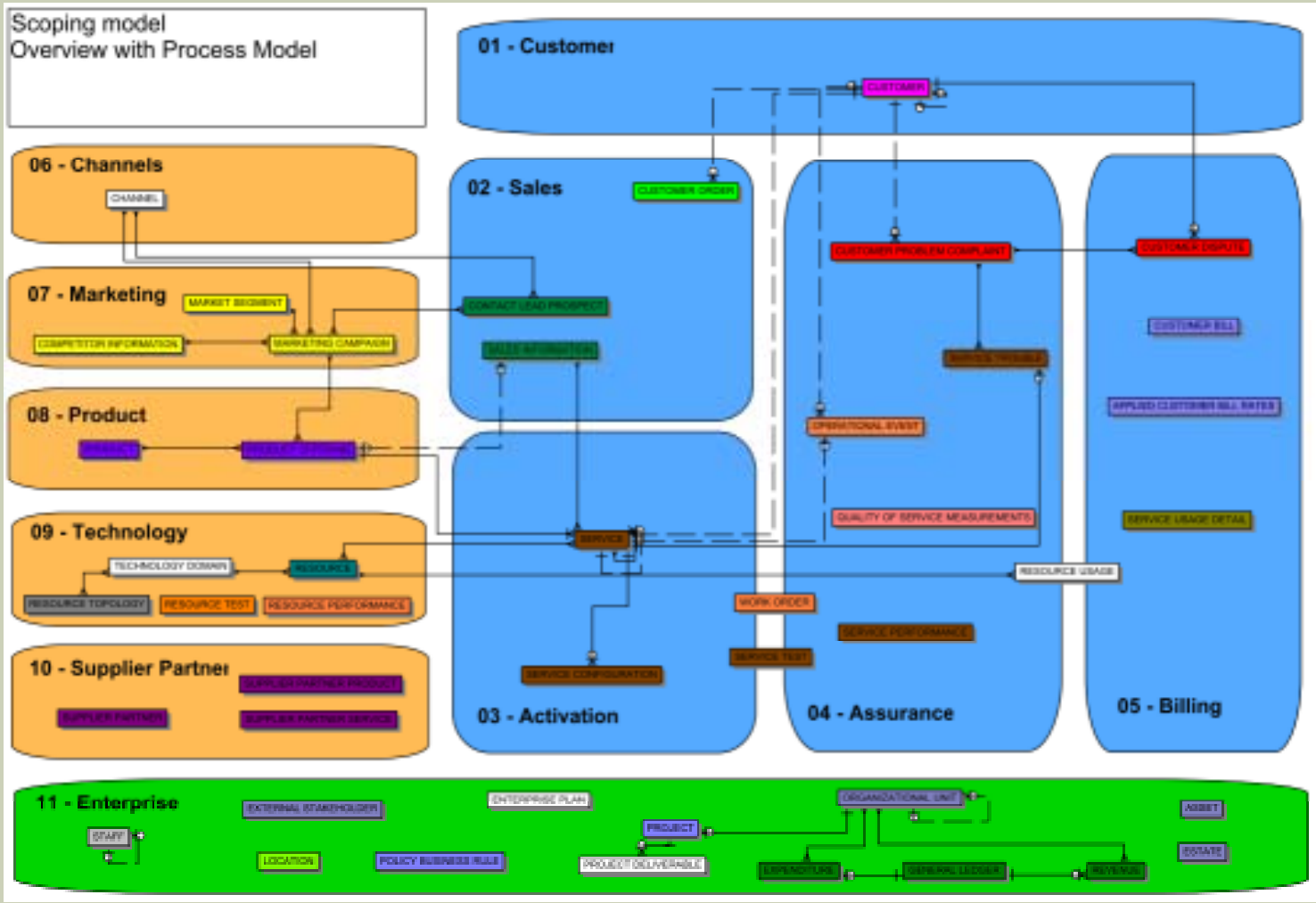
Integrated EA
March 2011

An Australian view of EA

- A habit of ‘thinking architecturally’
  - often more from necessity than choice
- Perhaps a bit anarchic at times…
  - again, often more from necessity than choice
- Five projects that pushed our EA beyond IT:
  - modelling business-information at a telco
  - process-modelling for logistics
  - managing information for aircraft research
  - high-level strategy for a bank
  - design to manage complexity in Army operations

EA example 1: Telco



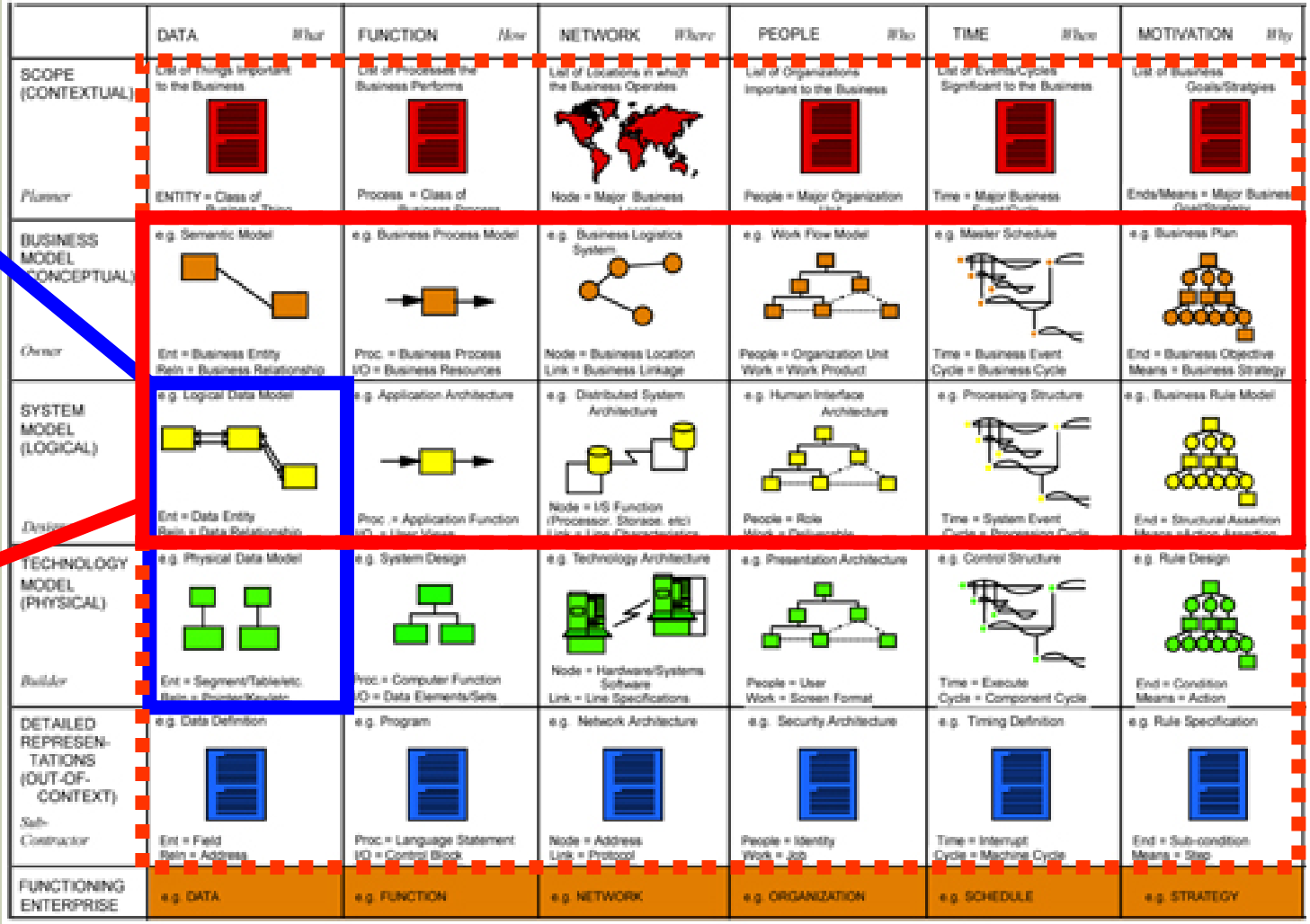
Data vs business-information

- Data-architecture:
  - made everything seem ‘logical’
  - single definitions, ‘single source of truth’
  - all seen from an IT perspective (databases, apps)
- Business-information:
  - real business use was much ‘messier’
  - derived-info: counts-of, averages-of, trends-of
  - event-driven, cyclical, sometimes uncertain
  - often blurry business-rules (‘modal-logic’)
  - meaning often dependent on people’s experience

