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Business Technology Consulting
5.0 Consulting Problem Analysis
Dr V Michell

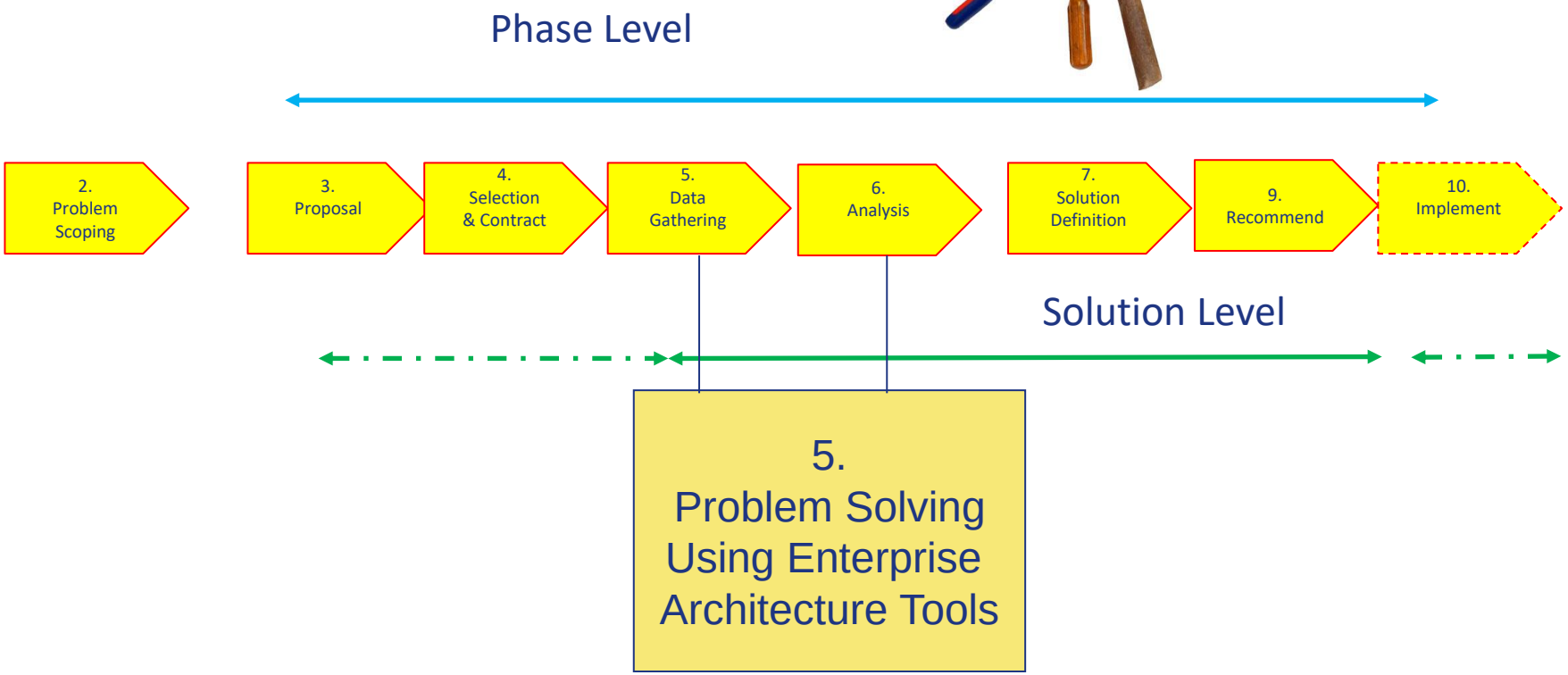
5.0 Consulting Problem Analysis Architecture Tools

- Data Gathering
- Architecture Construction
- Problem Analysis using EA Techniques

Learning Objectives After completing this unit you should:

- Ability to gather data from clients to support architecture modelling
- Understand how to develop the architecture artefacts and components
- Understand how to apply enterprise architecture to analyse business problems

5.0 Overview


Phase Level
2. Problem Scoping
3. Proposal
4. Selection & Contract
5. Data Gathering
6. Analysis
7. Solution Definition
9. Recommend
10. Implement
Solution Level
5. Problem Solving Using Enterprise Architecture Tools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5.1 Data Gathering
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5.1 Data Gathering

Aim:

Explore techniques for gathering relevant information for conducting an enterprise architecture analysis based on the business issue and needs

Questionnaires

- A series of questions designed to elicit specific information
- Questions may require different kinds of answers: simple YES/NO; choice of pre-supplied answers; comment
- Often used in conjunction with other techniques
- Can give quantitative or qualitative data
- Good for answering specific questions from a large, dispersed group of people

Source: INMR66

5.1 Capturing Information (cont.)

- Conduct interviews
  - Forum for talking to people
  - Structured, unstructured or semi-structured
  - Identify aims and question types
  - Ideally use two people
    - Alternate note taking/discussion
  - Good for exploring issues, and elicit scenarios
  - But are time consuming and may be infeasible to visit everyone

Source: INMR66

5.1 Capturing Information (cont.)

- Run workshops or focus groups
  - Group interviews
  - Focus on gaining views/consensus
  - May involve thinking activities/challenges
  - Needs to be planned and facilitated
  - Good for
    - Gaining a consensus view and/or highlighting areas of conflict
    - Identifying differences in process, actions and feelings
    - Harmonising information and knowledge
    - Preparing for change

Source: INMR66

5.1 Capturing Information (cont.)

- Observations
  - Spend time with stakeholders in their day-to-day tasks, observing work as it happens
  - Gain insights into stakeholders' tasks
  - Good for understanding the nature and context of the tasks
  - But, it requires time and commitment from a member of the design team, and it can result in a huge amount of data
  - Ethnography is one form
- Study documentation
  - Policies, procedures and rules are often written down in documents
  - Good source of data about the business and its codified knowledge
  - Work activities/steps involved in an activity, and any regulations

Source: INMR66

5.1 Influencing Factors in Information Gathering

- Which stakeholders to involve?
  - Identify the objective of the data gathering exercise
  - Focus on the key knowledge holders for the domain/technology
- Time to involve stakeholders
  - Interviews depend on availability
  - You will need alternative stakeholders
- Process
  - workshops, interviews, workplace studies
- Relate the choice of stakeholders to the data required
  - Knowledge of the work
  - Experience of the work
  - Stakeholder level – eg strategic. Managerial, worker
  - The type of data you want vs what they can provide

Source: INMR66

5.1 Influencing Factors in Information Gathering (cont.)

Interview Data

- Domain knowledge is often distributed and implicit
  - difficult to dig up and understand
  - Is often implicit knowledge
  - knowledge articulation: how do describe ‘how you walk’?

- Communication between parties
  - within engagement team (who collects what and when)
  - with customer/user (eg should you send a copy?)
  - between users… different parts of an organisation use different terminology

- Version control, ownership
  - Record changes to data
  - Can you use it – re IPR?

5.1 Influencing Factors in Information Gathering (cont.)

- Political problems within the organisation
  - Can you believe what you hear?
  - Is there a spin on certain information
  - Is information being with-held?
- Dominance of certain stakeholders
  - May alter data/information and hence the engagement decision and action!
- Economic and business environment changes
  - May change data and/or interpretations
- Balancing engagement needs vs. time and usability demands

Source: INMR66

5.1 Influencing Factors in Information Gathering (cont.)

- Clients rarely know what is possible
- Clients can't tell you what they 'need' to help them achieve their goals
  - that's why you are here

- Instead, look at existing tasks
  - their context
  - what information do they require?
  - who collaborates to achieve the task?
  - why is the task achieved the way it is?

- Envisioned tasks:
  - can be rooted in existing behaviour
  - can be described as future scenarios

...This leads us on to how do we link client information to problem solving?

