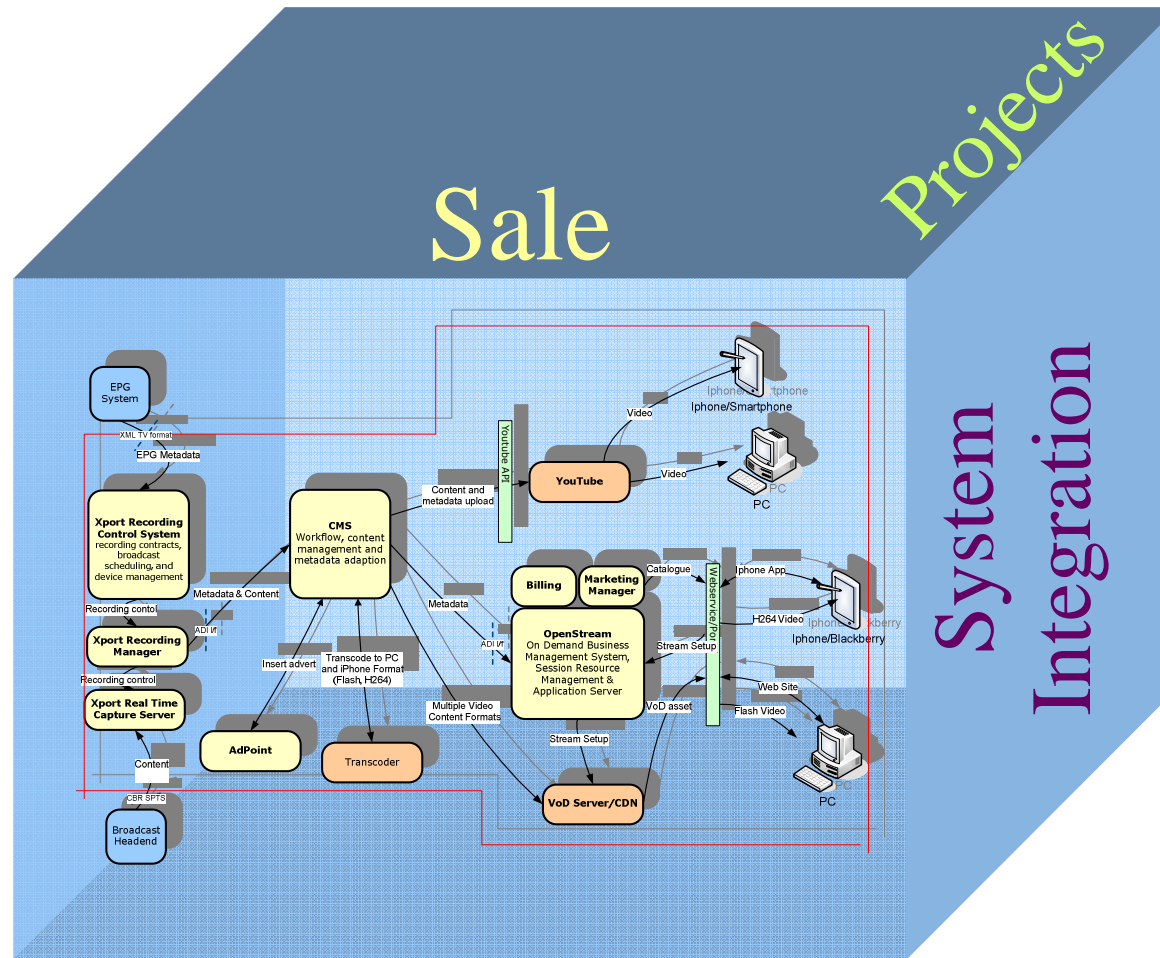# System Engineering for selling System Integration projects