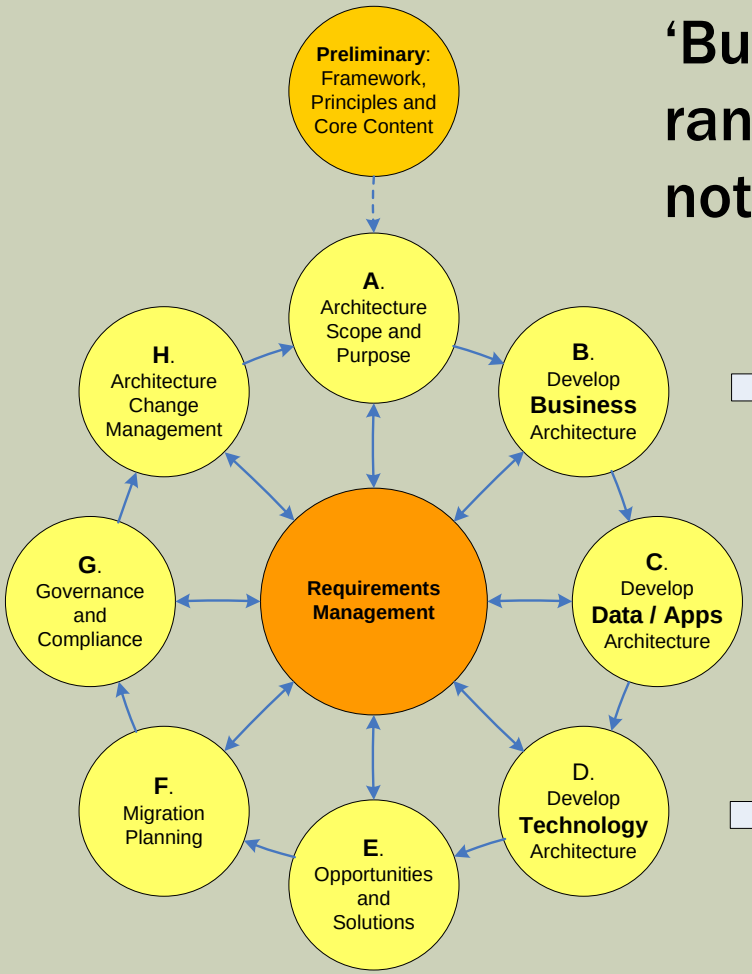
Data- vs info-architecture on Zachman

Data-architecture

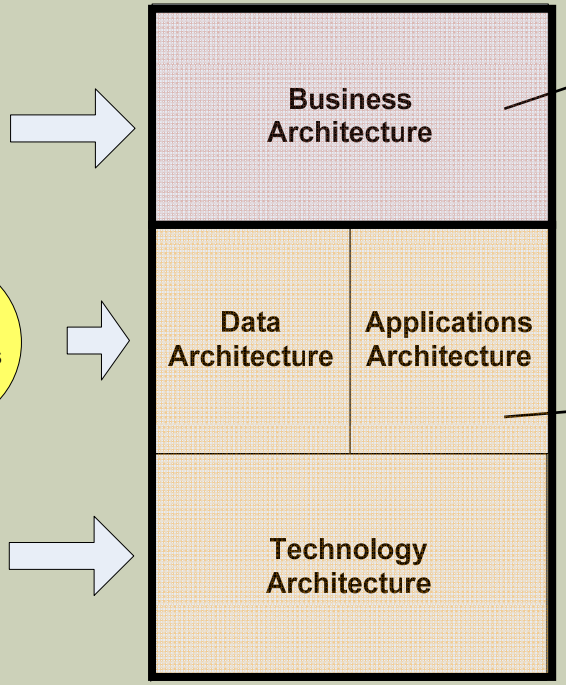
Info-architecture



We tried using TOGAF for business scope



'Business-architecture' as a random grab-bag for 'anything not-IT that might affect IT'?



Everything not-IT ?
(97% of enterprise; ADM: 8 steps)

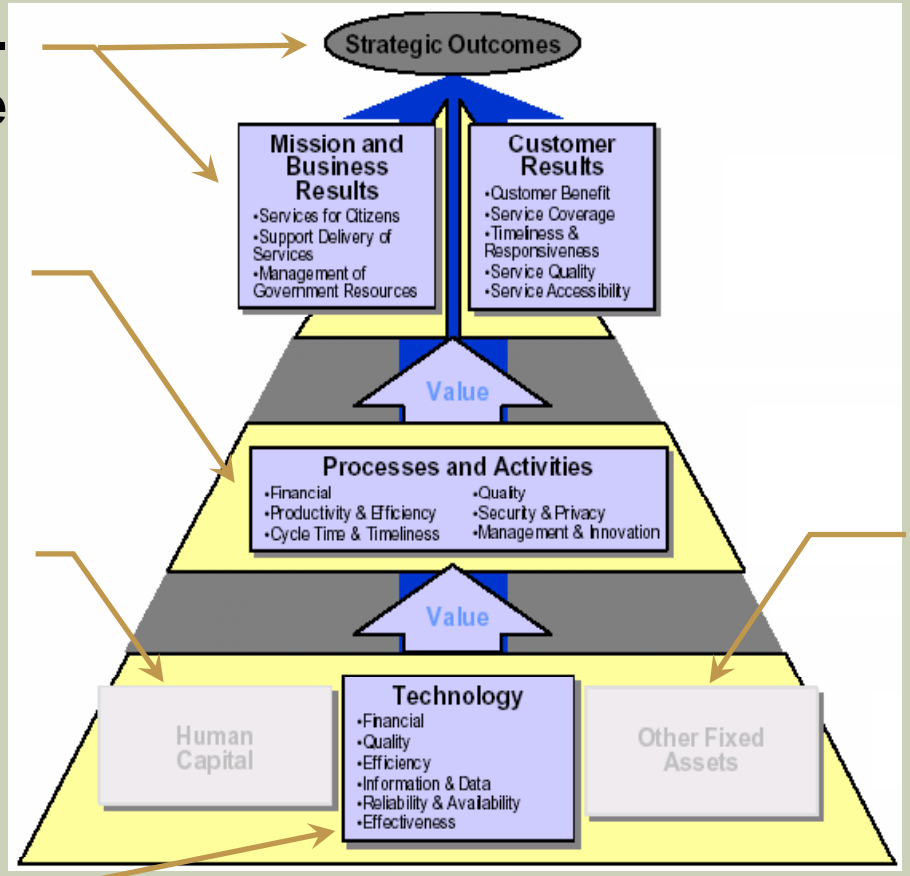
IT
(3% of enterprise; ADM: 67 steps)

FEAF was more useful, but not by much...

Business-architecture

Integration
(including data and apps architecture)

"Human Capital"
(people, manual processes etc)



FEAF PRM (Performance Reference Model)

"Other Fixed Assets"
(machines, machine-processes, vehicles etc)

"Technology"
(Information Technology only)

We even needed to rethink Zachman

Columns need restructure to support whole-EA

(original)	*What*	*How*	*Where*	*Who*	*When*	*Why*

(revised)	**Asset**	**Function**	**Location**	**Capability**	**Event**	**Reason**
(example segment)	Object Information Relationship Value	Mechanical IT-based Manual Abstract	Physical Virtual Relational Temporal	Rules Analysis Heuristic Principle	Physical Virtual Relational Temporal	Rules Analysis Heuristic Principle

At Operations level, we should be able to describe every service as:

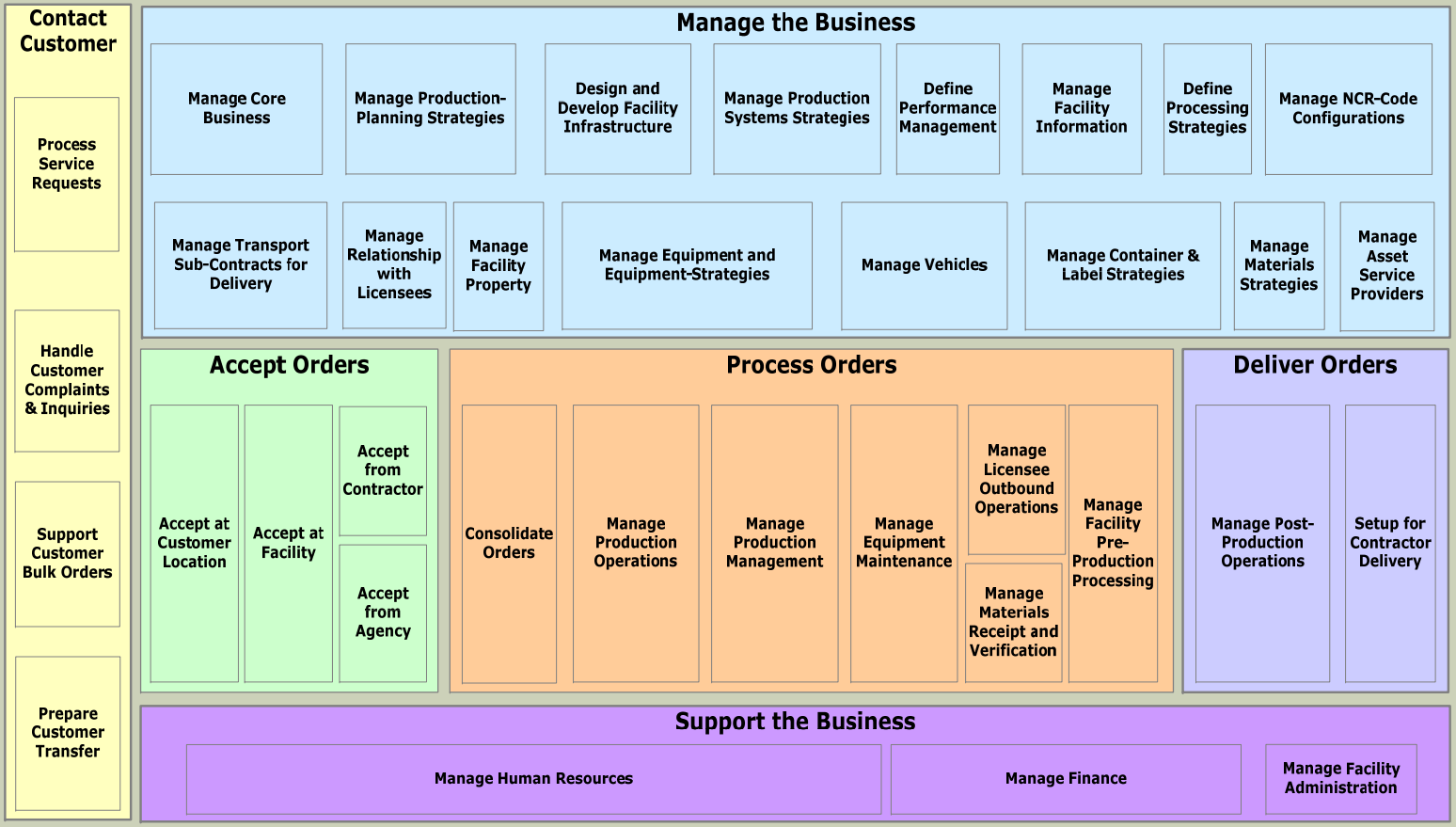
with	*do*	*at*	*using*	*on*	*because*
<asset>	<function>	<location>	<capability>	<event>	<reason>

