Establishing an Enterprise Architecture (EA) Practice

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Overview

• Business Transformation and Enterprise Architecture (EA)
  - EA for the entire organisation or part of it?
  - EA for the creation of alliances, networks and virtual enterprises

• Translating management objectives into action
  - Enterprise Architecture programmes, projects and governance
  - What to do, when and where, who should do it, what are the tools and methods, and what competencies are necessary?

• Enterprise Architecture Practice
  - What are its elements, when and where to use them (including the adaptation of the best elements of available EA Frameworks)
Overview (cont’d)

• The life cycle and life history of the organisation
  - From concept to Master Plan and Business Plan
  - From Master Plan to implementation and continuous improvement

• Standards and Reference Models

• Positioning IT in the EA effort (App Services example)
  - Architecting IT and
  - Using IT for architecting
The role of EA in business transformation

- **EA as a discipline** (‘what do practitioners of EA do’? / EA practice)

  collection of knowledge for identifying, developing the concept of, specifying, designing, implementing, operating and decommissioning enterprises

  - in other words a collection of change- / transformation knowledge (tools, methods, models, techniques, etc)

  - the scope (cf ISO 15704:2000 / GERAM) includes both human and technical parts of the enterprise and applies to all ‘enterprise entities’ (company, division, department, group, network of companies, projects, programmes, products...)
The two meanings of the word ‘Architecture’

a) Architecture as a discipline

- The word *Architecture* is often used to mean what it takes to conceive, create, operate and maintain, and (at the end of useful life) decommission a system - everything involved from the beginning to the end of the system’s life.

*Sometimes we refer to this as ‘Architecture Practice’*

- This requires the identification and description of all activities involved in the complete life-cycle of the system (or system of systems).

- Such a description is called an architecture of ‘Type 2’
The two meanings of the word ‘Architecture’

b) Architecture as a structure

• **EA as a structure** (‘what is the architecture of this enterprise’?)

  the expression of how a system (e.g. enterprise) is structured into its functional constituents (human organisation and technology)

  - Human/organisational architecture
  - Information Architecture
  - Business Process Architecture
  - Application Architecture
  - Technical architecture
    (ICT-, Manufacturing- / Service- Systems Architecture)
Architecture as a structure (cont’d)

• The word *Architecture* is commonly used to mean models / descriptions that represent how a system is structured and how this structure implements the system’s function

  NB the enterprise is a system (a system of systems)

• Such artefacts (models / descriptions) are ‘*Type 1’* architectures. E.g.,

  - **Information Architecture** – conceptual data model, or *collection thereof*, and what human or machine systems implement these
  
  - **Process Architecture** – definition of how business functions are implemented through a structured application of underlying functions (called processes, i.e. structured/interconnected set of activities [‘steps’])
  
  - **Application Architecture** – structure of software application functions, and how they are allocated to sw modules and sub-modules
  
  - **Technology Architecture** (ICT, Manufacturing and Service equipment) – structure describing how machine functions are aggregated into systems and subsystems
  
  - **Human / Organisational Architecture** – how humans functions are aggregated into organisational roles
To aim of Enterprise Architecture (EA)

• The aim of EA is to create an integrated enterprise (i.e. enterprise integration - NB enterprise integration is not the same as ‘enterprise application integration’)

• Integration means that there is a connected and co-ordinated information (and material) flow within the enterprise

  - Information and material is there whenever wherever needed, in the quality and quantity needed

  - This applies to activities in the business processes that provide service (or produce goods) and to management and control processes (e.g. strategic, tactical and operational objectives are harmonised)

  - EA maintains this co-ordination throughout the life of the enterprise (e.g. during and after business transformation)
Business Transformation and EA

Business transformation is driven by:

- external factors
- internal factors

Transformation / change can be:

- Reactive
- Proactive
- Adaptive

- Change must be driven by a vision developed with the understanding of the present and future mission of the enterprise

- Vision must be communicated, understood, adopted by stakeholders: leadership is the key
Well managed companies have a pro-active strategy

- The enterprise’s strategy can be expressed as a set of high level objectives and how to achieve them; a **vision** is a summarised representation of these.