The value of the System Engineer role after the development process
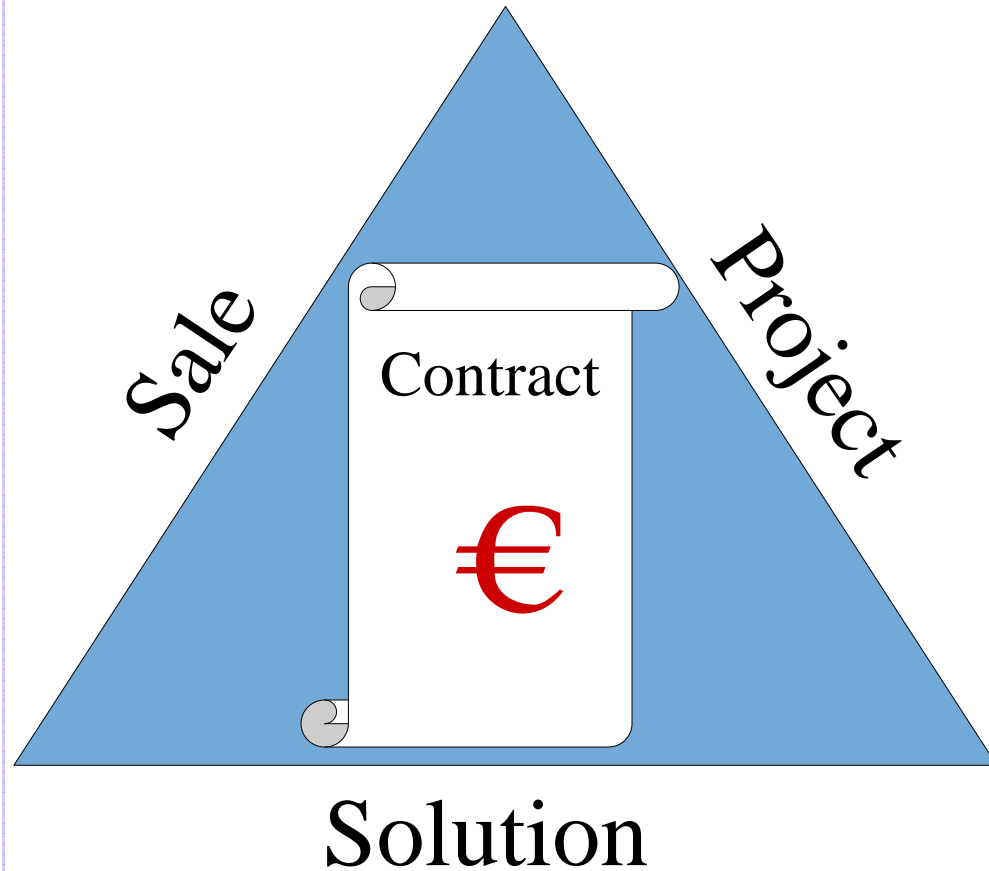
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https://sites.google.com/site/systemengineeringitaly/

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Activities over three dimensions