– this is an 'architecturally complete' pattern or composite

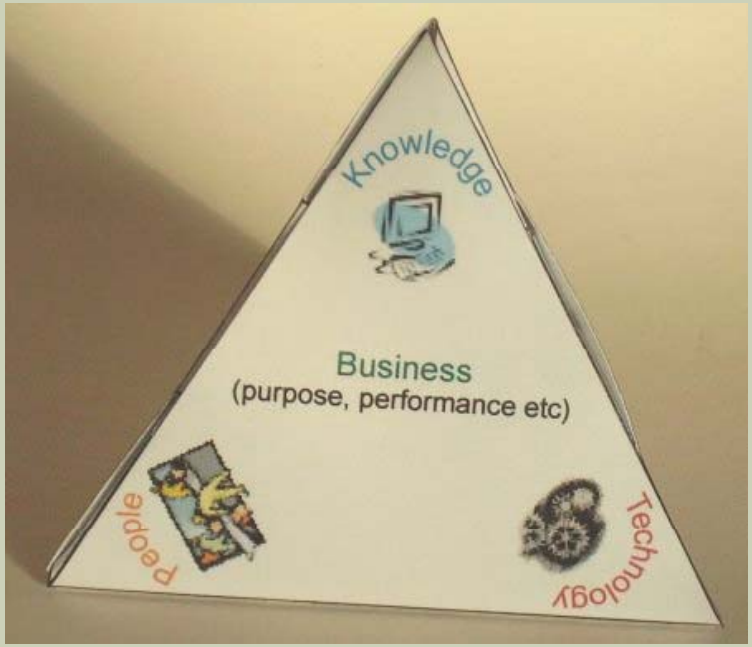
EA lessons learned

- Most current EA frameworks are IT-centric
  - TOGAF, SAP EAF, Gartner etc
- Best-fit for information-centric industries
  - Banks, insurance, finance, tax
  - Archimate example: ‘Archisurance’
- Need to cover other industries and contexts
  - information, things, people, purpose
- IT-based data-models are not enough
  - often need to cover whole cross-enterprise scope

EA example 2: Logistics

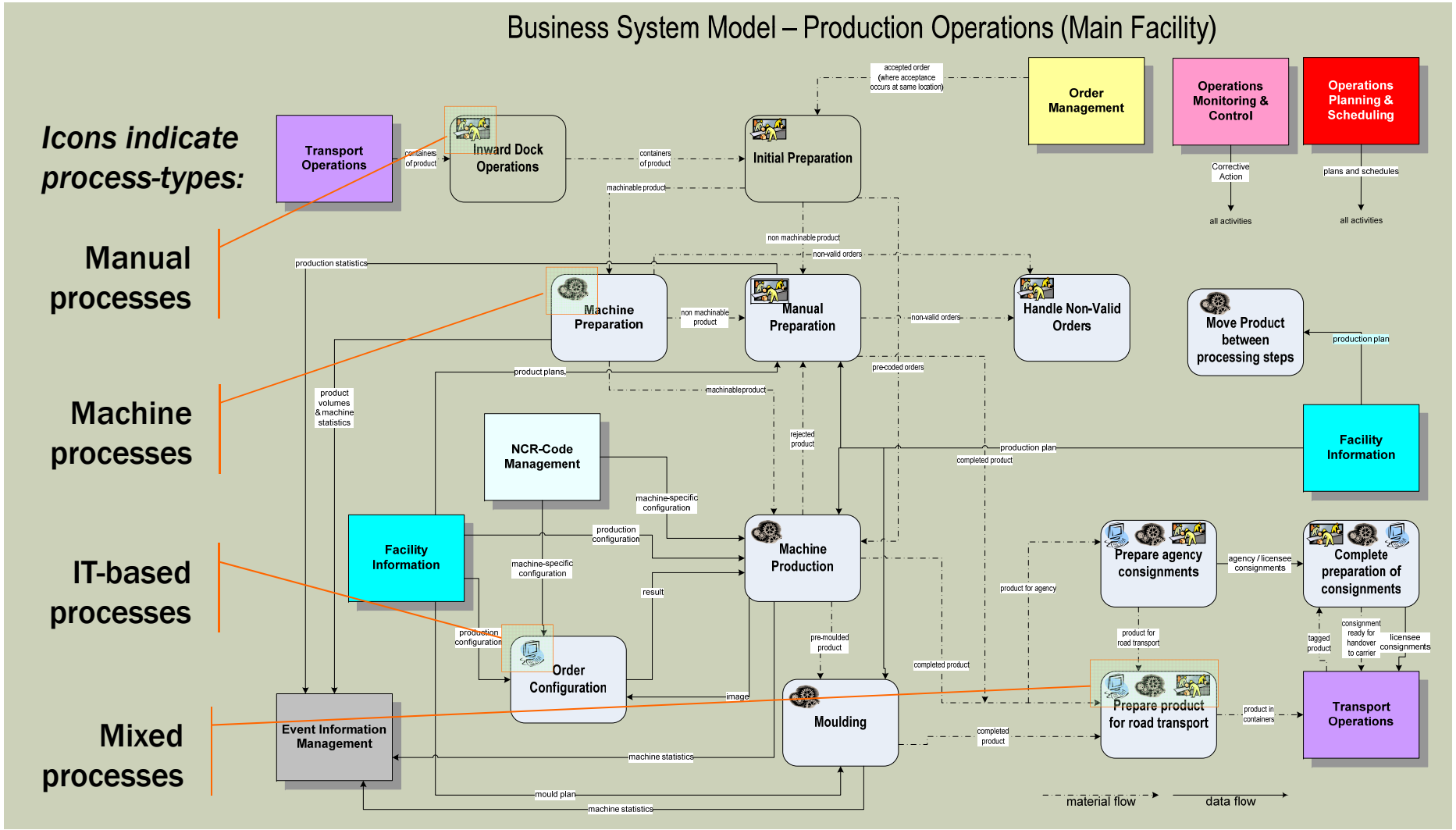


From processes to services



- Key design principles:
  - everything in the enterprise is or delivers a service
  - any service may be implemented by any combination of machines, people and/or IT

Modelling our Business Systems



Rethinking how to describe the enterprise

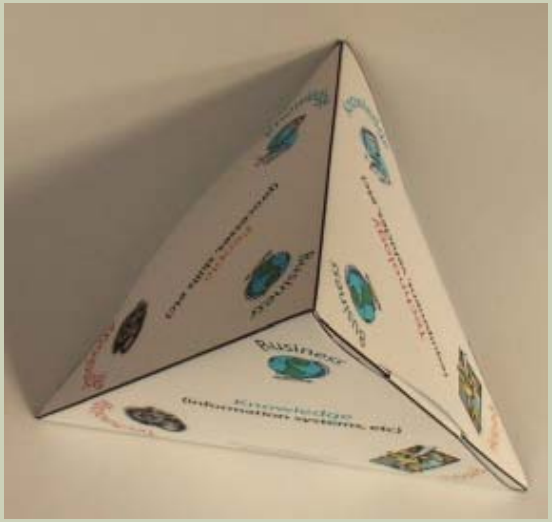
- Four dimensions to the structure of the enterprise:
  - Physical dimension (*transactions*)
    - machinery, warehousing/stock, logistics, lead-times, etc
  - Knowledge dimension *(conversations)*
    - information-technology, tacit knowledge, business meaning
  - People dimension *(relationships)*
    - skill-sets, teamwork, social networks, rostering, etc
  - Business-direction dimension *(purpose)*
    - business drivers/goals, strategy/tactics, performance, etc
- and the integration of these into a coherent whole

