IT Outsourcing

Outsourcing

- Outsourcing
  - In terms of transaction theory, from internal transaction to external transaction
  - Also vertical dis-integration (people, facilities may be transferred outside org)
- Insourcing
  - From external to internal transaction
  - Also vertical integration

IT outsourcing

- Outsourcing applied to IT activities
  - IT area, IT function
- A decision to be analyzed in terms of
  - Cost quality and service (KPIs, SLAs)
  - Strategic effects
    - Is IT core activity or not?
  - Know how
  - Protection of data and know how

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IT outsourcing – history

- 80, outsourcing of management of mainframes and applications
- 90, ERP, CRM packages developed
- 00, SaaS, Software as a service

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Outsourcing axes

- Activity/service
  - IT infrastructure
  - Application
  - Business Process
- Unicity
  - Solution for one (few) customers
  - Solution for many customers (mass market)
- Location
  - On-site
  - Off-site
  - Near-shore
  - Off-shore

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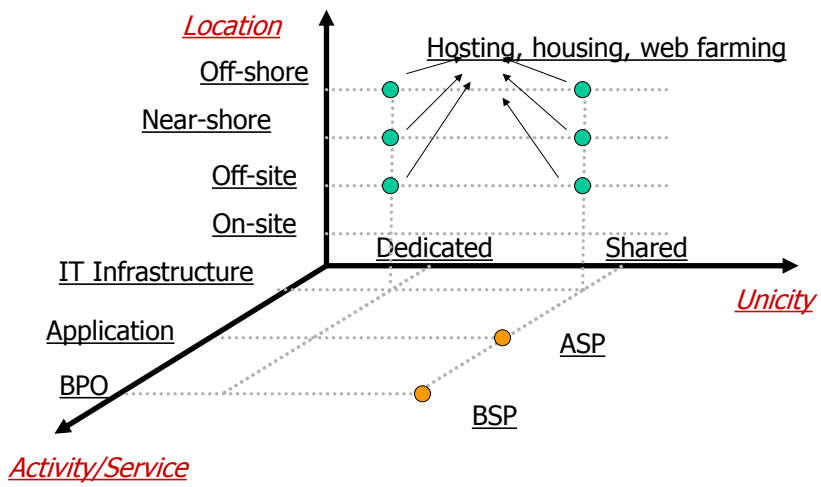
Outsourcing axes



Activity/Service

- IT infrastructure (PaaS, IaaS), hardware (PC, mainframes, printers), network (telecom services), call center
  - Hosting: hardware is property of outsourcer, in site of outsourcer
  - Housing: hardware is property of organization, in site of outsourcer
- Application development and maintenance of Applications
  - SaaS
- Business Process Outsourcing (BSP business service provider).
  - Complete Business Process

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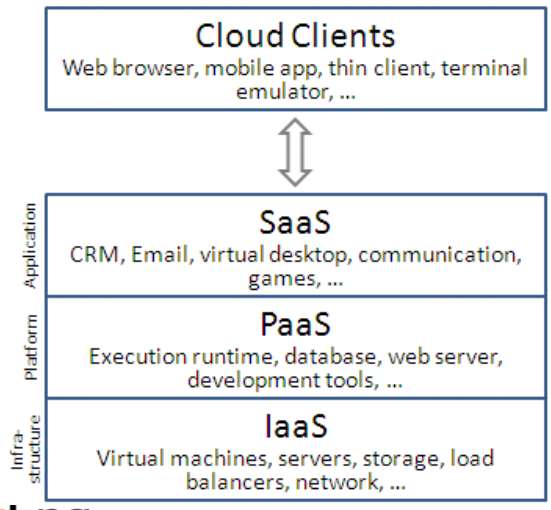
Cloud services



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8

Location

- On site
  - service is on same facility / building
- Off site
  - service is on other facility / building
- Near shore
  - service is on other facility / building, in same state or continent
- Off shore
  - service is on other facility / building, in other continent

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Off shoring

- Due to low cost of communications and skills, with common language
  - Ex. India for US and english speaking countries
  - Ex. Tunisia / Morocco for french speaking countries

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Location and law system

- Location implies a law system
  - Ex. privacy law in Europe vs US
  - Ex. Labour protection
  - Ex. Environment protection

Unicity

- Service is made for one customer
  - application developed by IT services for Organization O
    - Ex student subscription at Polito
  - Or developed by external company, on specific requirement by O
- Service is made for many customers and customized
  - Ex SAP, Peoplesoft, SAS
- Service is mass market
  - Ex. Office, Windows, Linux, mysql, ..