Three dimensions for a common purpose

The cast: three actors

➢Account
  ❖Profit & Loss
  ❖Commercial
  ❖Pricing
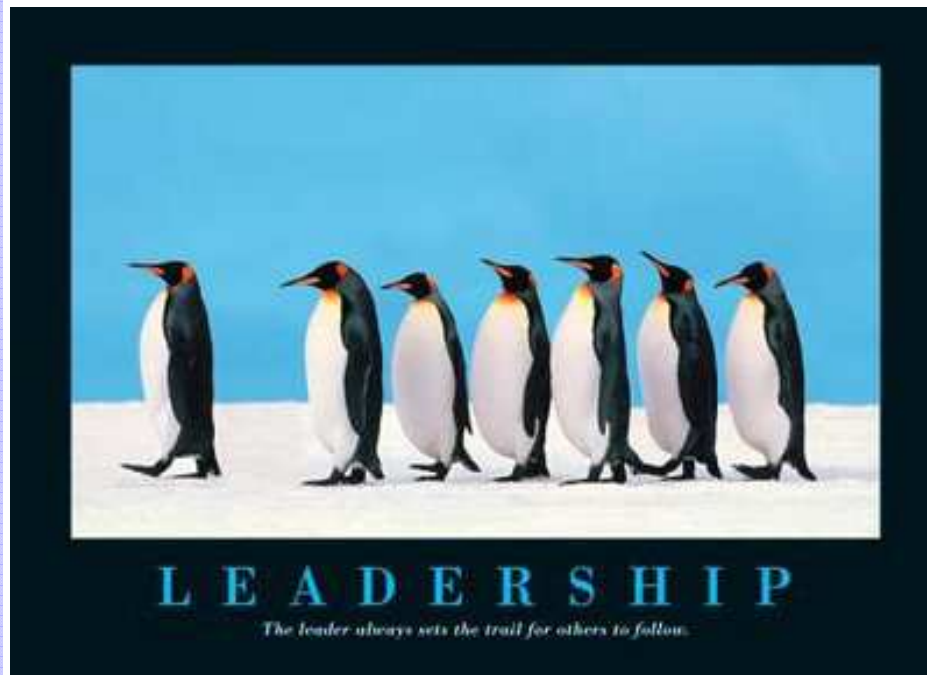 ❖Customer relation

➢SysEng (a.k.a. Solution Architect)
  ❖Requirements
  ❖Solution
  ❖Compliancy
  ❖Scoping

➢Project
  ❖Wbs
  ❖Total effort
  ❖Time and cost control

Co-Leadership

• Each of the three actors expresses his/her leadership for the responsibility he/she is accountable for.

• During the offer preparation, leadership moves from one to another following the different phases (Technical, Project and Commercial that wraps-up those previous two)

Two main ingredients

- Products
  - From your R&D
  - Sourced from partners

- Projects
  - Specifications
  - Development
  - Deployment
  - Integration and Test
  - Acceptance
  - Handover
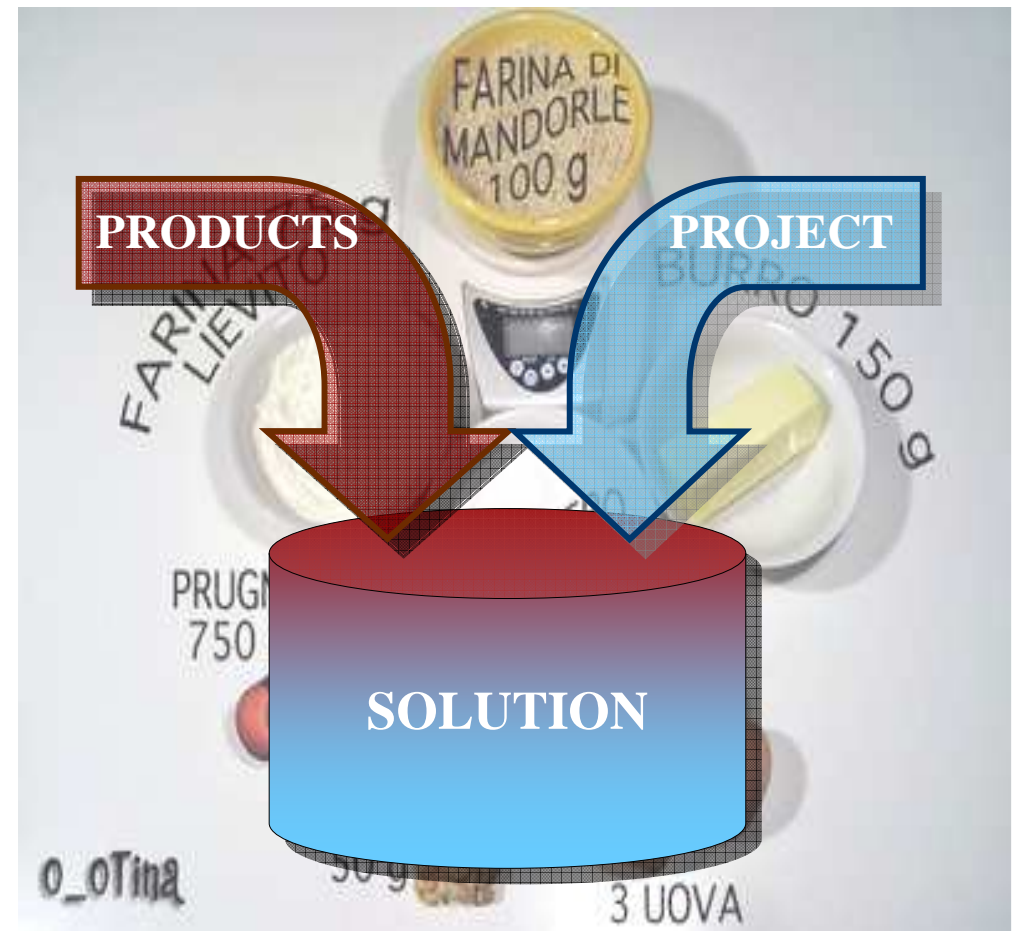
R&D vs Sales Unit