Real success making architecture tangible

With a simple cardboard ‘tetradian’, the dimensions became <u>tangible</u>…

…IT Architecture *and* Business Architecture, together, and more…

…rotating between different views…



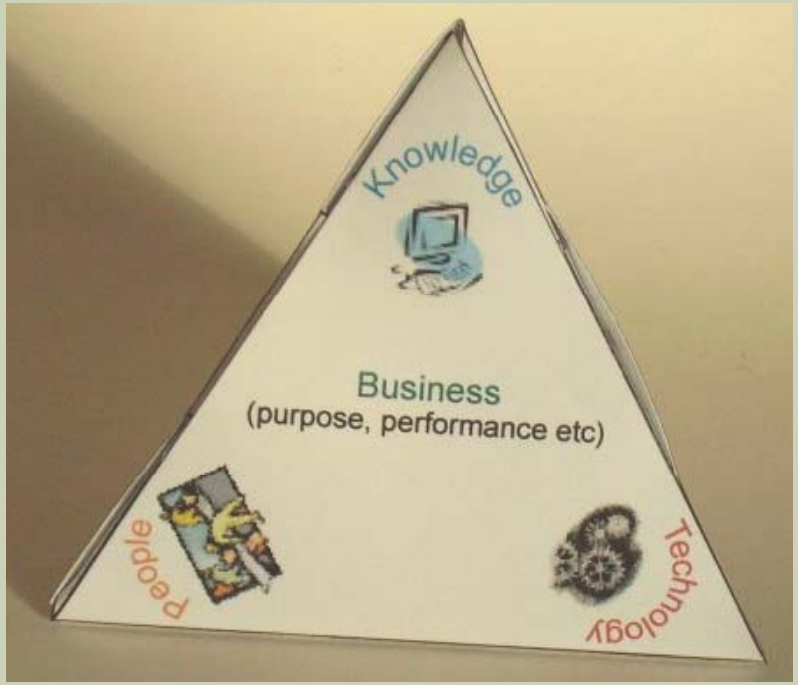
…for a fifth dimension, a sense of the whole…

…the business loved it: architecture seen <u>and felt</u> from every direction.

Each view is a subset of the whole

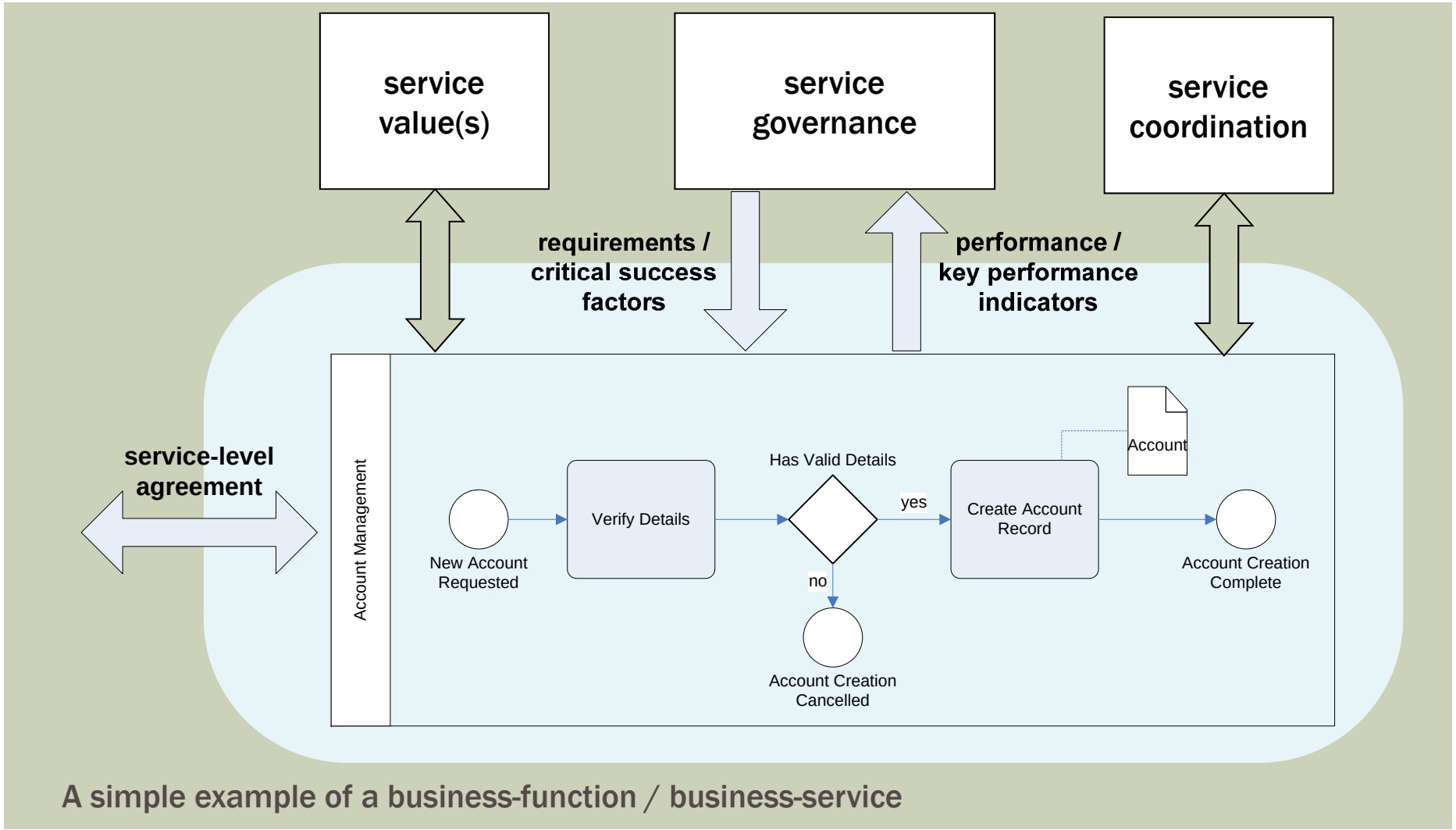
Typically, each business area sees up to three dimensions at one time:

- an **Operations** area sees only People, Machines, IT/Knowledge *(as on right)*
- an **IT** area sees only IT/Knowledge, Machines and Business
- an **HR** area sees only People, Business, perhaps IT/Knowledge



The <u>business system</u> is comprised of **all four dimensions**, always; the architecture must model this whole, <u>as</u> a whole.

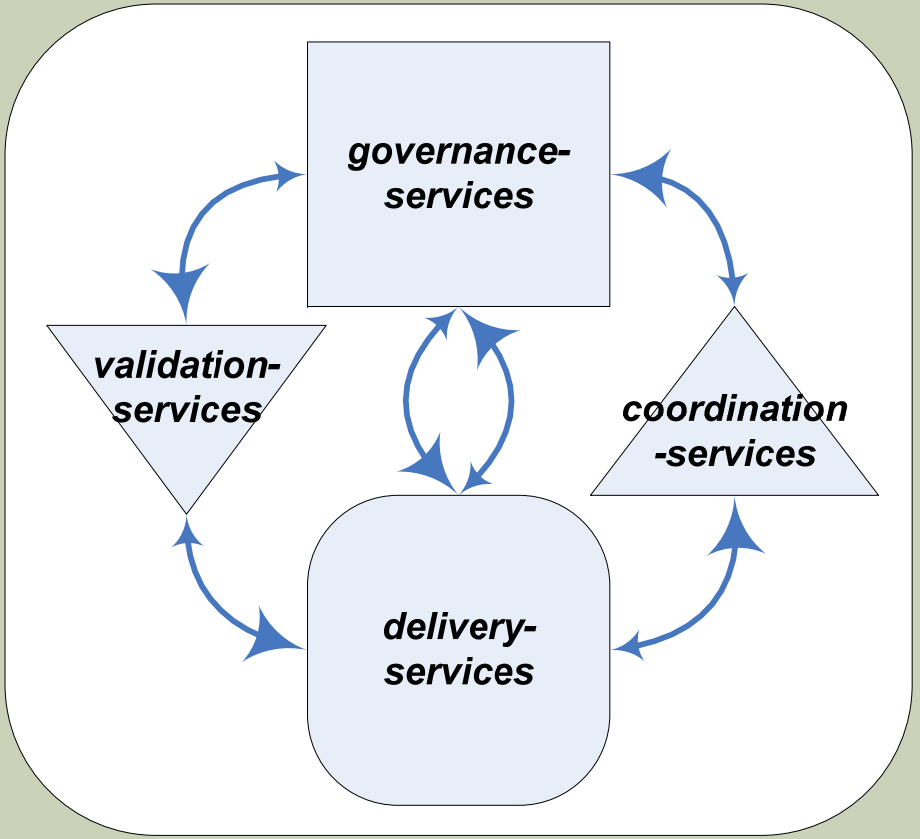
Rethinking services as systems



A simple example of a business-function / business-service

Four interdependent categories of services

- Balanced relationships between services make the overall system 'viable'
  - model based in part on Stafford Beer's classic 'Viable System Model'
- Every service needs governance, coordination, validation
- Ultimately every service is a 'delivery service'
  - because every service delivers <u>something</u>!