  - Modern management literature stresses the importance of the ‘Resource Based View’

Strategic objectives linked to (present and future) core capabilities and competencies

... realised in products / services that are competitive on the market

- Objectives must be confirmed by strategic analyses (risk, swot, industrial policies, supply chain / value chain, technology trends, workforce, investment efficiency, etc - i.e. various forms of planning)

- We need to know how to measure success and what is it that must go right otherwise the entire change process is jeopardised (critical success factors)
Some commonly followed objectives today...

- **Achieve Agility and Resilience** - create an enterprise that is able to adapt to changing business needs as a matter of course, without having to instigate ‘change’ processes. e.g. where mergers and acquisitions are not a major problem.

- **Optimise the underlying technology** (manufacturing, IT, etc) and create flexibility in technology use, so that changing business needs / business processes can be catered for.

- **Create organisational flexibility** (self organisation, rather then organisation by design).

- **Increase maturity** of the organisation (cf CMMI).
Some commonly followed objectives today (cont’d)

- Optimise business processes (efficiency, effectiveness)

- Introduce knowledge management to improve the use of human skills and knowledge and keep knowledge capital

- Create (new) core competencies (+ strategic outsourcing)

- Create (or participate in) a Network / alliance of enterprises, e.g. for supply chain integration

- Create / participate in Networks that develop a preparedness for future opportunities, so as to dynamically create ‘virtual organisations’ that respond to market needs
Vision: Set up a Network for creating Service Virtual Enterprises (SVEs)

The vision is based on a core competency of the MC that could create added value (remote plant monitoring and plant optimisation services).

Example

The MC has not always been able to support customers (mfg plants) during the operation of the Plant. MC has the vision to set-up a service network with partners such as OEM Vendors and local Maintenance Companies (strategic outsourcing).

Service Network Partners:
- Main Contractor (MC) [engineering company]
- Service Company
- OEM Vendor
- Non-network partners
- Customers (mfg plants)
Vision: use RPMS (Remote plant monitoring system)

Example

Instrument data are automatically transferred daily from plant to RPMS server through FTP protocol.

Data acquisition & Transfer system

Point data display

Graphic operation data

Receive&Demand

Analysis Data Setting/Display

Trend Data display

© TEC, 2002
Strategy of the Main Contractor Engineering Company

- **Objective:** create an enterprise network which has the *pool* of competencies and the readiness to create SVEs
  - Engineering company
  - Plant owners
  - OEM vendors
  - local service providers

  This ‘readiness’ includes trust, legal and organisational, technical, infrastructure, process preparedness

- **Objective:** for each plant and service type create an SVE on demand
  (alternatively a VE may be created for each service call, but this was considered risky at the time)
So how does EA help us achieve this transformation?

• It is impractical to try and change the *entire* business (and it is also usually not necessary)

• EA helps *identify* and *structure* the activities that must be done

• EA helps maintain a close link between the strategic objective and the eventual implementation of the change
to explain some basic concepts…
An Architecture Framework (AF) organises / describes everything involved in architecture practice.

Here are the basic concepts [cf ISO 15704:2000] that any AF should cover (even though their respective terminology may be different):

- Enterprise Entity
- Life-cycle, life-cycle relations
- Life history
- Modelling Framework
- (Particular) Enterprise Models
- Reference Models (‘partial enterprise models’)
- Enterprise Modules (components)
- Enterprise Engineering Methodology(ies)
- Enterprise Modelling / Enterprise Engineering Tools
- Enterprise Modelling Languages (and their semantic definitions: generic EM concepts)
The Life Cycles of Enterprise Entities are related.

**Entity A** (e.g. a factory):
- Identification
- Concept
- Requirements
- Design
  - Preliminary Design
  - Detailed Design
- Implementation (build)
- Operation
- Decommissioning

**Entity B** (e.g. product):
- Operation

The Life History of an entity consists of multiple, potentially parallel, sequences of events during the life of the entity.

**Life-cycle activities overlap (within / between sequences of events).** Each sequence of events is subdivided into *stages* separated by milestones (stage gates).