Ex. Web server

- Service = infrastructure (PC to run Apache + web pages)
  - No outsourcing
    - PC at location of O, property of O
    - All costs internal: hardware, rooms, conditioning, electricity, security
  - Housing at provider P, off site
    - PC at location of P, property of O
      - Hardware cost for O
      - other costs for P, and invoiced to O
  - Hosting at provider P, off site
    - PC at location of P, property of P

Ex. Web server

- Location
  - On site
    - Typically coupled with no outsourcing
  - Off site
    - Typically coupled with housing or hosting

Ex. Web server

- Unicity
  - Typically web server is commodity hardware and software (ex. PC Linux Apache), with some customization possible

Market of Providers

- Amazon AWS, Microsoft Azure, IBM Cloud
- Aruba, Telecom Italia, ...
- Pros:
  - Costs for infrastructure shared among many (economy of scale)
  - No investment in non core competence for O
  - Backup, recovery
- Cons:
  - Less control

Ex. Payroll

- Service = manage payroll for org O
  - No outsourcing
    - sw application is developed and mantained by O, used by O
  - Application buy
    - O buys application A from vendor and uses it
  - Application service
    - O rents usage of application A from vendor and uses it internally
  - Process outsourcing
    - O outsources to vendor V all payroll management

17

Ex. Payroll

- Location
  - For hardware running the application
    - On site, typically coupled with no outsourcing, application provisioning,
    - Off site for application service, process outsourcing
  - For people using the application
    - On site, typically coupled with no outsourcing, application provisioning, application service
    - Off site for process outsourcing

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Ex. Payroll

- Unicity
  - Given the amount to be paid (specific to employee and company) all the rest (contribution to health plan, pension plan, taxes) is ruled by law

Market of providers

- See chapter ERP, CRM

Ex. Emergency assistance

- Service =
  - process to support drivers in emergency cases (call center to receive calls from drivers, filter out, dispatch to ambulance, police, car maintenance)
  - Offered by car insurances, car makers
  - No outsourcing: call center in company + emergency vehicles
  - Process outsourcing: process managed by specialized companies (Automobile associations, Europ Assistance, ..)

Ex. Emergency assistance

- Location
  - On site
  - Off site
    - Typically coupled with process outsourcing

Ex. Emergency assistance

- Unicity
  - Close to commodity, level of service can vary for customer

Other outsourced processes

- Companies and rewards management
  - Food companies
  - Retailers
  - Airlines
- Car Insurances and evaluation of damage to cars

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The outsourcing decision

- Which activity / service to outsource?
  - Strategic or not?
    - (part of) a strategic activity can be outsourced anyway
  - Is the know how in the service important?
  - Can be 'packaged' and done outside?
    - A commodity activity may or may not be outsourced
  - Can be done outside at lower cost/better quality/ shorter delay?

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- Ex
  - Email service
  - Commodity: yes
    - Market of providers
  - Strategic: no
  - Know how: no
  - Privacy, law system
    - US officials cannot use
    - See Hillary Clinton case

- Ex
  - Data storage
  - Commodity: yes
  - Strategic: no
  - Privacy: yes
    - Ex most banks/ companies do not use external cloud for storage

- Ex:
  - Airline, pricing algorithm
  - Commodity: no
  - Strategic: yes
  - Know how: yes
  - Privacy: yes
    - No outsourcing

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The outsourcing decision

- Make or buy?
- Planning Monitoring (COBIT)
  - Are roles for selecting vendor / writing contract available?
  - Are roles/skills for monitoring outsourced activities available?