Source: INMR66

5.1 Exercise

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5.2 Enterprise Architecture Problem Analysis

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5.2 Problem Analysis– for Enterprise Architecture

Architecture Modelling

EA Problem Analysis

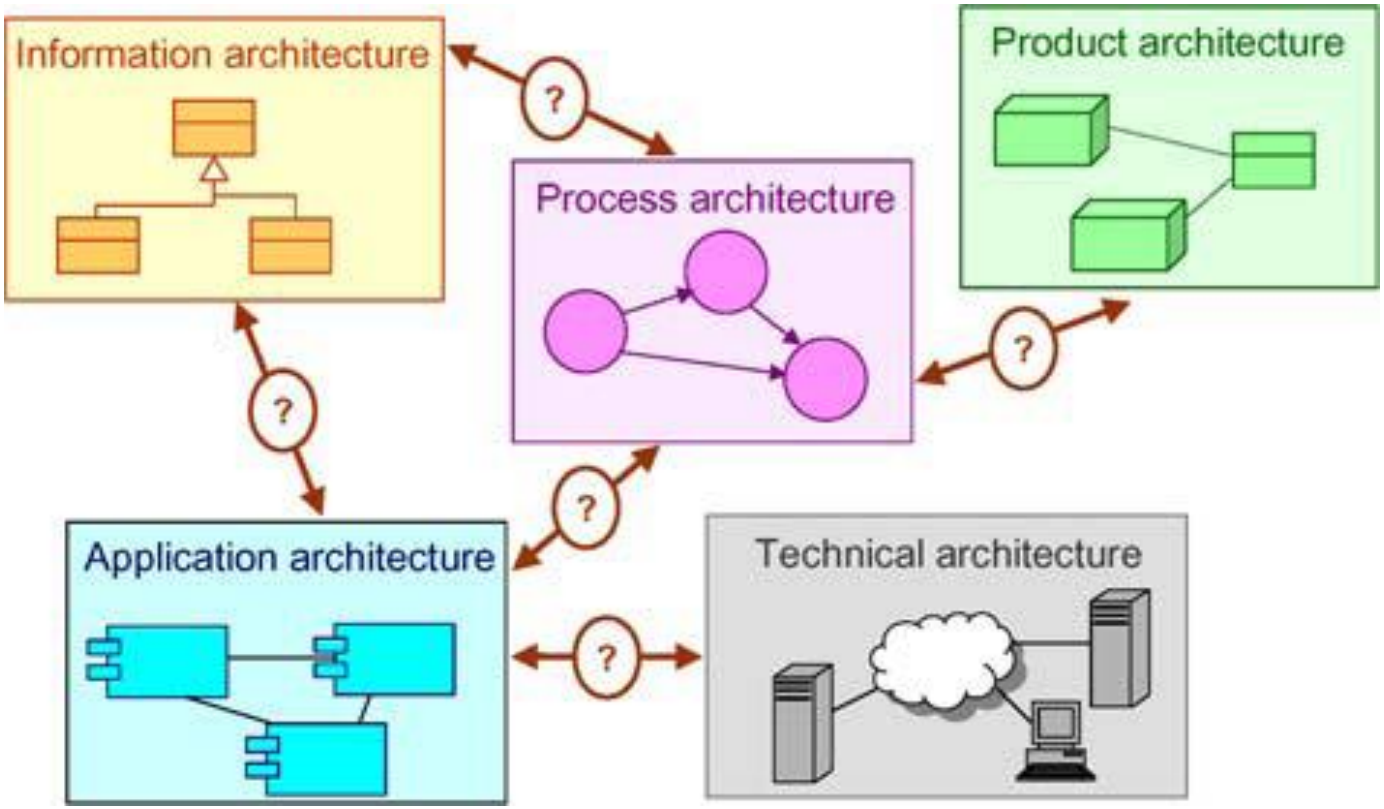
Building the Architecture Components

Using the Architecture Components

Enterprise Architecture: Integrating Domains

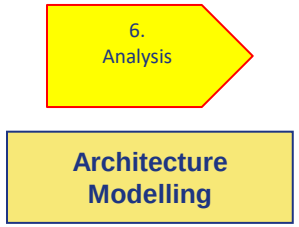
6. Analysis

Architecture Modelling

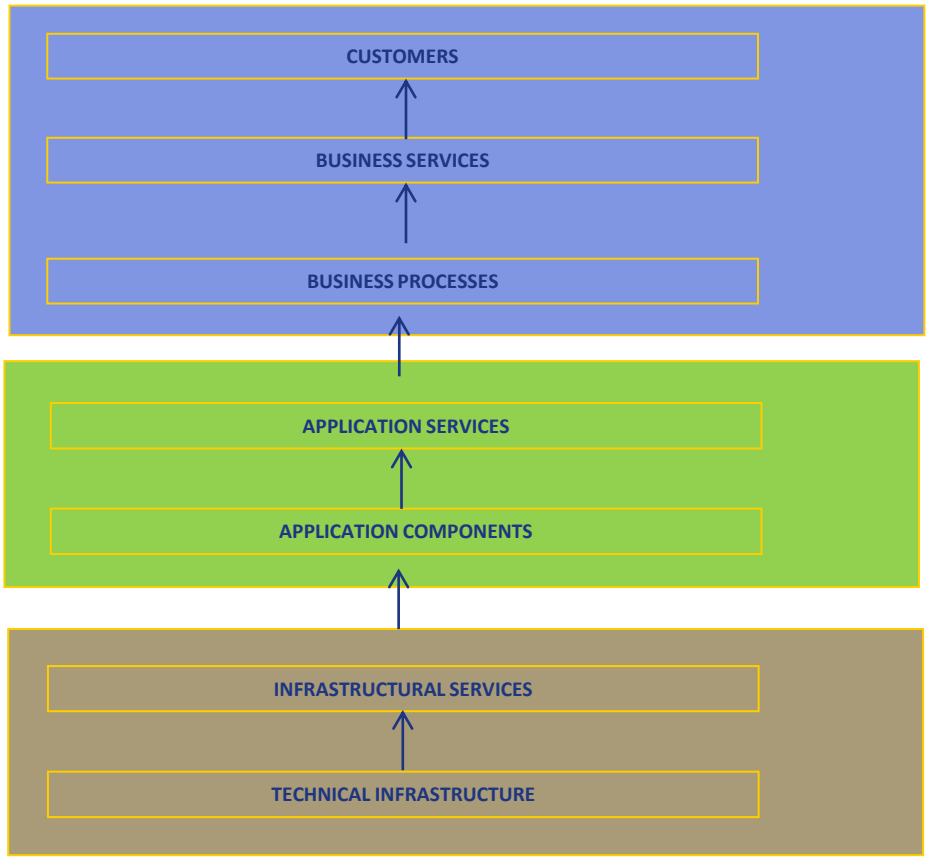


Source: EA76 Jonkers H. et al Enterprise architecture - Management tool and blue print for the organisation

5.2 Architecture Modelling - Recap



Enterprise modelling language *Lankhorst 2009 pp88*



Business Layer
– offers products/services to external customers realised by business processes

Application Layer
– supports the business layer with application Services realised by software components

Technology Layer
– offers infrastructural services (processing, storage, communications services to run applications realised By computer and communication devices and system software

5.2 Business Service Analysis - recap

Architecture Modelling

Definition

Business Service ***The externally visible functionality which is meaningful to the environment and realised by business behaviour*** - *Lankhorst 2009 pp94*
Service: ***A service unit of functionality that some entity (system, department, organisation) makes available to its environment*** - *Lankhorst 2009 pp88*
example - *Lankhorst 2009 pp108*

The **business services** are the services provided by the business to its client. Enterprise Architecture requires identification of business services
[xx]