**Life Cycle ‘phases’ of an Enterprise Entity**

(note: life cycle ‘phase’ is *not* a temporal concept)
Modelling Frameworks (MFK) provide a means to organise the models / descriptions used throughout the life-cycle of the system in question.

As long as ISO15704:2000 requirements are satisfied, these MFKs, or in-house combinations of these, are suitable.
Most modelling frameworks tell us about the needed types of models / descriptions, but give different levels of advice about the scope

- ISO 15704:2000 defines scope requirements in addition to defining the types of models needed

- These requirements can be satisfied in conjunction with many known modelling frameworks
GERA modelling framework

Life-cycle phases

Views

Generic
Partial
Particular

Subdivision according to genericity

Instantiation

Customer service
Management-and control

Subdivision according to purpose of activity

Software
Hardware

Subdivision according to physical manifestation

Resource
Organisation

Subdivision according to modelling views

Information
Function

Subdivision according to means of implementation

Human
Machine

Subdivision according to means of implementation
Start with understanding your ‘Business Model’

Suppose this is the ‘entire’ enterprise (and its life-cycle ...)

How do we determine all the steps of change needed to achieve a strategic objective (which in turn is based on a vision)?

We want a Master Plan and an Implementation Plan

... which is feasible and
... to which the stakeholders are committed and understand

To change everything (Big Bang) is not feasible: we decompose the enterprise into its constituents and see what needs to change?
Legend for next pages

stands for
As the enterprise operates (AS IS) it transforms incoming goods and services into goods and services for its customers.

Who performs all these other activities?

identification
concept
requirements
preliminary design
detailed design
implementation
decommissioning

One task of management is to ensure that all of the above are covered by mgmt themselves, or by internal / external support and by establishing appropriate roles and responsibilities (individuals, committees):

Enterprises need EA capability
Before decomposing the enterprise into its constituents we need to remain just for a while on the whole-of-enterprise level.

The strategy is enterprise-wide and the change requirements need to be developed in light of the complete business.
Developing the ‘Business Model’ for the future

1. Identify the TO BE business with its mission, involved entities and their strategic relationships (take into account the extended enterprise, in-house and relevant external infrastructure)

2. Develop the business Concept (vision, strategic objectives and major policies and principles and critical success factors that should guide, and argue the why, of the transformation, e.g. through AS IS analysis)

Leadership is essential: gain wide stakeholder support (consultation / common understanding)

Need champion and sponsor of change (NB the origin (idea) of the strategy may be at various levels of the organisation and is sometimes informally communicated - i.e. not only official channels)

1+2 is strategy making (usual strategy making activities are involved)

The arguments should be supported by an analysis of the impact of change
At this stage ...

• There is a champion, a sponsor

• ‘Pre-feasibility study’ has been informally conducted and basic strategic analysis has confirmed strategy (1+2)

• Stakeholder consultation has taken place and support has been gained

• At this point there is no formalised organisational host yet for the change (only the champion and the sponsor)

• Now the sponsor can help establish a formal organisational host - could be at Headquarters level or be part of a ‘lead constituent’ (division, department that has established influence within the organisation and is trusted by the rest of the organisation; usually the champion is from this element)

Example: EA Office + Supervisory Board
Establish a formal organisational host (We go through the entire life-cycle of this host (EA Office + Supervisory Board))

- Define their tasks (mandate), policies, responsibilities, decision making processes / procedures / authorities,
- Determine Personnel roles (including skills / knowledge requirements)
- Determine / Select IT and logistic support needs (office, admin, tools, budget)
- Determine training needs
- Train, assign personnel, deploy tools, establish accounts, assign admin personnel
Enterprise AS IS

- As-IS but with new draft strategy

+ EA Office & Supervisory Board

Enterprise + confirmed strategy

**EA Office and Supervisory Board start operating**

Main task at this stage is to **confirm the strategy**

Conduct feasibility analysis and any other strategic analyses deemed necessary

May need to perform *some* AS-IS analysis as part of this activity (e.g. maturity, market, etc)