EA lessons learned

- Breaking away from IT-centric thinking is hard
  - our project eventually took over the architecture unit
- Underpinned by systematic, inclusive metamodels
  - four dimensions: ‘things’, information, people, purpose
  - whole-enterprise approach to service-oriented architecture
- Architects work in abstracts, but business-folk don’t
  - we needed to make our examples concrete and tangible
- Essential to engage the business-folk from the start
  - a real make-or-break for architecture credibility

EA example 3: Defence Research

A knowledge-management horror-story...

- 30-year gap between initial-test and new research
  - all senior staff from original project now retired or dead...
- Original research-reports were almost useless
  - had been heavily ‘laundered’ for political reasons
- At least two person-years expended on:
  - searching ‘inherited’ filing-cabinets for missing info
  - building catalogue of recovered paper-documents
    - ***but still no real search-facilities available!***
- Main test-program needed 30yr-old test-data
  - data eventually recovered from fragile tape-reels
  - recorded data-structures could only be guessed...

A question of lifetime

- Standard procedure: test-record life is ‘five to ten years after Task completion’.
  - much too short – see platform / material lifetime
- Effective lifetime can be **>50 years**:
  - compare to:
    - Task lifetime (3 years)
    - software or hardware lifetime (3-5 years)
    - typical government policy lifetime (10-20 years)
    - typical working lifetime (20-40 years)
- Needed stories to convey knowledge over time

Managing the long-term knowledge

- Knowledge combines three types of information:
  - data - objective, usually quantitative
    - provides information content
  - metadata - 'information about information'
    - identifies information context
  - connection - subjective, usually qualitative
    - derived from experience
    - describes perceived relationships between data-items
    - indicates information meaning
- Objective data are easy to store in databases...
  - ...but meaningless without metadata and connections!

Balancing technology and culture

"If you're spending more than one-third of your time on technologies for knowledge management, you're neglecting the content, organisational culture and motivational approaches that will make a knowledge management system actually useful."

[Tom Davenport]

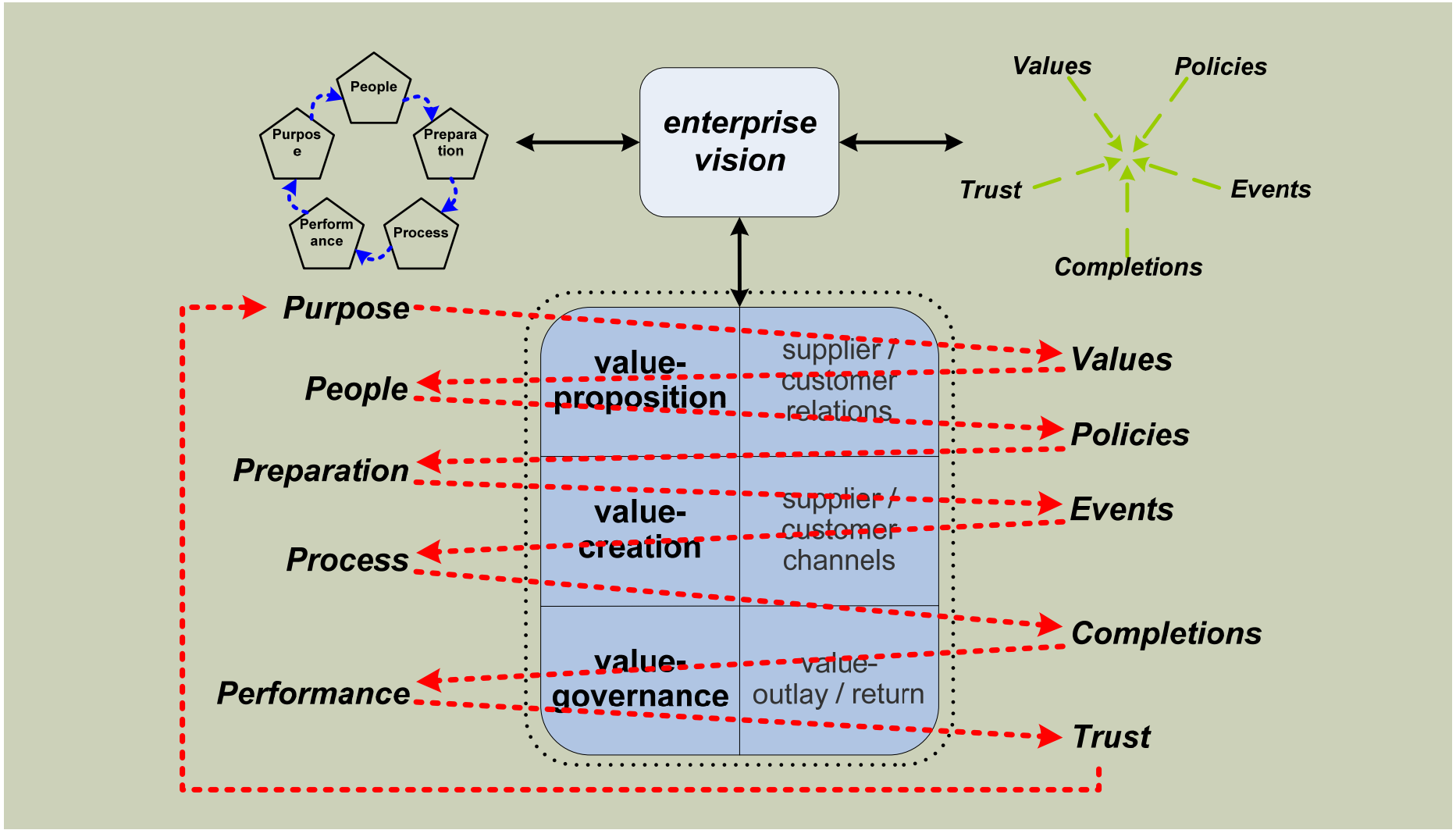
Too much focus on technology?

- An intense search for ‘the perfect KM database’:
  - *storage* - data, metadata, connections
  - *search* and cross-reference
  - *access-control* and usage *metrics*
- But knowledge-management depends as much on:
  - *leadership* - a commitment to organisational quality
  - *change-management* - creating a ‘learning organisation’
  - *culture* - creating a habit of sharing knowledge and exploring its potential for re-use
- A struggle to get scientists to be serious about culture

EA lessons-learned

- Knowledge-sharing was central to the work
  - from data to information to knowledge
- IT plays a part, but it's more than just IT
  - culture is the real core, not the IT
- Managing long-term knowledge requires:
  - technical expertise in long-term data-migration
  - narrative-knowledge to carry stories of meaning
- These need to become part of the **architecture** of the enterprise