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The outsourcing decision

- Risks
  - Changes in organization / It strategy
  - Changes in service / vendor
  - Changes in technology / environment

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The outsourcing process

- Plan (Cobit)
  - 1 Define activity / service (requirements, SLAs)
  - 2 Find and evaluate vendors / products
  - 3 Write contract
- Monitor (Cobit)
  - 4 Enforce / monitor contract (SLAs with vendor)

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Outsourcing costs

- Use TCO approach
- Including all cost categories beyond nominal cost of product/service
  - search and evaluate vendors
  - Write, enforce contract
  - Hidden costs: lockin, loss of know how ..

1 Define activity

- F. Levy: "*If you can really write the whole job down on paper, then someone else can do it*"

2 Find and evaluate vendors

- Find
- Evaluate
  - Vendor and its history
  - Product and its history
  - Users of product / vendor
  - Switching costs, competitors available
  - Avoid all eggs in one basket
- 2 is long, and cost not proportional wrt cost of transaction
  - Similar cost to buy pencils or nuclear plant[35]

3 Contract writing

- Legal part
- Technical annex
  - Description of product / service
- SLA (service level agreement) and KPIs
  - Service, quality, cost
  - Defined here
  - Used in activity 4, Monitoring

3 Contract writing

- The harder to describe activity / SLAs, the better to insource the activity
  - See discussion external vs internal transactions
- Duration of contract is key factor
  - The higher the risk, the shorter the duration

3 Contract writing

- Consider conditions to change (interrupt) contract in case of
  - Changes in service description
  - Changes in technology / context
- Consider what happens if the service is insourced again
  - Property of data, procedures, hardware, assets
  - People and know how

Contract costs

Contract cost = cost contract writing + cost contract enforcing

Careful about trade off

- typically lower upfront (writing) cost may imply higher enforcing cost

Also contract costs are fixed wrt transaction cost, and same for delay

Contract costs

	Project A.	Project B
Cost of project	550 M	2.5 M
Contract costs	2M	0.1 M
Internal employees (find and search)	20	10
External consultants (contract writing)	10	5
Contract cost vs project cost	**0.40%**	**4%**

Negotiation delays

	Project A.	Project B
Project cost	**550 M**	**2.5 M**
Delay	***15* months**	***18* months**
Decision to outsource	5 months	8 months
Search for vendor	1 months	0
Vendor selection	6 months	3 months
Negotiation	2 months	6 months
Contract signing and start of outsourced activity	1 month	1 month

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SLAs and KPIs

- Hard to define the 'right' ones, and essential to monitor the contract
- Consider the end to end service chain, and its effect on the business processes (not components)
  - Ex: process to produce invoices
    - Yes: SLA = downtime of 'invoice production process'
    - No: SLA = downtime of server

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SLAs and thresholds

- What should be the thresholds?
  - Ex Downtime of invocing process <
    - 1 day per year?
    - 1 hour per year?
    - 1 min per year?

  Unlikely to define the suitable ones upfront

  Better to allow thresholds to be changed during operation of service

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4 Contract monitoring

- At regular intervals
  - check SLAs
  - check issues / problems in the service
- Requires dedicated, competent roles
  - To monitor the service
  - To monitor the context (business, technological) and decide possibly changes to the contract / service

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4 Contract monitoring

- In COBIT terms
  - Plan and monitor processes remain insourced
  - And require key IT competences, skills
  - Working closely / in partnership with the service provider
  - Outsourcing IT does not mean having no IT competences
    - No control is possible of what is not known..