Services are often listed as part of an existing business model or architecture

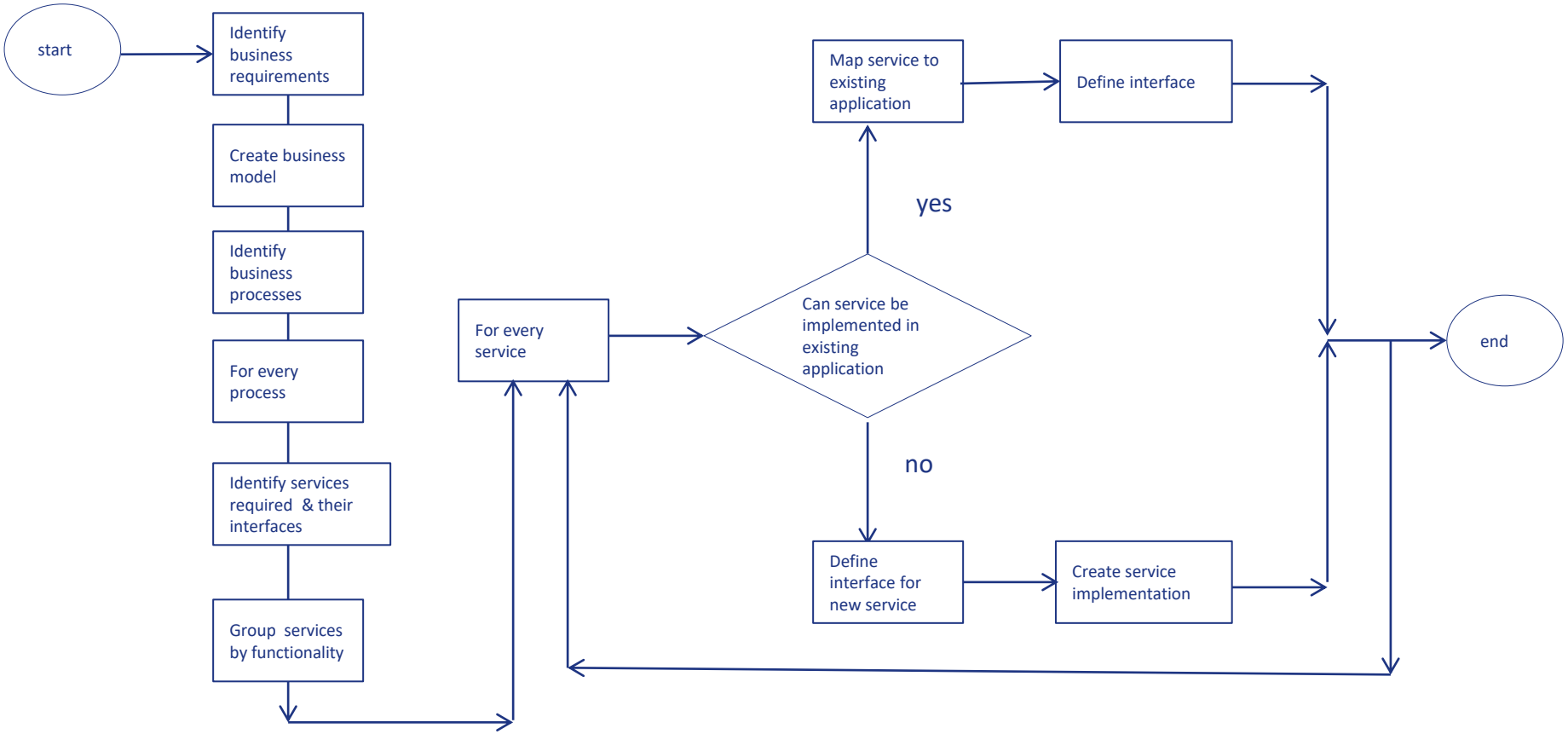
*The **business services** are the services provided by the business to its client. Clearly defining business services is necessary in order to be able to make a correlation between the services provided by the business and the IT that supports those services. Also the criticality of the service to the end client, will in turn affect the importance of the IT service*
(Source Spence & Michell 2011)

5.2 Business Service Analysis

6. Analysis

Architecture Modelling

Enterprise Architecture requires identification of business services
…If not defined by the client these can be defined based on the business processes



5.2 Business Service Strategic Value Model BSVM

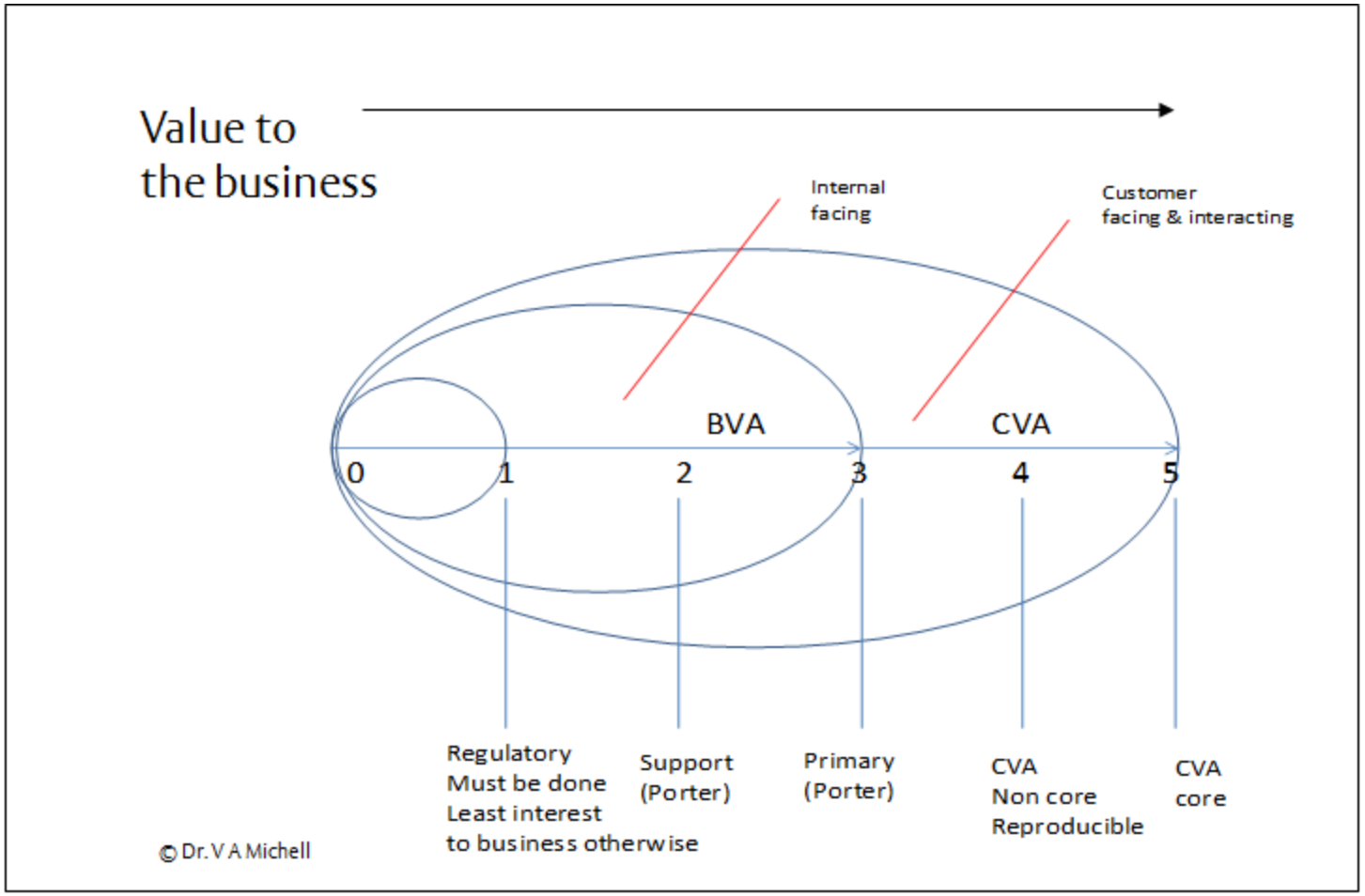
Not all business services are equal

…How can we rate the value of the business service to the business?