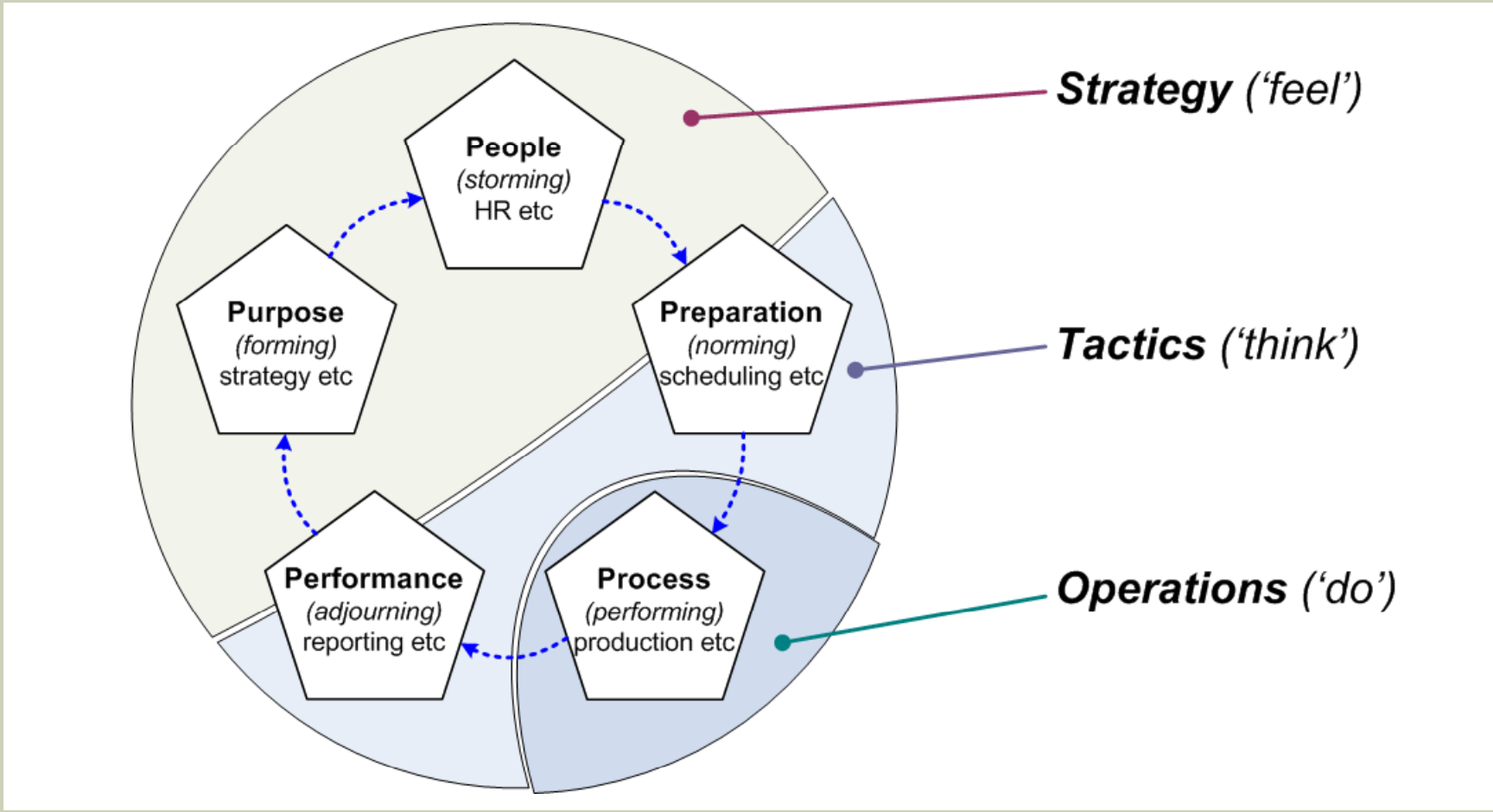
EA example 4: strategy for bank



A question of respect

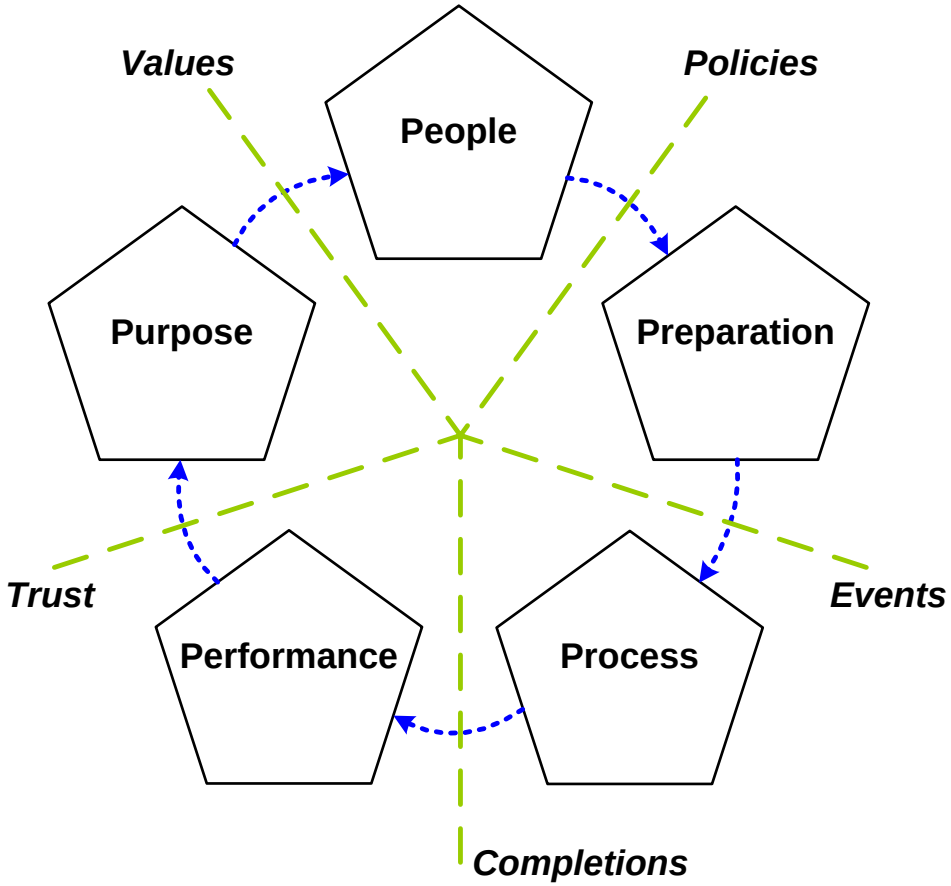
- Slump from most- to least-respected in region
  - loss of internal mutual-respect as well as external
- Impacts across entire enterprise
  - customer-relations, internal morale, state politics
- No real concept of ‘big-picture’ strategy
  - arbitrary targets used as substitute for strategy
- Urgent need to create ‘strategic conversation’
  - must highlight and clarify systemic issues
  - yet <u>also</u> simple, engaging, unthreatening

A cycle of interdependent enterprise



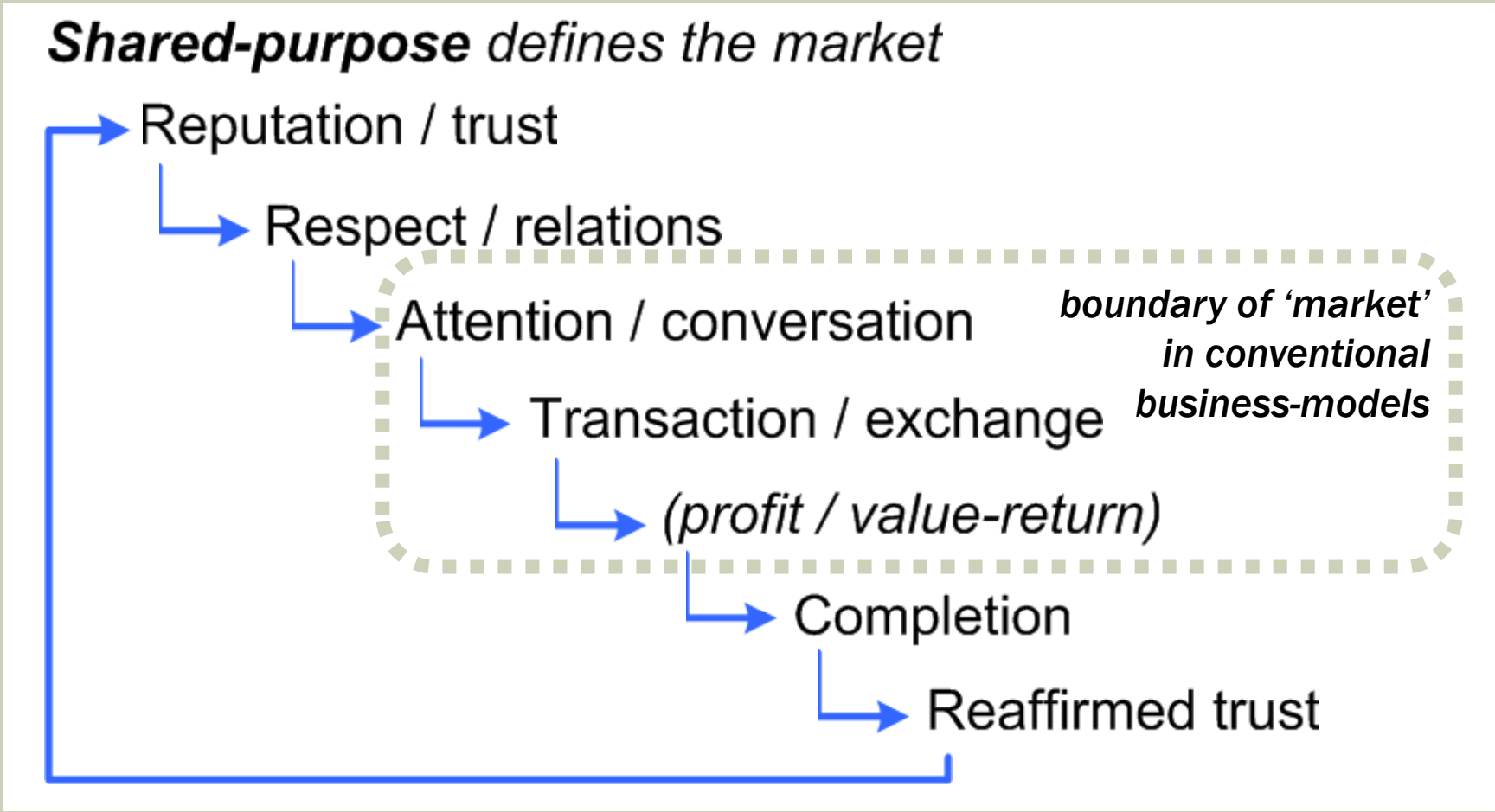
adapted from classic 'Group Dynamics' project-lifecycle