As a result of this, the confirmed / refined strategy has stakeholder support and understanding, and can be **actioned**
EA Office + Supervisory Board with the participation of Strategic Business Units (SBUs) and possibly (external) Service Providers

Define Information and Process requirements

... for the business domain that is deemed to be in need of change
... on the whole-of-enterprise level (NB business processes cut across SBUs)

IMPORTANT NOTE: this step may not have to be performed before the next if change can be clearly localised to part of the enterprise!
3. Requirements - Information and Process reqmts are best developed on the whole-of-enterprise level

- **Information requirement** models can be captured as **Information Schemata** (conceptual schemata - e.g. Entity Relatiohsip / UML Class Diagram, IDEF1X, etc)

- **Process Requirements** can be captured as **Process Models**. These typically cut across several SBUs and also call (rely on) APP Services

- The two are related, because processes use and produce information thus the above requirements need to be co-developed

  Reliance on existing database schemata
  Reliance on existing data definitions (of data not stored in databases)

- **Information requirements**: not only an integration of existing schemata - must apply quality criteria, design optimisation principles, plan for maintainability and possibilities for extension. **Piecemeal, by domains of business function to carve out realistic projects**
4. Architecting – a ‘Business Model’ is a particularly useful way to represent strategic relationships, what needs to change, why, who should do it, when, where and how.

The AS-IS and TO-BE Business Models would not be completely different – this localises the change’s scope.

Steps 1 + 2 can be done by the champion and sponsor (who can be the business owner or top mgmt with the approval of the business owner).

This step (4) will need
a) A small group of people (who can involve and activate stakeholders from the rest of the business) and
b) A body that supervises the project / programme (governance)

EA group (a)
EA supervisory board (b)
EA Office with the participation of Strategic Business Units (SBUs) and possibly (external) Service Providers + Supervisory Board

Create an architectural (structural) decomposition of the Enterprise

On the high level this can be expressed as a ‘Business Model’ (BM)

The BM is a structural model of the enterprise but also shows the life cycle of the constituents

One can ‘read’ the methodology to be followed in the change process
Note

• **3 & 4 do not have to be carried out in sequence!**

• The Business Model, which is a draft of (4), can be developed **ahead of time** and through this the scope of change contained

• Subsequently it is possible to re-visit (3) [the requirements] but localise the development of the requirements to the domains that need change (or are in some way involved in the change through ‘spill effects’)

• The outcome of (4) is a Master Plan, including the Information-, Process-, Technology-, Application- and Human / Organisational Architecture(s)

• In practice we **rarely carry out a complete enterprise wide Master Planning exercise** (except perhaps for green field enterprises, however, in that case we rely on a previous similar enterprise’s Master Plan)
A Business Model (TO BE example) -
the enterprise is identified as a system of interrelated entities
Suppose that in steps 1 + 2 HQ determined the business objective to optimise Application- and Data Services.

HQ identifies and develops the concept of the new Application- and Data Services.

HQ identifies, develops the Concept of, and defines the Requirements, of an **EA project**, creates the project, and is involved in the supervisory mgmt of the project.

The Project designs and implements the Application and Data Services.
The TO BE enterprise as one system

The (HQ/EA Office) of the enterprise identifies and develops TO BE concept and ‘Business Model’

The (same) enterprise decomposed into a system of systems (‘Business Model’)

5. HQ/EA Office of enterprise creates a focused EA project

The project develops the Information and Process Requirements of the enterprise (limited to the business domain in question)

Note EA Project as a new business entity!
It is possible to mark up this ‘Business Model’ (the model of the business) showing enterprise entities that need change or that need to be created.
The ‘Business Model’ diagram representing the ‘architecture of the business’ includes operational and strategic relationships.

The change may end up making organisational and policy changes across the enterprise (SBUs and including HQ) and introducing new decision making processes.
HQ / EA office identifies and develops Concept* of App Services (AS) (derived from enterprise concept)

... defines the Requirements (the scope of functions) of App Services

... this includes the service function that App Services will provide to Business Units and the mgmt function of App Services

... also the definition of information requirements on APP Services’ interfaces

* Note contents of ‘Concept’ for an entity (see slide 26)
6 Execute Project ...