- Core competence client value adding (unique to business and highly valid to the client)
  eg Kecheng Semiotics Lecture – value to IRC/you the customer
- Client value adding (not unique but valued by the client)
  eg Standard lecturing service – deliver BTC lecture
- Business value adding primary – adds value to the business/supports client need internally
  eg setting up student records
- Business value adding secondary – adds value to business alone
  Eg university marketing
- Regulatory – required by regulators, adds little/no value to the business
  Eg data protection compliance

5.2 Business Service Strategic Value Model BSVM

Evaluate each business service on a value scale



5.2 Architecture Process Analysis

Architecture Modelling

Business Process ***A structured and defined sequence of activities that transforms a set of inputs (of specific value) to produce a specific output (of a different value)*** (CS27)
example *- Lankhorst 2009 pp118*

Business processes are based on the products and services produced by the organisation *Lankhorst 2009 pp95*

Example: Enterprise Management Processes

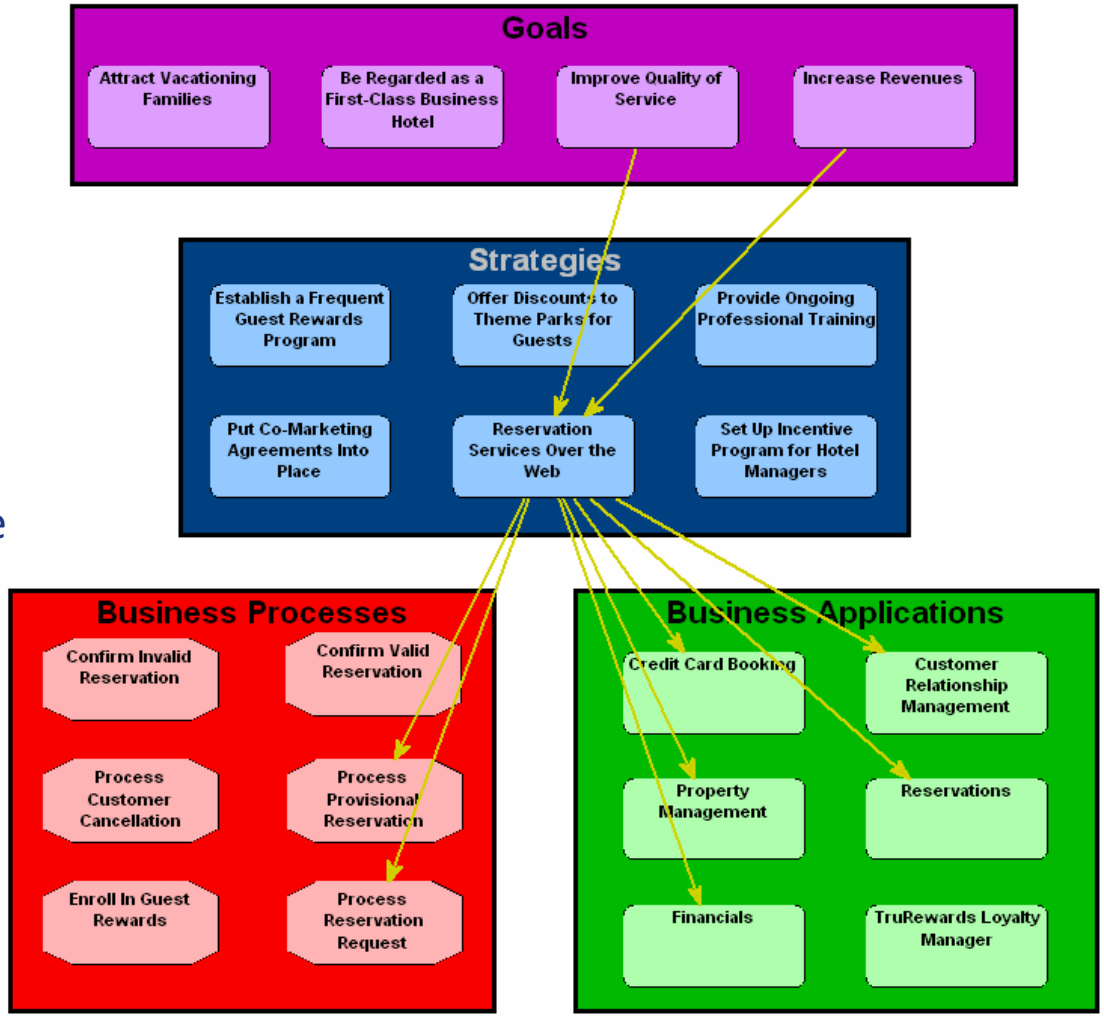
- Order Fulfilment
- Assurance
- Billing
- Selling
- Order Handling
- Problem Handling
- CRM Operations Support & Process Mang.
- Sales & Channel Mang.
- CRM Operations
- Market, Product and Service Management
- Operations
- Process Mang.

5.2 Architecture Process Analysis

Architecture Modelling

6. Analysis

Business processes and their linkage to applications:
Hotel Example - Source [EA74.128 fig4]



- Processes should be in the form verb-noun

Eg: 'Confirm valid reservation'

- Business applications may be used by multiple processes linked via services
(strategies in the client example)

5.2 IS Service - recap

Architecture Modelling

Application Service

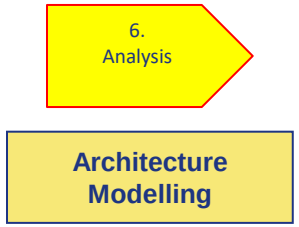
An externally visible unit of functionality provided by one or more components, expressed
Through well defined interfaces and meaningful to the environment,
Lankhorst pp101

Software Services *(i.e. software as a service concept - SOA)*

A Software service is a well defined self contained function fulfilling a particular business need provided by an application or module on request of another application Source:Strnadl C.(2006) Aligning Business and IT - The process driven architecture model *Information Systems Management*.]

Services are self describing open components that support rapid, low cost composition of distributed applications
[Papazoglou M.P. & Georgakopoulos D . (2003) Service Oriented Computing. *Communications of the ACM* October. Vol 46 No 10.]

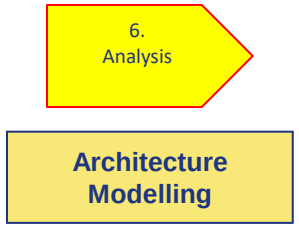
5.2 IS Service - Reality



But…SOA is still new to many businesses

- Still have legacy systems (non service oriented)
- Many applications or parts of applications provide services to business processes and to support business services

5.2 IT Inventory Analysis



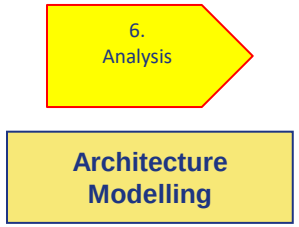
Information technology

The IT inventory is a list of the IT applications or software with relevant features for example

- *Functionality*
- *Performance rating*
- *Total cost of ownership*
- *Acquisition information*
- *Relationship to business services or processes*

The IT inventory is a valuable repository of data about what software is used by the business and where it is used

5.2 IT Inventory Analysis



Information technology in reality: (Spence & Michell 2011)

The term "IT Estate" is generally used to refer to the complete portfolio of technology used within a business – including applications and infrastructure.

If the knowledge of such an IT Estate is not encapsulated and maintained in some kind of "living repository", then the lack of corporate knowledge can be exacerbated over time by changes to personnel within the organisation, so that key knowledge as to what exists and for what purpose, is lost as people's roles change.