Creating conversation across enterprise



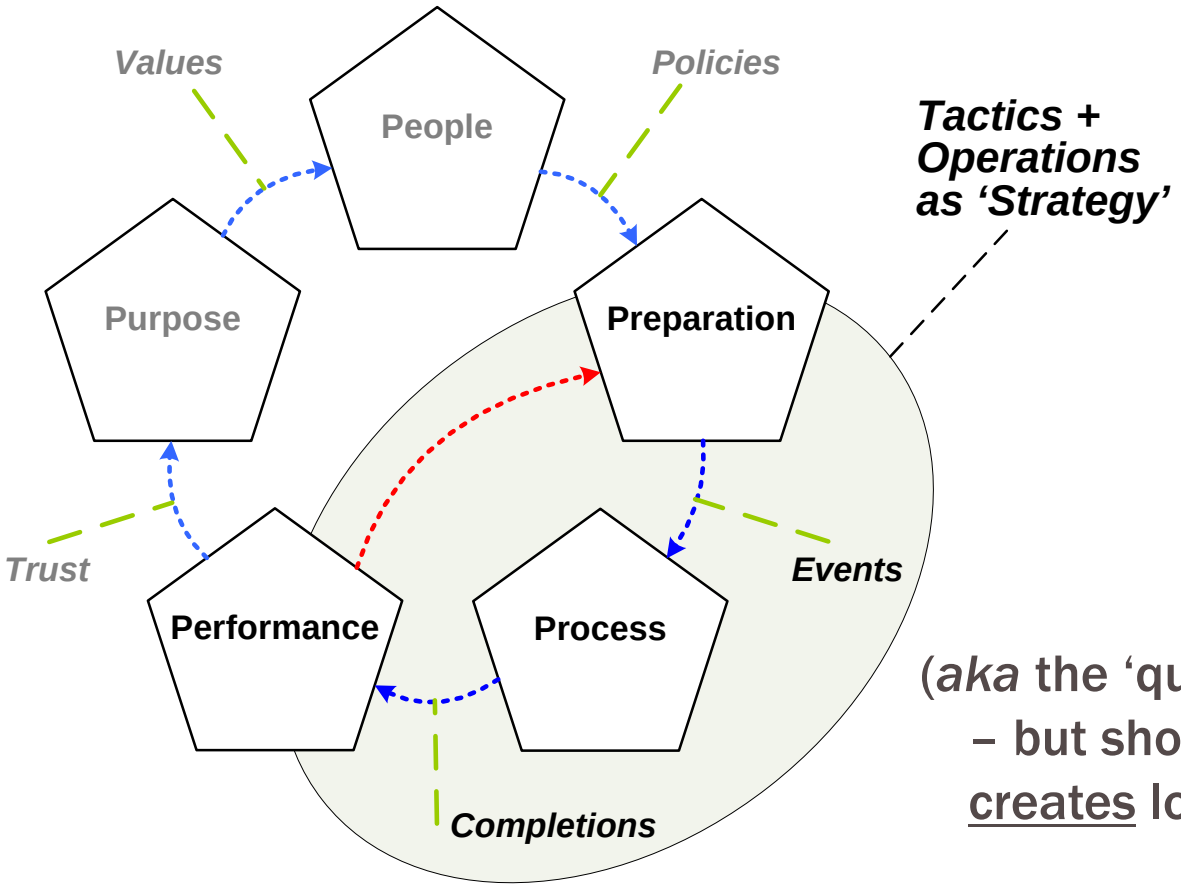
adapted from VPEC-T (see Nigel Green & Carl Bate, 'Lost in Translation')

Trust, reputation and the market-cycle



future transactions depend on (reaffirmed) reputation and trust

An absence of strategy



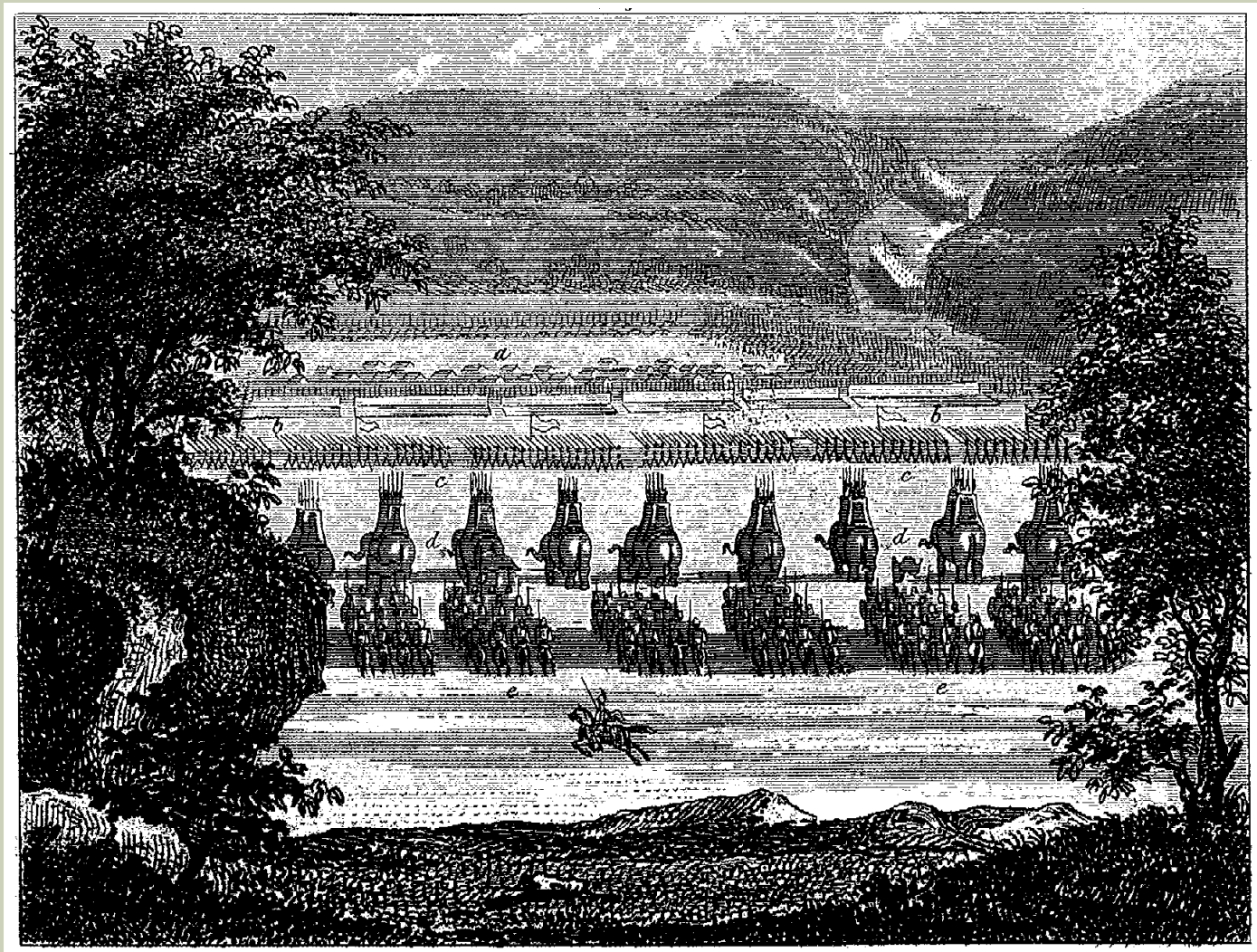
(*aka* the 'quick profit' cycle – but short-term profit creates long-term fail)

refocus on strategy required, to rebuild links to Purpose and People

EA lessons-learned

- Priorities: culture → strategy → tactics → ops
  - "culture eats strategy for breakfast" [Peter Drucker]
- Arbitrary targets often mistaken for strategy
  - "our strategy is last year plus 10%"
  - gives no indication as to what to do, or why...
- IT-centrism hides the real issues
  - IT-detail important but often used as a distraction
- Culture, respect etc as architectural concerns
  - culture as the real core of the enterprise

EA example 5: Army as ‘enterprise’



A back-and-forth on Army architecture

- Army is facing new kinds of operational roles
  - adapting architectural ideas from other domains
- Deliberately experimental approach
  - ‘brainstorming’ adaptations of ideas from commercial and government architecture
- Start-point: a ‘business-anarchist’ perspective
  - “no rules, no rights, values come first, agility is key”
- ‘Enterprise’ as a focus for shared commitment
  - bounded by vision, values, principles, stories

Rethinking what's meant by 'enterprise'

Most common assumption: 'the organisation is the enterprise'