- Both implements the "12 SE roles model" but are based in different core businesses
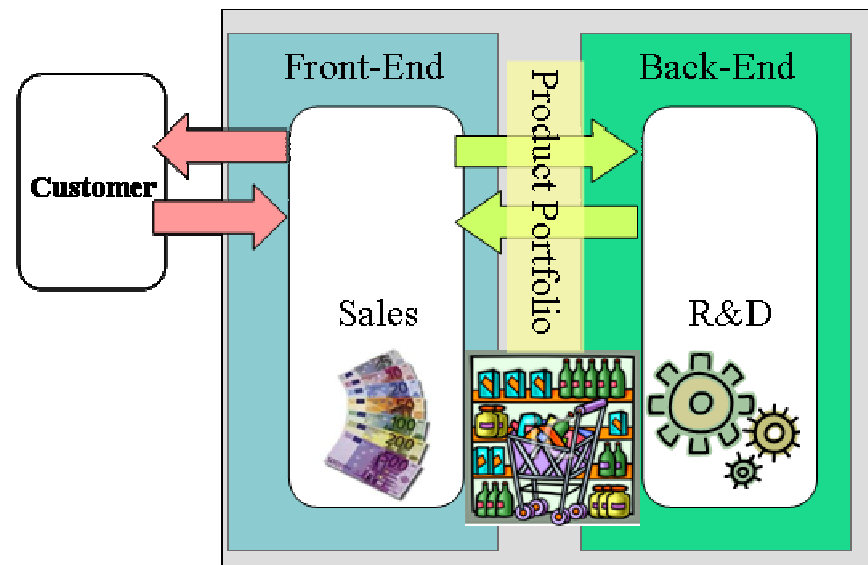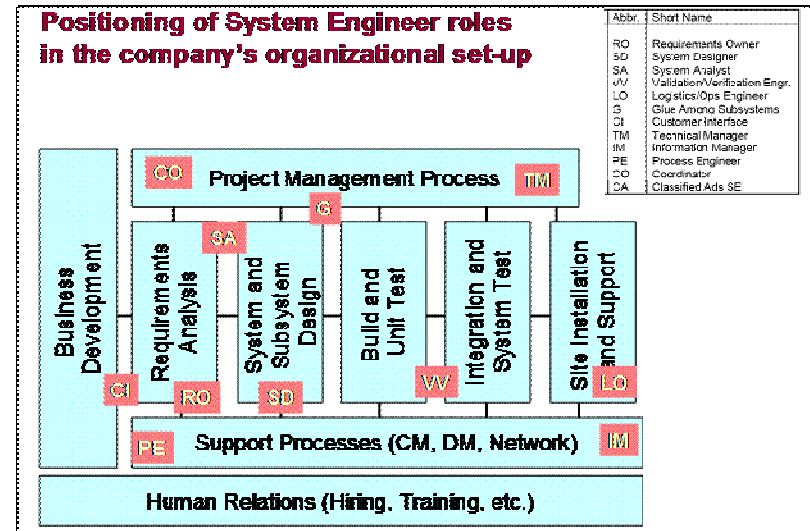
- R&D
  - sells development project hours

- Sales Unit
  - sells turn-key solutions which include a mix of products and project hours.