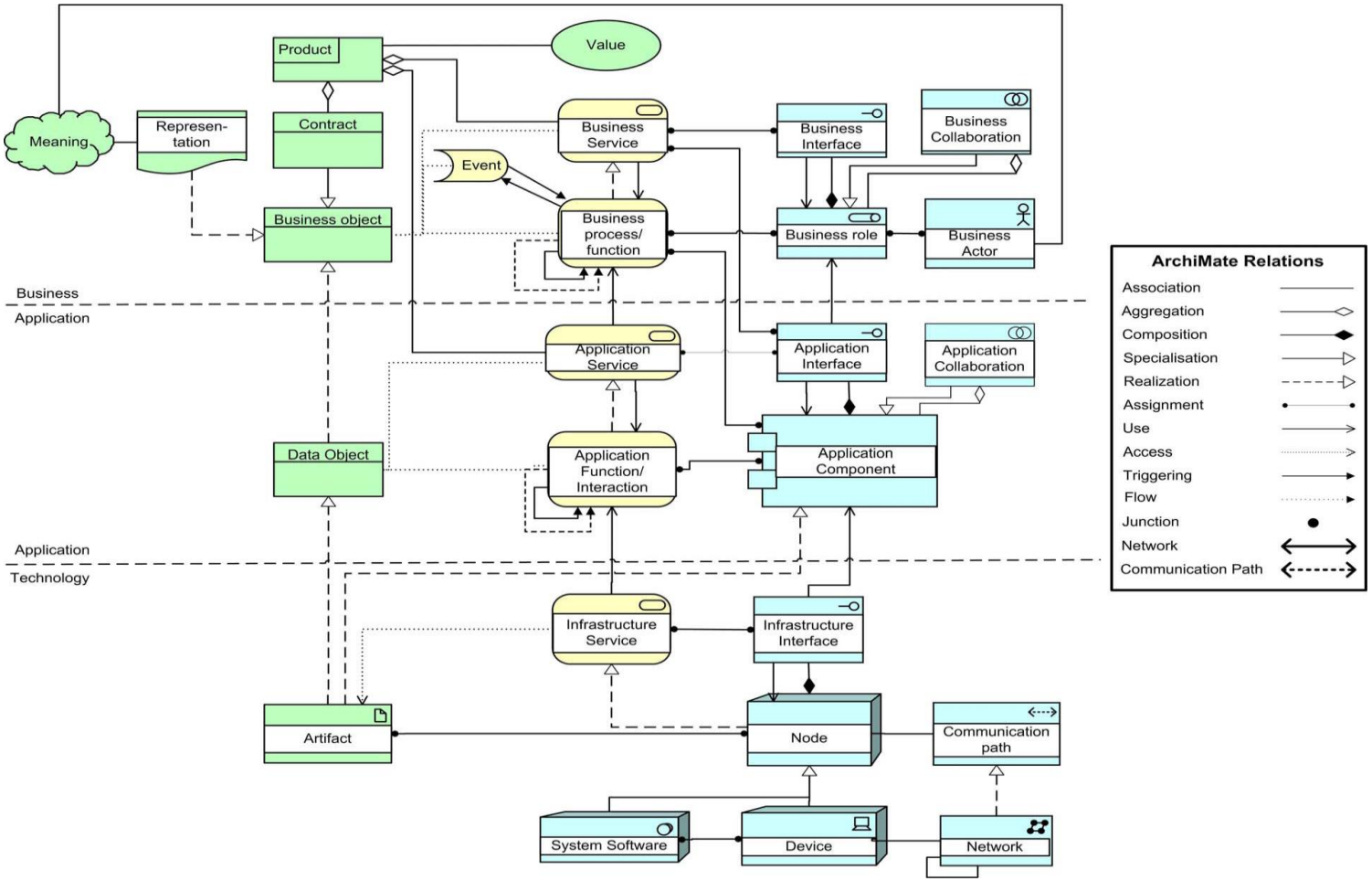
The federated nature of some large organisations can make this problem worse, because from the outset, no one part of the organisation ever has a complete picture of the business and technology architecture!

The best that can be achieved in these circumstances is that individual parts of the organisation try to document solution architectures that capture their piece of the picture.

5.2 EA for System Analysis

6. Analysis

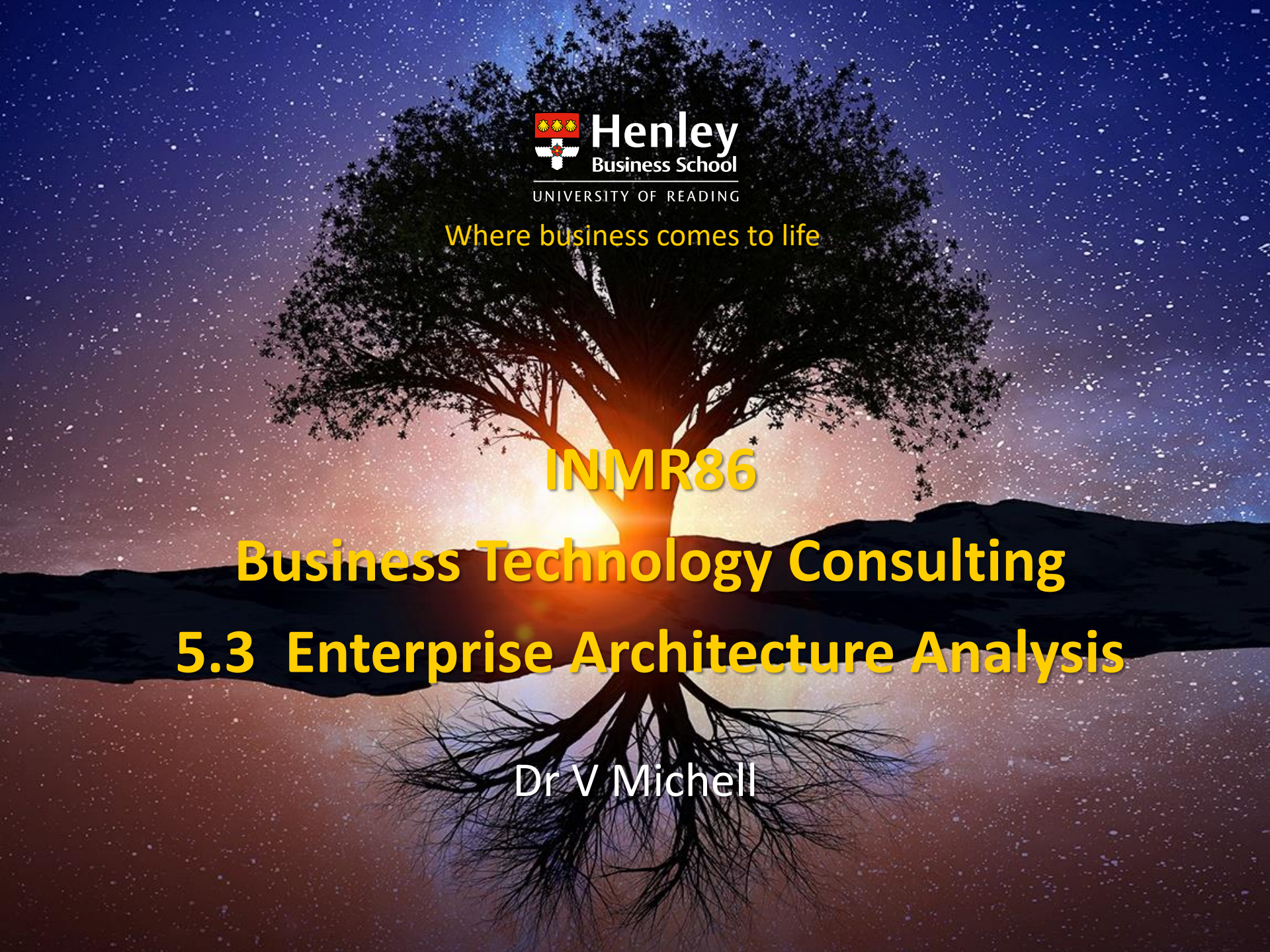
Architecture Modelling



Source EA77 Narmann P. et al Using Enterprise Architecture Models for System Quality Analysis

Exercise 5.2

6.
Analysis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5.3 Enterprise Architecture Analysis
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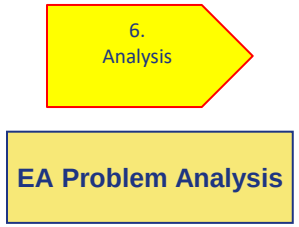
5.3 Analysis Parameters



What is to be analysed?

- Clients may have a range of problems for analysis
- You may identify a number of drivers to investigate based on client strategic problems

– examples we will review will include:

a) Cost

b) Rationalisation & standardisation: of IT, of processes#

c) Business-IT alignment

5.3 a) Cost Analysis

Problem Analysis

IT infrastructure and applications costs are growing see EA69:

The capital and recurring costs needed to build and manage the infrastructure can be a significant fraction of the IT operational costs an enterprise is trying to optimize.

- *infrastructure level, - trend towards increased consolidation and commoditization*
- *the system design needs to be optimized for utility functions targeted at*

the service-level agreements (SLAs) of the individual services as well as the total cost of ownership

Total cost of ownership TCO

= total cost of building/buying, licensing, maintaining IT applications or infrastructure

5.3 a) Cost Analysis

Problem Analysis

Real world example *(see Spence & Michell 2011)*
Many factors may contribute to a high cost of ownership of an IT estate;

For example, high costs associated with running applications in data centres could be traced back to costs for the actual infrastructure (servers, switches etc.)

…and costs for the datacentres themselves (cooling, power, rent etc.)

For the servers, then costs could be associated with both software and hardware – and the costs for both of these are likely to go up over time as the products on which they are based start to become obsolete and thus the subject of special (custom) support arrangements.

