

Value-based business-IT ALignment

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IT Services: A Real Options Thinking Approach

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Value modeling workshop, Tilburg, Jan. 18-19, 2007

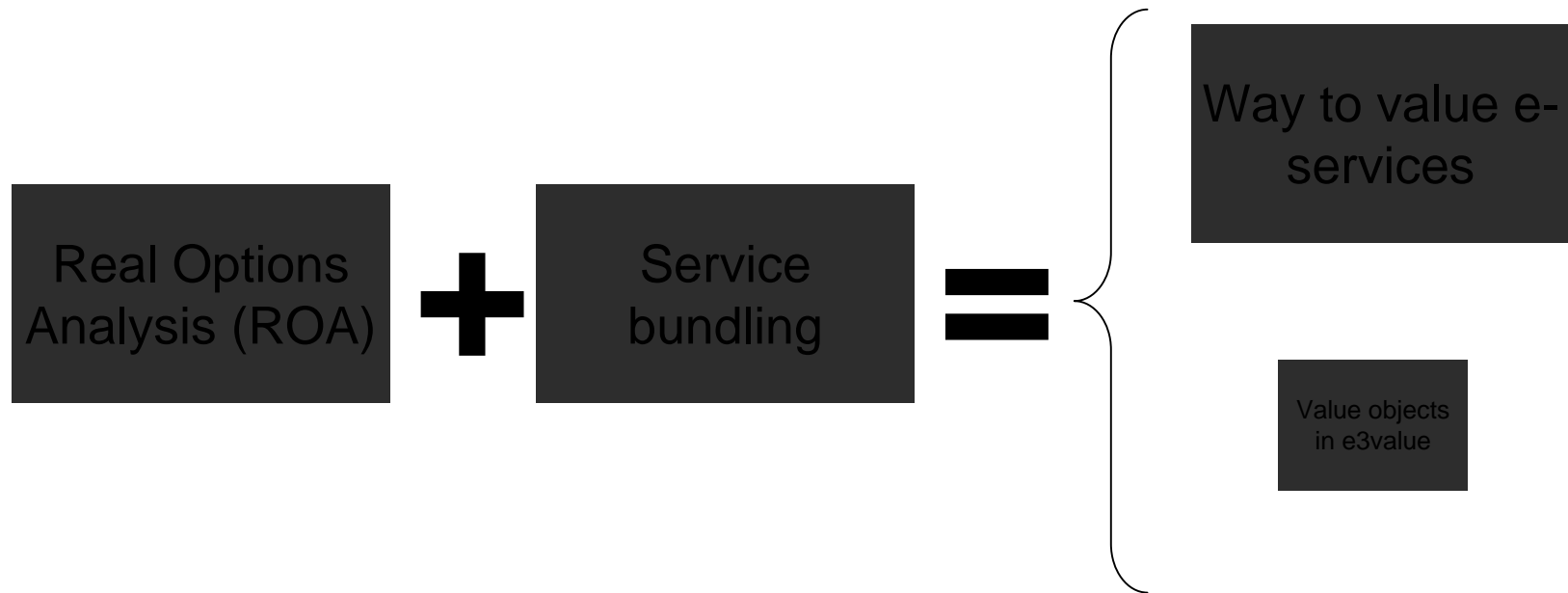


“Option” according to Merriam-Webster’s

- ...
- something that may be chosen: as a : an alternative course of action <didn't have many options open> b : an item that is offered in addition to or in place of standard equipment
- a contract conveying a right to buy or sell designated securities, commodities, or property interest at a specified price during a stipulated period
- ...