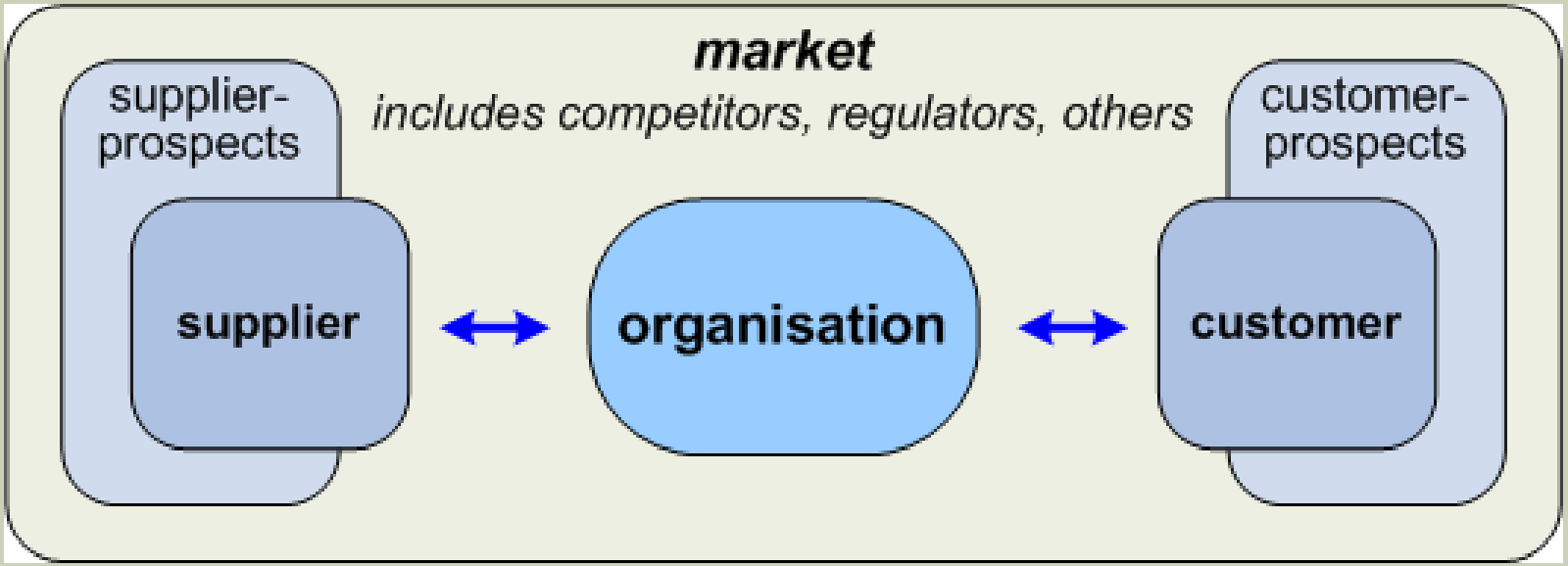
From a business perspective – and in Defence too – this is the effective scope of TOGAF's 'business architecture'

Supply-chain as ‘the enterprise’

Supply-chain is one thread within an overall ‘value-web’

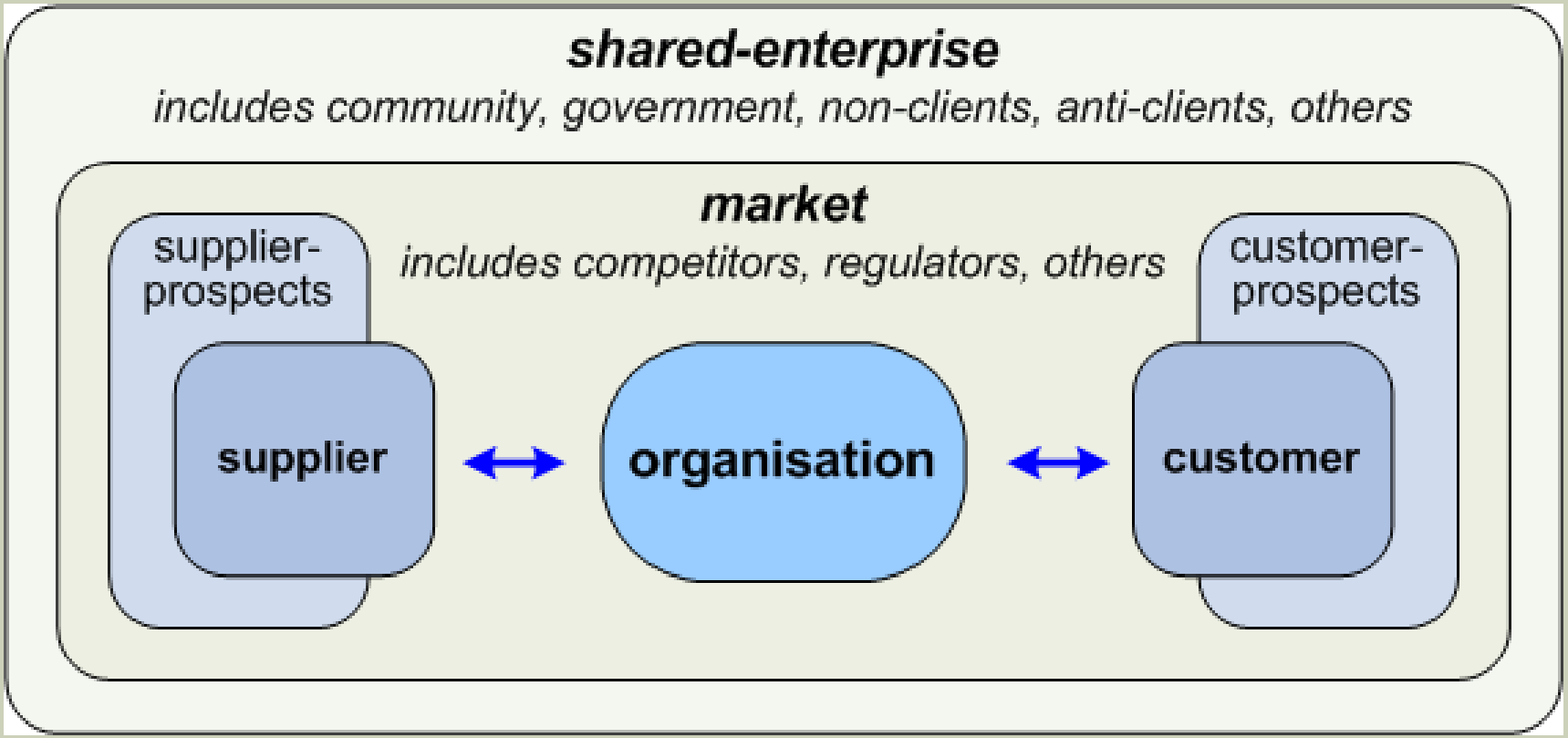
Typical business-model or supply-chain view
(can introduce strange distortions – eg. Enemy as ‘customer’)

Market as ‘the enterprise’



Overall Defence ‘market’ includes actors who do not yet have active transactions with us, also other types of transactions

Real scope of ‘the enterprise’



Overall enterprise has many actors who may have only ‘intangible’ transactions / interactions with us (yet can have major impacts on what we do)

The military enterprise

- Role of military in overall societal enterprise
  - von Clausewitz: “War is not merely a political act, but also a political instrument, a continuation of political relations, a carrying out of the same by other means”
- Enemy as ‘anti-client’ in enterprise
  - assumption: “destroy Enemy’s ability to fight”
  - is ‘reduce other’s desire to fight’ more effective?
- Enterprise-model and market-cycle
  - maintain the focus on a shared ‘Why?’

Design for human complexity

- British Army experience in Northern Ireland
  - every action or inaction by any soldier is ‘political’
- US Army experience in Iraq / Afghanistan
  - success is most often from ‘reduce desire to fight’
  - US Army CAC: ‘FM 5-0 The Operations Process’
    - role of design-thinking: FM 5-0 ‘Information Briefing’ [PPT, 11.0Mb]
- New emphasis on ‘Commander’s Intent’
  - outcomes-driven, not process-driven
- Enterprise vision provides the anchor

Beware of over-focus on technology

- Defence has same issues as in IT-centric ‘EA’:
  - info is important, but there’s more than just IT
  - technology is important, but there’s much more to Defence architecture than just the technology
  - complexity of people-issues is the real core concern – hiding in the ‘easy’ technology-realms doesn’t make those complexities go away!
- A literal ‘service-oriented architecture’?
  - yet what or whom does each service serve? –vision as the key anchor for enterprise

EA lessons-learned

- Don't describe Enemy as a 'customer' of the Army!
  - taxonomically correct, but makes no sense to our clients!
- Market and Enterprise can make practical sense
  - needs some adaptation from business-context
- Complexity requires new approaches
  - not just about 'who has the biggest elephant' any more!
  - role at Ops level of techniques such as design-thinking
- Architecture concept of 'vision' enables new options
  - identify 'common ground' – enables shift from 'Enemy' status to active assistance in operational goals

A broader role for EA?

- A habit of ‘thinking architecturally’
  - “things work better when they work together”
- Perhaps a bit anarchic…
  - rules often arbitrary abstractions from real-world
- Need to think beyond IT or technology alone
  - maintain awareness of the enterprise as a whole
- Keep returning to the vision, the ‘Why?’
  - the ‘Why?’ defines the overall enterprise, provides common-ground for shared-stories

Thank you!

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