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CSF for outsourcing

- Do not overlook hidden costs (risks)
- IT skills are needed (COBIT plan, monitor)
- Continuous control of contract, interaction with vendor, partnership
- Continuous analysis of risks and changes

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46

Hidden costs

- Discontinuity in the service
  - Learning curves, disruption in service and related ones
- Monitoring, renegotiation
- Costs for insourcing in case of failure

Example

Outsource for

1. E-commerce web site (development, maintenance) to be developed
2. ERP operation and maintenance
3. Management of data center (customer and supplier data), housing of servers at outsourcer site

IT area in company, 7 people

- CIO (45.000 € / yr);
- System manager (25.000 €);
- 3 programmers for ERP (30.000 € each);
- Data manager (20.000);
- 1 web designer (20.000 €).

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Costs per year --insourced		Outsourced
CIO	45	45
System manager	25	25
Programmers (buy, from 3 to 1)	90	30
Data manager (buy, from 1 to 0)	20	0
5 new programmers (if make)	125	0
Training new programmers (1° yr)	12.5	0
Telecommunication costs	10	0
Rental (facility)	5	0
ERP server (2 yrs)	5	5
Outsourcing fee	0	225
Search of vendor (1° year)	0	20
Negotiation (1° yr)	0	20
Total	**357.5**	**370**

Cash flow per year

Year	Make	Buy	diff
1	357,5	370	-12,5
2	345	330	15
3	340	325	15
4	340	325	15
5	340	325	15

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Cash flow, to day (7% rate)

year	Discount rate	Make	Buy
1	0.935	334.11	345.79
2	0.873	301.34	288.23
3	0.816	277.54	265.30
4	0.763	259.38	247.94
5	0.713	242.42	231.72
Net Present Value		1414.79	1378.99

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Issues

- Renegotiation costs not considered
- Re – insourcing costs not considered
- New technologies available in next 5 years
- Reduction of costs for outsourcing in 5 years
- Loss of IT skills

- Another possibility to counter these issues is selective outsourcing

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Ex – selective outsourcing

Outsourcing for 3 activities, 275.000 euro/yr

Outsourcing 1+2 , 150.000 euro/yr

Outsourcing 3, 125.000 euro/yr

Analysis for outsourcing of activity 3 only

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	insource	Oousource all	Selective Outsourcing
CIO	45	45	45
System manager	25	25	25
Programmers	90	30	90
Data manager	20	0	20
web designer	20	0	0
5 new programmers	125	0	0
Training	12.5	0	0
Telecom	10	0	10
Rental	5	0	5
ERP server	5	5	5
Outsourcing fee	0	275	125
Search of vendor (1° year)	0	20	20
Negotiation (1° yr)	0	20	20
Total	**357.5**	**420**	**365**

NPV

YEar	Discount rate	Make	Buy	Selective Outsourcing
1	0.934579	334.11	392.52	341.12
2	0.873439	301.34	331.91	283.87
3	0.816298	277.54	306.11	261.22
4	0.762895	259.38	286.09	244.13
5	0.712986	242.42	267.37	228.16
NPV		**1414.79**	**1584.00**	**1358.49**

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Focus on

- 2 (Find and) Evaluate vendors
  - Product functions
- 3 Contract writing
  - Transaction cost estimation (cost of product)

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Evaluation

Evaluation

- Vendor
  - Main risk: vendor bankrupt, product discontinued
- Product
  - Main risk: product not suitable

Evaluation selection of vendor

- Vendor
  - Size
  - Reputation
  - Time on the market
  - Availability of local offices / local support
  - Availability of services about the product from other vendors

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- Product (is the product suitable?)
  - Functions
  - Non functional requirements
    - (usability, performance, reliability, portability.. ISO 25010, ISO 9126)
  - Context requirements
    - Compatibility with ..
    - Platform (DB, OS, ..)
    - Skills available
    - Cost, TCO

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ISO 25010

- Reliability
  - Failures per period
    - Overall or per function
  - Availability per period (ex 99% per year)
    - Overall or per function
- Usability
  - Time to learn
  - Evaluation by set of users

ISO 25010

- Efficiency
  - Response time,per function
  - Memory usage, per function / overall
- Maintainability
  - Time / cost to add or modify function
- Portability
  - Time / cost to port to different plaform
    - OS, DB, GUI, ..