  - More frequent financials keywords:
    - profits
    - margins
    - NS, OB, CF
    - OPEX, CoS

Positioning of System Engineer roles in the company's organizational set-up

Abbr.	Short Name
RO	Requirements Owner
SD	System Designer
SA	System Analyst
VV	Validation/Verification Engr.
LO	Logistics/Ops Engineer
G	Glue Among Subsystems
CI	Customer Interface
TM	Technical Manager
IM	Information Manager
PE	Process Engineer
CO	Coordinator
CA	Classified Ads SE

Focus on SE: Business development

- Situation analysis
  - Market dynamics
  - Technology outlook
  - Product Portfolio
  - Competitors
- Wanted position
- Gap Analysis
- Solution and Strategy
- Implement
- Monitor

Focus on SE: Solution Architect

Customer Requirements
- Interviews
- Presentations
- Demos
- Tenders

Technical documents
- Purpose
  - Annexes to the contract
  - Project baseline
- Solution Description
  - Scoping
  - SoC
- Requirement Spec
- Models
  - Functional
  - Interworking
  - Logical
  - Physical
  - Networking
  - Deployment

System Engineering Activities

Solutions
- Customer Environment
- Products
  - In your portfolio
    - Customized by R&D
  - 3PP
- Suppliers Management
  - Allocation of Requirements
  - Split of responsibilities
  - Declaration of compliance
- Overall Statement of Compliance
- Dimensioning and traffic models
- BoM/BoQ
- New integration/adaptation layers
  - Interworking components
  - Requirements for development

Many tasks, one objective: get the best gain/cost ratio

SI: One responsible towards the customer

Focus su SE: Project Support

System architecture can shape the project strategy…

WBS

GANTT

Architecture and Integration Strategy

Project and Resource Strategy

System Integration & Validation

System break-down

Input Req

Implementation

System depth scale

System architecture can shape the commercial value

Commercial Strategy

… which in turn can shape the commercial milestones

€   €   €

Commercial Milestones

time

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Set the boundaries of the offer

- Scoping: define, set and declare the scope where the solution offered applies
  - Explicit requirements
  - Declare assumptions
  - Dependencies external to the project
  - Responsibility matrix

- Nothing extra MUST be for free!

Risk Analysis

- Anything that can increase the cost and reduce the profitability

- Analyze
  - Figure out what can go wrong
  - Identify sources of extra cost/time
  - Quantify the uncertanties still pending or not clarified

- Estimate the cost of the actions to mitigate those effects

Business Case

- Costs
  - Products
  - Developments
  - Project
  - Risk mitigation
- Price
- Gross margin
  - Discount and negotiation
  - Fixed costs
- Operating Income