(Informed by AS’s Concept and Scope)

A Project specifies App Service Requirements

App functions, interfaces and their information content (as defined in Information Schema) & protocols to access Apps (e.g. through SOAP)

Service descriptions (e.g. using WSDL)

B Project architecturally designs AS

... (re) aggregates App functions into App modules (cf ‘App Architecture’)
... defines how App functions use Data Services (as defined in “Info Architecture”)
... defines human functions (roles / job descriptions) & processes, policies, procedures (mainly for mgmt roles in this case)

App Services may be 100% automated (or almost)

However mgmt of services needs greater human involment
Architecturally designing Application Services

- An important problem today: application programs being tied to business processes

- A recurrent strategic objective is to change this situation, in hope of
  - Implementing and separately maintaining applications as services
  - Implementing a business process design, management and execution service, so that business process implementations (e.g. workflows with suitably designed user interfaces) can invoke application services

- Usual problem: there are too many applications which support essentially the same function or there are large overlaps

- Therefore a profile cleaning is necessary

- The same is true of databases (must be done in phase 3!)
Cleaning application profiles

• The enterprise needs a stocktake of functions supported by applications (and associated databases)

• Decision needs to be made as to
  - what functions to aggregate in the TO BE applications
  - what functions to remove from existing applications

• A catalogue needs to be maintained of application functions for future decision making (when new business requirements suggest that new applications may be necessary)

• This decision making needs organisational roles and associated approval processes. Thus the change may end up making some organisational and policy changes across the enterprise (SBUs and including HQ)!
The role of Reference Models in this process

- The development of models of processes / information / resources etc on all levels of the enterprise entities involved is
  - Needs Time
  - Needs expertise / skills
  - Needs quality assurance
  - May result incompatibility with the broader business environment

- International, industry / de facto standards need to be used and adopted and / or adapted if needed
Partial enterprise models / reference models (reusable trusted components)

Reference models can be:
- Policy level
- Function / task definitions
- Process / Information
- Model level
- Architectural Design level (Typical IT structures, Organisational Styles, Professions, etc)
- Detailed design level (e.g. protocols)
- Implementation level (e.g. language bindings)
Forms of Partial Models / Reference Models

- **Typical earlier concrete cases** - these can be modified, adapted to fit the particular case

- **Fill in the blank** - available on various levels of abstraction or detail (e.g. list of functions $\rightarrow$ activity model $\rightarrow$ process model)

- **Model building blocks** - tested model components ['Lego'] and rules of combination

Examples...
Agreed models speed up project formation and make project execution and costing more predictable.
Agreed models speed up and improve the quality of the design, however, the EA project must carry out this adaptation / specialisation / completion.
Note

- Often there are applicable standards for the same area
  - ISO 12207 (SW development processes)
  - ISO 15288 (system Life Cycle Processes)

  harmonisation still in progress

- Until this is achieved, the end user needs to make a decision which one to use / how to combine these
Execute Project (cont’d) ...

C Detailed Design of App Services

- Language binding of interfaces
- (Re) Packaging legacy Apps into new protocols
- Coding (if necessary)
- Coding Service Descriptions
- Coding workflows (if applicable)
- Coding relational or XML implementations of data

D Build App Services

- Training / assigning personnel
- Commissioning, testing, integration of App modules
- Decommissioning (some) old modules
- Releasing App Services into Operation

SBUs and external service providers contribute to the execution of the Project
An often neglected part is organisational (re)design

- When processes, policies and procedures change the organisation may also have to change
Future direction in reference model development: use of the agent paradigm for organisational design

Agent: Autonomous (human, artificial, hybrid) entity with the following properties

- **purposeful** - displays goal seeking behaviour
- **autonomous** - can decide a course of action (plan) to achieve the goal
- **reflective** - can represent and reason about the abilities and goals of self and those of other agents
- **able to act** - can mobilise its resources to act on its plan
- **adaptable** - can recognise inadequacy of its plan and modify it, or change its goal
- **conversational** - can negotiate with other agents
- (sometimes additional characteristics are listed)
The organisation as an agent