Software Vendor Evaluation Matrix

Product: Date:

		Criteria	Weight	Vendor A	Vendor B	Vendor C	Vendor D
		Software Name ---					
1	SW Features	Critical functionality					
2		(List each specific item)					
3							
4		Important functionality					
5		(List each specific item)					
6							
7		Nice-to-have functionality					
8		(List each specific item)					
9							
10		Productivity features					
11		(List each specific item)					
12							
13		Cost-saving features					
14		(List each specific item)					
15							
16		Other					
17							
18	Vendor	Stability					
19		Size – Revenue					
20		Size – Support staff					
21		Size – Number of clients					
22		Years in business					
23		Location					
24		Strategic plans					
25		Investment in R&D					
26	Costs	Software license					
27		Software implementation					
28		Software support					
29		Hardware requirements cost					
30		Hardware maintenance					
31		Other costs					
32		Additional features options					
33		Data migration cost					
34		TCO (Total Cost of Ownership)					

65

Selection

- MCDA (Multiple Criteria Decision Aid)

	Option1	Option2
Criterion1	5	1
Criterion2	1	5

  - Ex : scores 1to 5 to each criterion

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Aggregation

- Sums
  - Sum all votes with same weight
- Weighted average sums
  - Sum votes giving different weights
- Pairwise comparison
- ..

Aggregation – simple sums

	Option1	Option2
Criterion1 (vendor)	5	1
Criterion2 (product)	1	5
Sum	5+1 = 6	1+5 = 6

Aggregation – weighted sums

	weigth	Option1	Option2
Criterion1 Vendor	10	5	1
Criterion2 product	5	1	5
Sum		5*2+1*1 = 11	1*2+5*1 = 7

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Selection

	Option1	Option2
Function1 (0 to 5)	Available 5	Not available 0
Function2	Not available 0	Available 5
Size of vendor 5 if > 1000 people 4: 500 to 1000 3: 500 to 50 2: 50 to 5 1: 4 to 1	400 people 4	40 people 2
Portability 5: windws, unix, 2 only linux 1 only windows	To windows and unix 5	To unix 2
SUM	14	9

Selection

	WEIGHT (10)	Option1	Option2
Size of vendor 5 if > 1000 people 4: 500 to 1000 3: 500 to 50 2: 50 to 5 1: 4 to 1	7/10	40 people 2	400 people 5
Portability 5: windws, unix, 2 only linux 1 only windows	3/10	To windows and unix 5	To unix 2
WEIGHTED SUM		4*3/10+ 5*7/10 =1,2+3,5 =4,7	2*3/10+ 2*7/10 =0,6+1,4

Rules

- Criteria should be
  - Sufficient
  - Not redundant, not correlated

Assumption

- There is no best choice (best product) in absolute
- There is a most **suitable** choice to a certain **need**
  - The need being expressed by a set of criteria and their weights

- Ex.
  - A sport car is better than a family car?
  - A sport car is more suitable for a need
    - Speed, fun, status
  - A family car is more suitable for another need
    - Safe and cheap transport of people and stuff

Product functions

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- 'Function', 'functionality', 'functional requirement'
  - In context of requirement engineering means
- Behaviour of the software product between input and output
  - Typically described in the form 'do something'
  - Ex: 'compute invoice', 'create reservation'

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- Since functions can be at different level of detail, and related among them, they are typically organized in a hierarchy

Manage customer	Create customer
	Delete customer
	Search customer from ssn
	Search customer from name
	Modify customer

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- And numbered

1 Manage customer	1.1 Create customer
	1.2 Delete customer
	1.3
	..
2 Manage invoice	2.1
	...
3 ...	

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- Key activity in the selection is to
  - List the functions needed by the process(es) in the organization
  - Check for each product / vendor if the function is available

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		Option (product) 1	Option 2
1 Manage customer	1.1 Create customer		
	1.2 Delete customer		
	1.3		
	..		
2 Manage invoice	2.1		
	...		
3 ...			

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- Best starting point to list functions is the BPMN
  - Task in bpmn → zero one or more functions