- *Is it worth to go?*

Complexity of the relationships: SE as glue
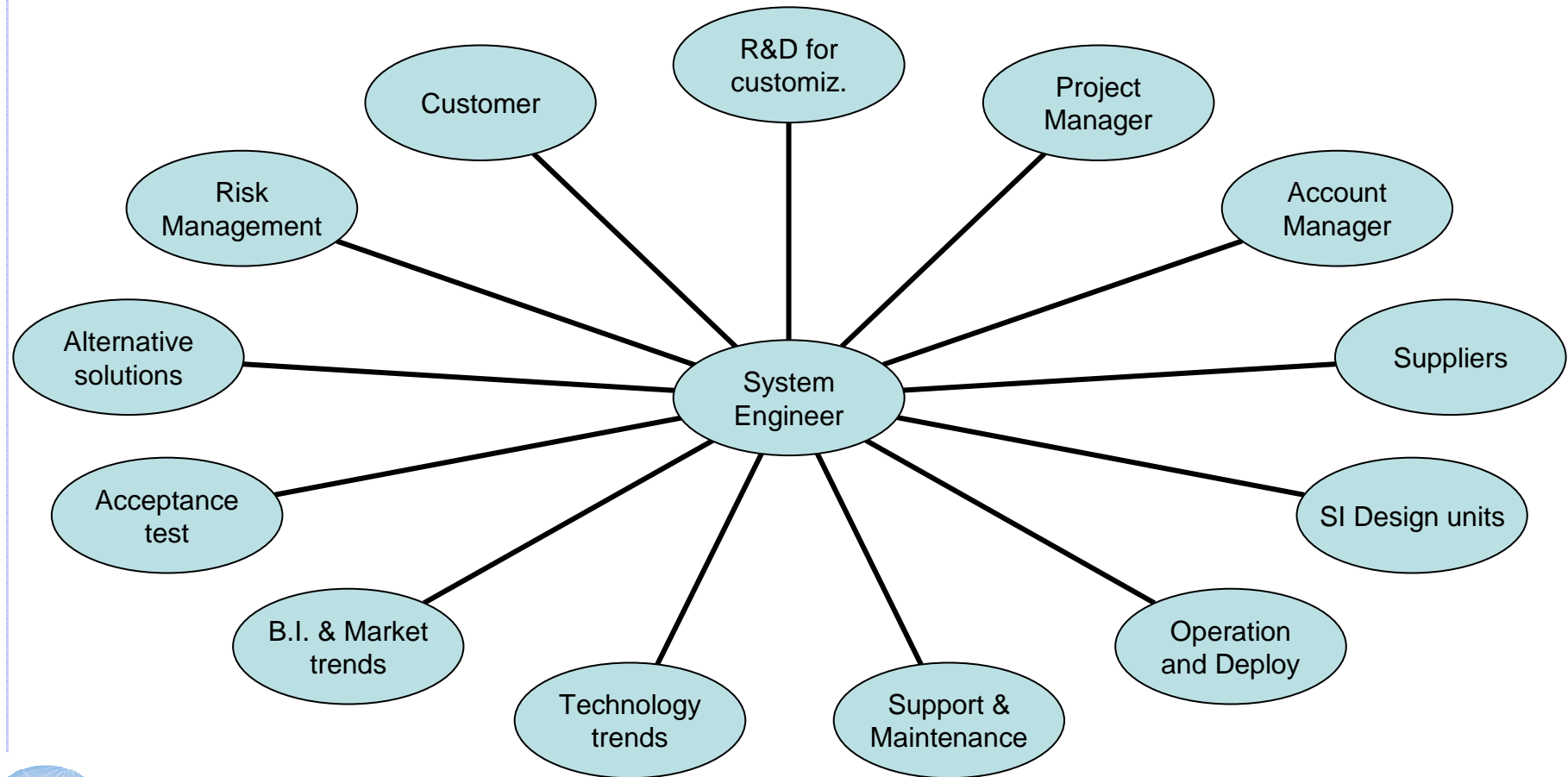
The cost of Pre-sales SE

- Not all the opportunities become an Order from the customer

- Two different SE costs
  - SE in pre-sales
    - Presales cost
    - OPEX (Fixed cost)
    - 10 proposals, 1 OB
    - No guarantees of the paid cost
    - Mitigate the risk

  - SE in delivery
    - CoS
    - It's part of the sold items
    - It's paid by the customer

- OPEX reduction = SE reduction?
  - NYCT example: SE is a value to decrease cost!

  – *In response to the Chairman's public commitment to deliver the capital program at lower cost, NYCT's Systems Engineering unit is charged by the Chief Engineer with transitioning the organization from traditional siloed civil/structural-oriented engineering to a systems approach.*

WHAT? I DID NOT WIN THE ELECTION?

BUT I SPENT SO MUCH MONEY

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