Eventually the products involved will become unsupportable, which transforms an issue with high cost into an operational risk to the business and its services!

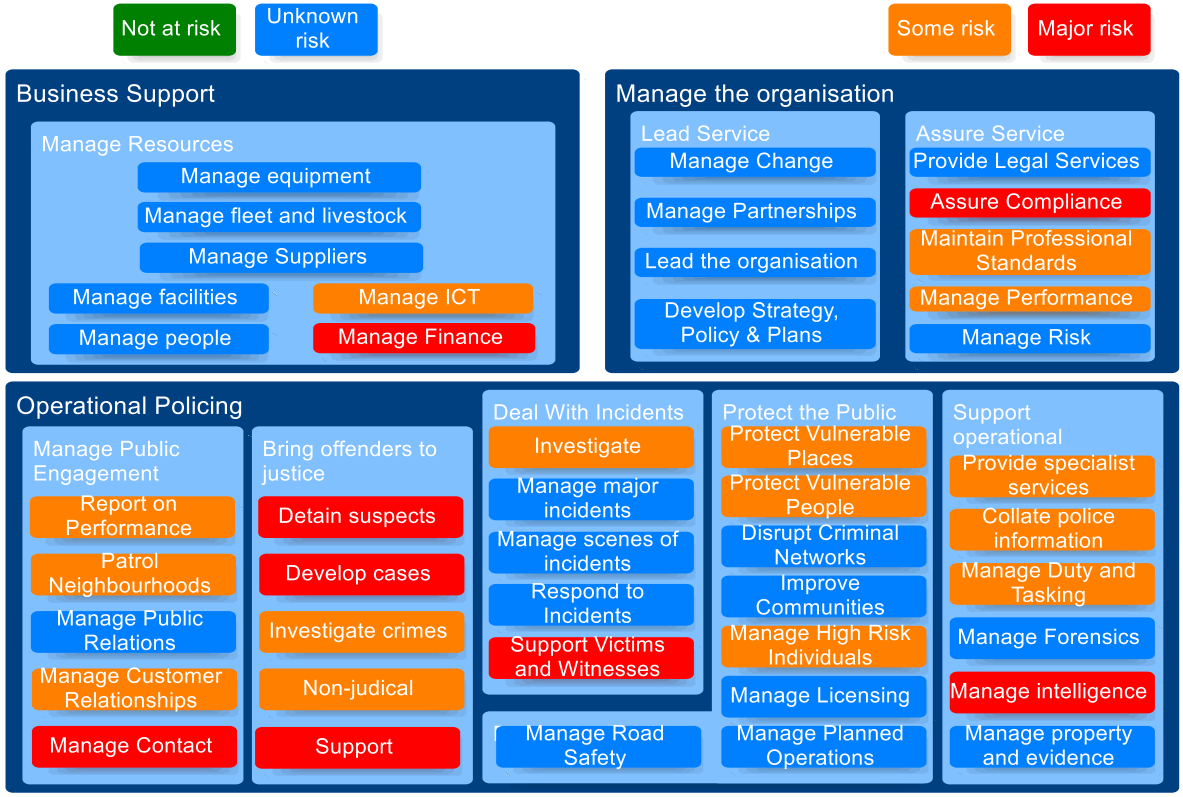
…So an EA approach could be used to identify IT and infrastructure inventories and related costs and risks to services

5.3 a) Cost Analysis

Problem Analysis

…So an EA approach could be used to identify IT and infrastructure inventories and related costs and risks to services eg:

Police Business Services Risk Heat map *(Spence & Michell 2011)*



5.3 b) Rationalisation & Standardisation

EA Analysis Approach - Example of EA mapped to client needs (Spence & Michell)

The **organisation** information allows us to represent the structure of an organisation, which is where the users of the applications reside.

Business Services: The business services were populated from a generic UK police business service architecture published by the National Police Improvement Agency, called the "Policing Activities Glossary" (NPIA, 2011). And represented graphically with a modelling tool

Applications: were defined by (or **Application Instances**) and **IS Services** (both taken from TOGAF). By definition, any two applications that are labelled as offering the same IS Services are duplicates; and one of the aims of that study was to aim for a „minimum set" of applications that gave the full range of required IS Services (functionality). Part of the business case for rationalising applications is of course the cost of running those applications,

This **infrastructure** resides in physical **locations**, which are important to know for a number of reasons, especially when part of the rationalisation design includes closing one or more data centres. *(Spence & Michell 2011)*

5.3 b) Rationalisation & Standardisation

What EA Standard to Use?

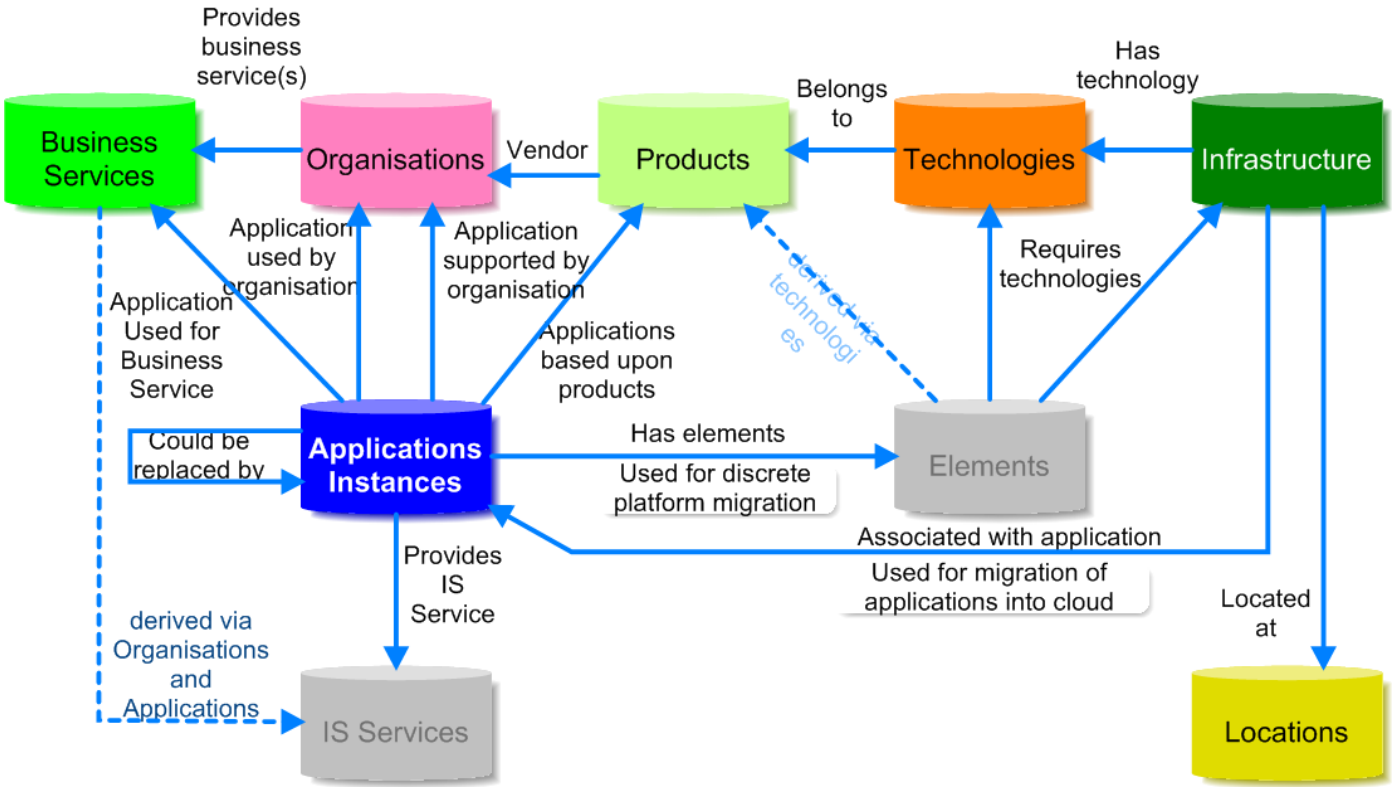
It is frequently necessary to adapt EA standards for different client situations. Reasons for this include:

(a) the client prefers a particular standard (e.g. TOGAF or Zachman (Noran, 2003) or one of their own frameworks

(b) there are requirements for a particular engagement that demand a change to the standard model.