- Individual humans in the enterprise are agents
- A group of people (higher organisational entity) should also behave as an agent
- We want the organisation and the network to have agent properties

Goal: The aware enterprise
• **Granting adequate level of autonomy**

  – ‘underqualification’: task description does not match the abilities of agent

  – ‘overqualification’: the *controlling* (!!!) agent is unable to specify the task on high level, and the controlled one cannot accept it on too low level

  in both cases there is a ‘band of tolerance’
• The dynamic organisation is not predefined, but is created or re-created for the objective / task thus the types of objectives achievable by the dynamic organisation are much wider

• The dynamic organisation does not experience as much turbulence

• The dynamic organisation defines the rules of the game and strictly enforces them
Forms of organisations with similar aims

• Fractal factory (the organisation is built of elements where the rules of combination are the same on any level of complexity)
• Holonic manufacturing (each manufacturing cell is an autonomous element which is part of a the higher level autonomous entity etc.)
• Virtual Enterprise (the supply chain of the extended enterprise is managed as if it was a single enterprise management displaying agent properties)
How multiagent ‘control’ works

Negotiate (A-F) to do ‘c’ in future

F: Propose to do ‘c’

A: grant request
States of conversation: 1. Start  2. Proposed  3. Accepted  

Utterance source:
\(<\text{performative}\>\) : uttered by Agent A
\(<\text{performative}>/\) : uttered by Agent B

Cf FIPA protocols
www.fipa.org
Allocation of people to roles

“Organizational design is the purposeful specification of relationships” (Wheatley)

Organisational design profiles (Keidel, 1995)

Choices decide the character of the organisation
Choices in style of organisation

• Strategy formation: decompose top level strategy to operational goals (control)? Use consensus based strategy making style (co-operation)? Individualistic directions (autonomy)?

• Layout: segregate people by function (control)? Establish team-spaces (co-operation)? People in separate rooms (autonomy)?
**Choices in style of organisation (cont’d)**

- Reward system: establish role-based salary ladder (control)? Use team-based reward system (co-operation)? Reward individual excellence (autonomy)?

- Decision system: direct line of command (control)? Team decision making (co-operation)? Delegate decision authority (autonomy)?
These patterns decide what the organisation is like

- Some patterns that work for traditional organisations do not work for virtual organisations
  - Co-location: not an option
  - Autonomy: on operational level yes but co-operation and control on higher levels
  - Strategy making: style depends on relative strength of participants

Must carefully consider the mix of these options
We specify the functions then the processes of the operation
We must also specify the functions and the processes of the management and control of each entity ... HOW?
GRAI GIM Reference Model

Management & Control (Command and Control)

Service delivery and / or production (operations)

Decision-support management information system (MIS)
To manage the production system the ICOM of the transformation that takes place in the production must be provided.

- **Input** (when and where accessible by resources under the control of resource management)
- **Machine, human, resources** (available for resource management to control)
- **Controls** (provided by resource management in real time to transform input to output)
- **Output** (when and where produced by resources under the control of resource management)
Categories of decision functions

- Management of product (I/O)
- Management of resources (M)
- Planning and co-ordination (C)

Instead of straight away producing a process model of management and control from scratch (e.g. using IDEF0) we use a generic reference model to identify the types of management functions needed.

This give quality control (makes sure we do not forget to include important functions)
Decide on product strategy (what when for which type of customer, what region, price category, ....)

GRAI GRID - to model the management of the enterprise

“control” is the real-time mgmt of resources
Decide on resource strategy (humans, assets, capital / machinery, infrastructure…)

GRAI GRID - to model the management of the enterprise

“control” is the real-time mgmt of resources
Decide on strategic direction (product driven, resource bound, …)

GRAI GRID - to model the management of the enterprise

“control” is the real-time mgmt of resources
Decide on product tactics (production plans, advertising plans, distribution plans…)

GRAI GRID - to model the management of the enterprise

“control” is the real-time mgmt of resources
GRAI GRID - to model the management of the enterprise

Decide on product tactics (production plans, advertising plans, distribution plans…)

“control” is the real-time mgmt of resources
GRAI GRID - to model the management of the enterprise

Decide on resource plans (leasing, buying, maintenance, hiring, training,...)