5.3 b) Rationalisation & Standardisation

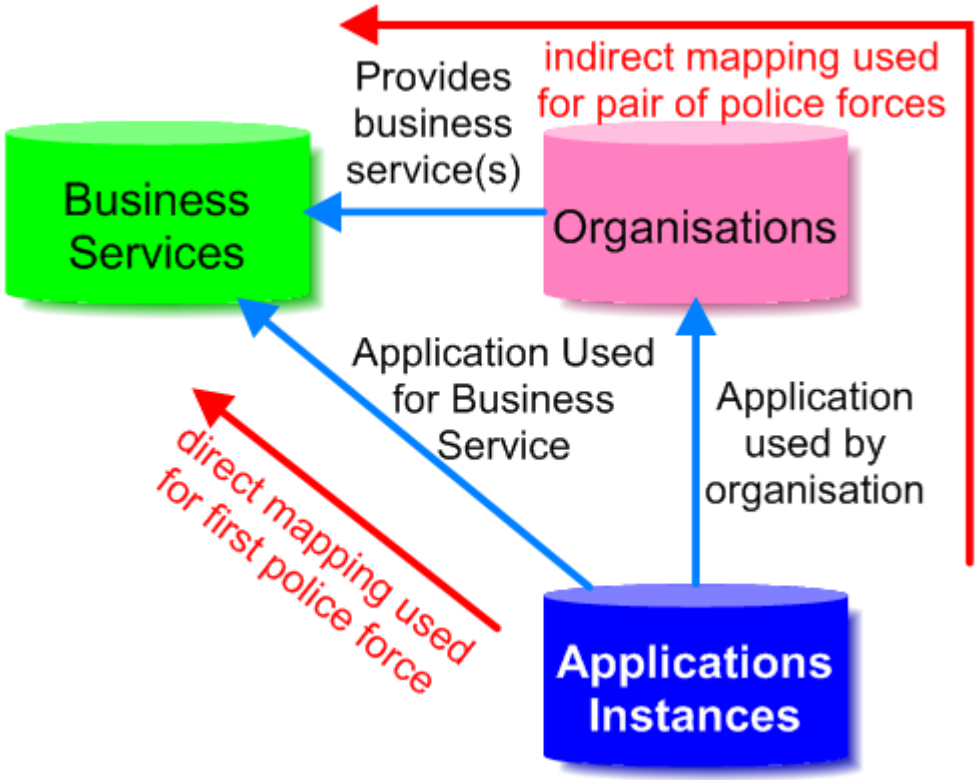
Sample Meta Model for Analysing Cost and Business Risk due to Obsolescence



5.3 Business Service Analysis

Architecture Construction

Adjusting to the reality of the client!



5.3 IT Inventory Analysis

Architecture Construction

Information technology **- adaptation of terms**

EA offers a dictionary of terms and relationships – may need to adjust to client/problem needs

Obsolescence as applied to technology (such as hardware and software products), using the definition previously offered, means "loss or impending loss of support for *hardware or software 'products'* that reduces their ability to continue to function in the organisation".

These products are produced by various organisations (vendors / manufacturers), who often specify a date beyond which support for their products will either cease, or become more restricted. *Note products refer to software products and need to be clearly defined as such!* *(Spence & Michell 2011)*

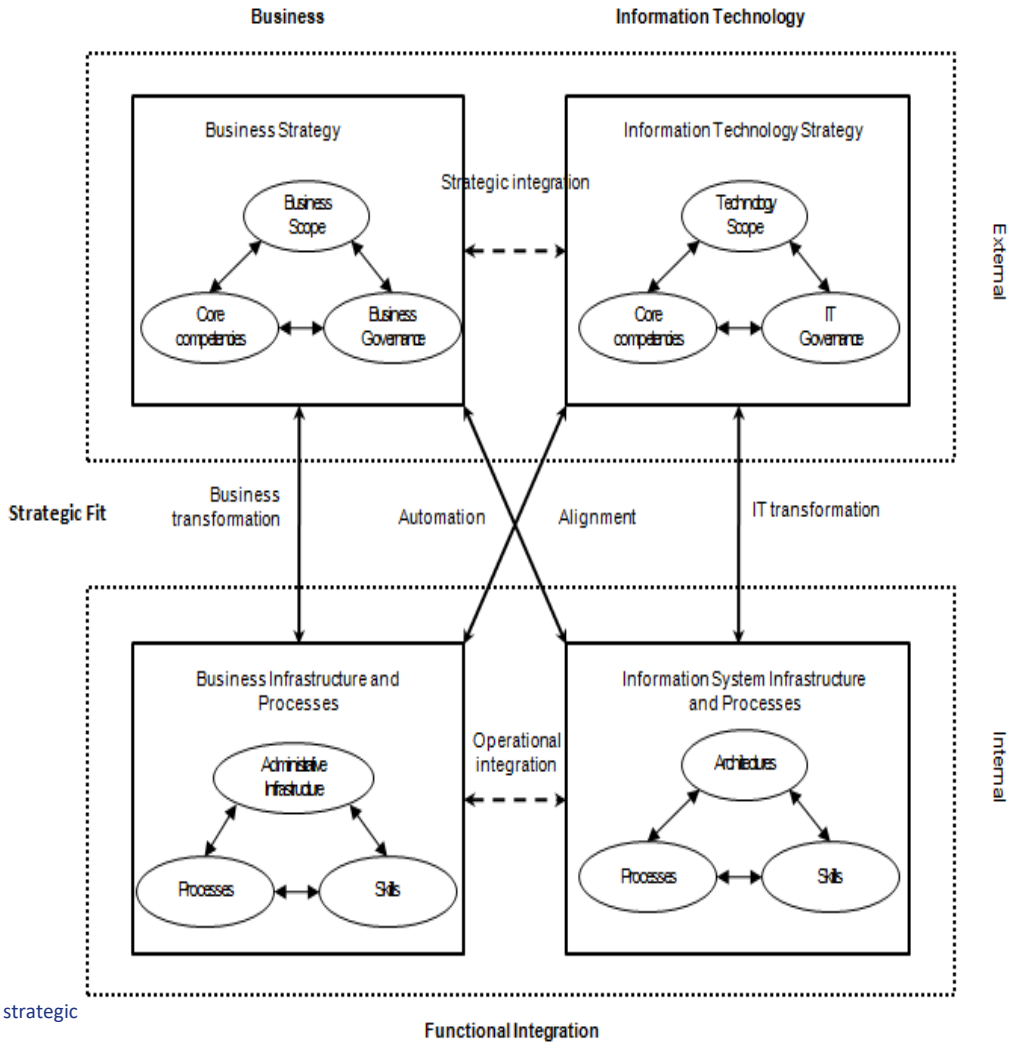
5.3 c) Business-IT Alignment Analysis

Problem Analysis

Henderson & Venkatraman

Business and IT infrastructure Must be aligned as must their strategies

…IT infrastructure must be aligned to the business activities to avoid ineffective and inefficient activity and ensure a competitive business