“control” is the real-time mgmt of resources
GRAI GRID - to model the management of the enterprise

“control” is the real-time mgmt of resources
Decision centre

$DC_1$

decision framework of $DC_1$

(OBJECTIVES, CONSTRAINTS AND DECISION VARIABLES)

inputs (intra- and inter system)

decision frameworks provided by $DC_1$ to other DCs

outputs (intra- and inter system)
Decisions are taken by Decision Centres (DC)

- A decision centre (DC) aims at achieving a set of objectives
- A DC has a decision framework which consists of
  - objectives
  - decision variables
  - constraints
Question:
Suppose we have a good decision system, what should be the organisational structure?

Answer:
Map the organisation on this (GRAI) GRID
Decision Roles

co-ordination

co-ordination
Relationship between decision system and organisation

The protocols used between Manager and Managed Roles decide the style of organisation (cf org. patterns, slide 62)

Decision (management) jobs

Decision system: roles

Organisation: assigning people to roles
Co-ordination

Flat hierarchy
Strong over-managed hierarchy
Flat hierarchy with conflicting roles
Skill mismatch in jobs. Skills for upper level management functions often are different from operational level skills.
Paternalistic management (person in the job is not given enough autonomy)
Notice that the EA project develops the requirements specification of **Information** and of **Processes**

Both of these *cut across* multiple enterprise entities (since business process activities are performed by SBUs)

... therefore the contribution of SBUs to the project is essential from phase (3)

SBUs must contribute to the definition of information and contribute to the definition & validation of processes

The EA project also makes changes to company-wide policies (e.g. regarding new technology investment decision policies and processes)

In this way the EA project makes a lasting impact (the enterprise will have a built-in capability to maintain a clean technology profile)
The Business Model can be used to ‘read’ the methodology to be followed

• This will be demonstrated through an example
The TEC Business Model

- Identified the need and a vision
- Determined the strategy to satisfy these needs and achieve the vision
- Identified the enterprise entities involved & their relationships (and represented these through the ‘Business Model’)
Identify Business Model for Network

- In this activity, the initiating partner:
  - refines mission and vision of business opportunity
  - selects and defines the network strategy
  - develops the business plan to create the service network

- This activity may be triggered by a customer request for a future set of services or a business opportunity identified by the initiating partner.
Lead Partners

Initiating Partner

Develop Master Plan of SNO

Service Network Org (SNO)

Reference Model for Qualified Suppliers (RMQS)

Pool of Potential Serv. Providers

Reference Model for Qualified Suppliers (RMQS)

Qualified Serv. Providers

Plant OEM vendors

Selected Vendors / Suppliers for SVE

Service Virtual Enterprise (SVE)

Plant (factory)

Selected Vendors / Suppliers for SVE

Initiating Partner
Develop Reference Models for Service Virtual Enterprises (SVEs)

- In this activity, the partners and SNO:
  - Identify the necessary VE types
  - Develop the master plan for SVEs
  - Do detailed design of common parts of all SVEs
  - Select qualified suppliers to participate in future SVEs

- The major outcomes are:
  - Common reference models for all SVEs
  - Qualified suppliers

Bernus, Noran, Baltrusche, Schodde, Riedlinger, 2002
Develop Qualification criteria (process, policy, infrastructure, etc) for network membership
Select Partners and Create Network

- In this activity, the initiating partner:
  - Does preliminary design of Service Network
  - Does detailed design of Service Network
  - Sets up Service Network

- The major outcomes are:
  - Service Network Office (SNO) is created
  - Strategic Partners are selected
Lead Partners

Initiating Partner

Service Network Org (SNO)

SVE Reference Model

Service Virtual Enterprise (SVE)

Plant (factory)

Pool of Potential Serv. Providers

Reference Model for Qualified Suppliers (RMQS)