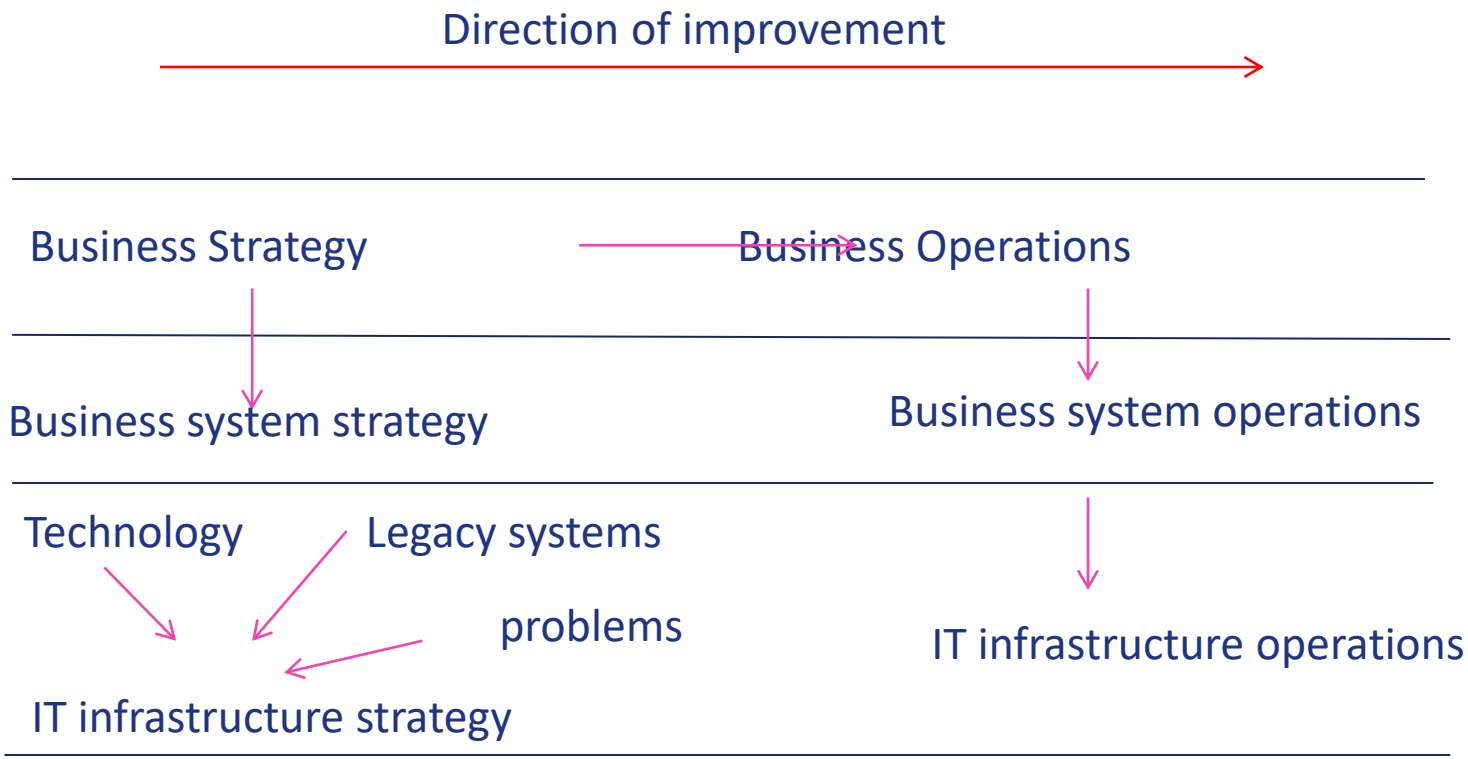
Adapted from: IS4 - Henderson J C & Venkatraman N - STRATEGIC ALIGNMENT - A framework for strategic information Technology Management - Sloan WP No. 303989-MS 1989

5.3 c) Why Business-IT Mis-alignment?

Problem Analysis

'Business processes drive decisions about business system architecture' [Lankhorst pp247]

…but infrastructure decisions are often not made with any business needs in mind
…and system development is often out of phase with infrastructure development



5.3 b) Business-IT Alignment

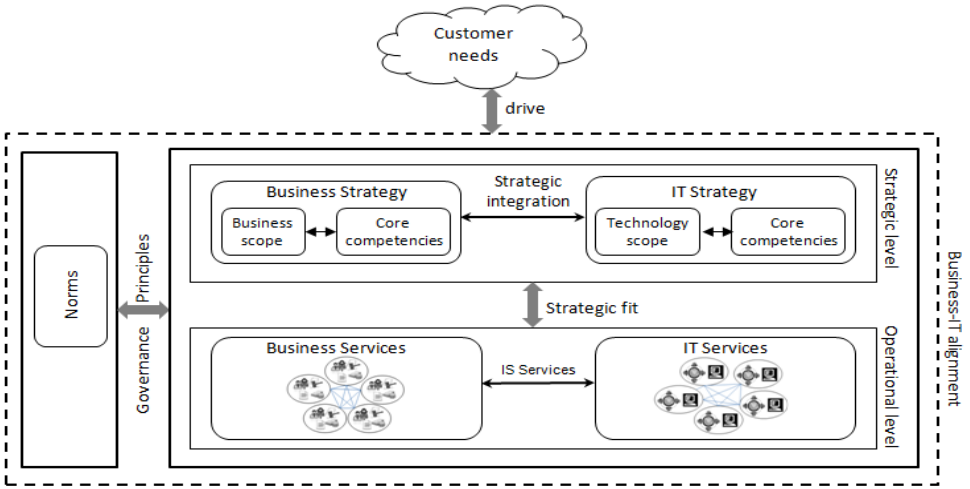
Problem Analysis

Business system alignment is achieved by aligning the system design department with the supported business operations [Lankhorst pp248]

… but strategic alignment is often not enough (Chen, 2008).

We may need to check the alignment of IT applications and systems with business services and processes

=> An architecture solution can help!

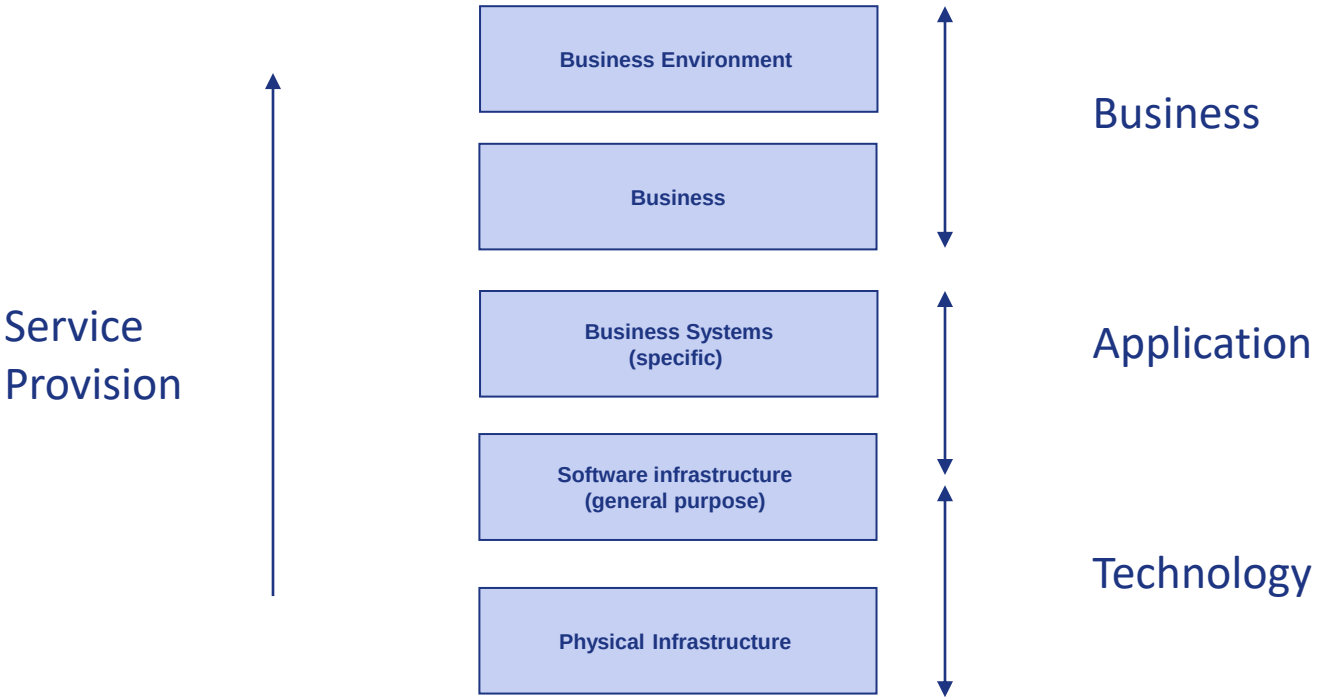


5.3 c) Business-IT Alignment

Problem Analysis

- A Layered architecture separates layers (process, IT etc)
- …But also links the artefacts as a set of systems that need to be aligned to the business
- Systems at each layer provide services to successive higher layers that can be measured

[source Lankhorst pp 238]



Exercise 5.3