Qualified Serv. Providers

Build SNO

Selected Vendors / Suppliers for SVE

Plant OEM vendors
Lead Partners

Initiating Partner

Service Network Org (SNO)

Identify Need for an SVE

SVE Reference Model

Selected Vendors / Suppliers for SVE

Pool of Potential Serv. Providers

Reference Model for Qualified Suppliers (RMQSV)

Qualified Serv. Providers

Plant OEM vendors
Create SVE (incl. selection of vendors, suppliers)
Design a Particular SVE

- Select suppliers from qualified pool
- Select suppliers for particular SVE
- Design components specific to particular SVE

- Customer request for future set of services
- Service network
- Service network office

- IDEF0 context

In this activity, the partners and SNO:

- Do identification, concept and requirements lifecycle phases of a particular SVE
- Do detailed design of specific components for the SVE
- Select suppliers for a particular SVE from the qualified pool of suppliers

The major outcomes are:

- Suppliers for the particular SVE are selected
- Detailed design for a particular SVE is completed
Build and Operate SVE

In this activity, the SNO:
- forms a particular SVE
- operates a particular SVE and responds to specific customer requests
- Monitors the performance of the SVE

The major outcomes are:
- notifications to change the SVE
- notifications to decommission the SVE
- production of service history logs
- service results (which is the actual purpose of the SN and SVE)
Initiating Partner

Lead Partners

Service Network Org (SNO)

Service Virtual Enterprise (SVE)

SVE Reference Model

Pool of Potential Serv. Providers

Reference Model for Qualified Suppliers (RMQS)

Qualified Serv. Providers

Selected Vendors / Suppliers for SVE

Plant OEM vendors

Provide after sales service / operational support to plant

Plant (factory)
From Business Model diagram to particular methodology

- A step by step process that TEC was able to follow to successfully create the Service Network and virtual Service Enterprises

- The process (methodology) could be ‘read’ from the Business Model diagram and was detailed in IDEF0

- Subsequently the process was translated into a Gantt chart so as to plan the change process
The ‘business model’ may also be expressed as a set of interrelated life cycles and life histories.
Toyo Eng Offers Remote Surveillance Of Overseas Plants From Japan

TOKYO (Nikkei)---Toyo Engineering Corp. (6330) has started a service to monitor the operating conditions of overseas chemical plants from Japan, company sources said Monday.

If problems occur, the firm will propose to customers how to repair and improve the facilities after analyzing the data.

Although a broad range of domestic makers of gas turbines and other equipment have adopted remote surveillance technologies for their factories, it is rare to provide a service to monitor the operations of overseas plants.

The company has begun to monitor a plant in Palembang, southeastern Sumatra, of Indonesian fertilizer maker P.T. Pupuk Pusri by using a communications system linking the facility with Toyo Engineering’s headquarters in Japan.”

(The Nikkei Business Daily Tuesday edition)
海外プラント
日本で監視

東洋エンジニアリングは、海外で受注した化学プラントを完案する。遠隔監視は割合のギャップなどを手伝うが、プラントを日本から監視するサービスを提供している。このプラントは、インドネシアの肥料プラントで、マトラ島東南部のバレンバレ農業用の肥料用として使用されている。このプラントは、東洋エンジニアリングがサービスを提供し、プラントの遠隔監視サービスを通じて、プラントの状態を監視することができる。
Summary

• The business model is a map of the enterprise and represents both operational and strategic relationships among the involved entities (SBUs, Projects, Programmes, Products, External Service Providers).

• The Business Model shows the life cycle activities of all entities and guides us to define the role of entities in the change / transformation of the enterprise.

• Each entity has a modelling framework.

Note the recursion in the decomposition of the enterprise into constituents - this can be repeated for each entity in turn!
Summary

• A Modelling Framework informs us about the outcomes of these life-cycle activities (models / descriptions) - content and scope and Reference Models should be used along the way

• Make sure - whichever EA Framework you intend to use - that you are aware of all the ISO 15704:2000 / GERAM requirements
Thank you

Questions?

Visit http://www.cit.gu.edu.au/~berkus to find out more about the