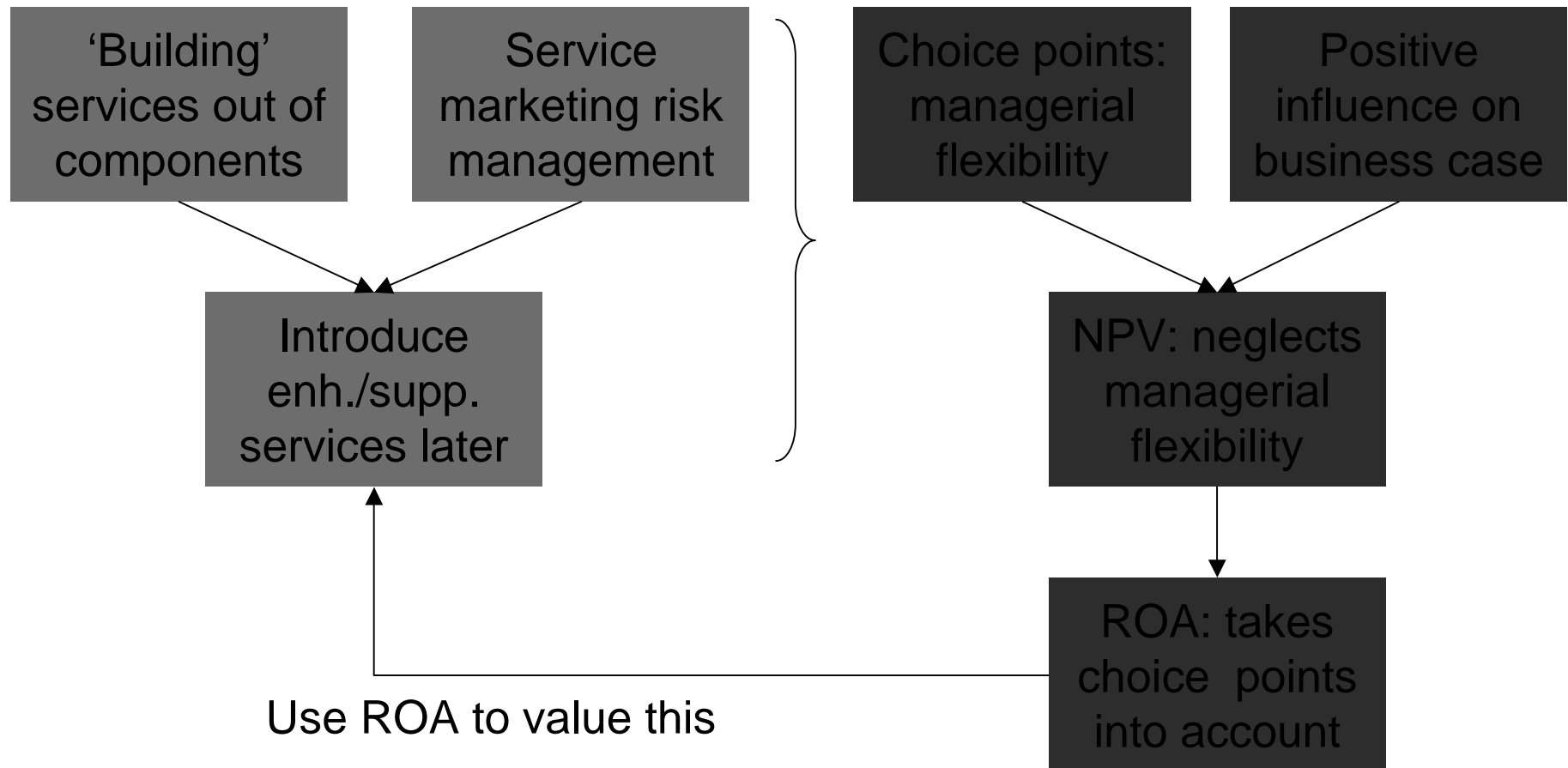
Goal of this presentation



- Really?
- Does this have practical value?



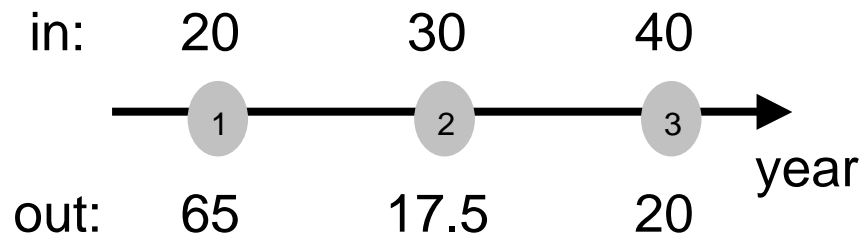
Overview



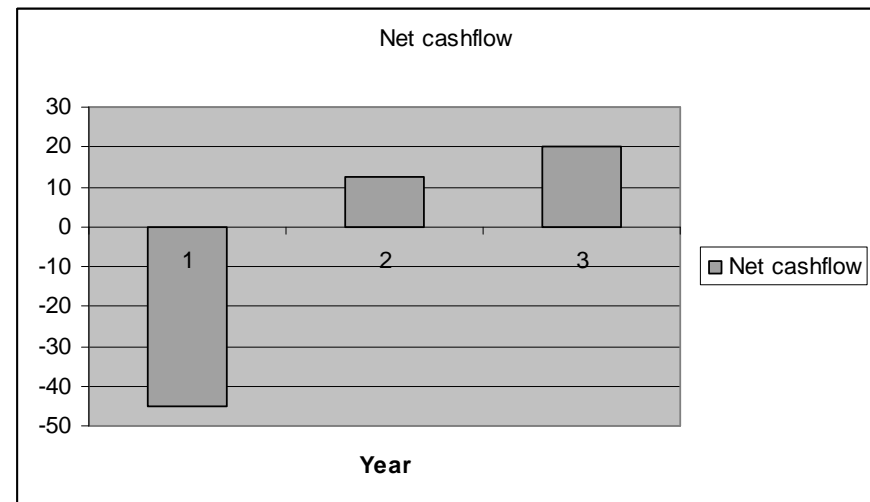


NPV: dominant approach

- NPV = Net Present Value



sum of discounted
net cashflows (NPV) = -14.5





Configuration of Service

- Core service: describes value from customer perspective
 - Supporting services: needed to enable consumption of core service
 - Enhancing services: can be added to core service to increase value
- Service bundle: set of core services

Vodafone BloX

BloX voor SMS'en

 **Dubbel SMS/M**
Dubbel zoveel
TeGoed voor 2,
» [Meer over C](#)

 **Onbeperkt SMS**
Onbeperkt SMS
Nederland voor
Onbeperkt: bij n
SMS-berichten p
» [Meer over C](#)

BloX voor bellen

 **Onbeperkt naar Vast**
Onbeperkt bell
voor 20,00 eur
Onbeperkt: bij n
belminuten per r
» [Meer over C](#)

BloX voor mobiel interr

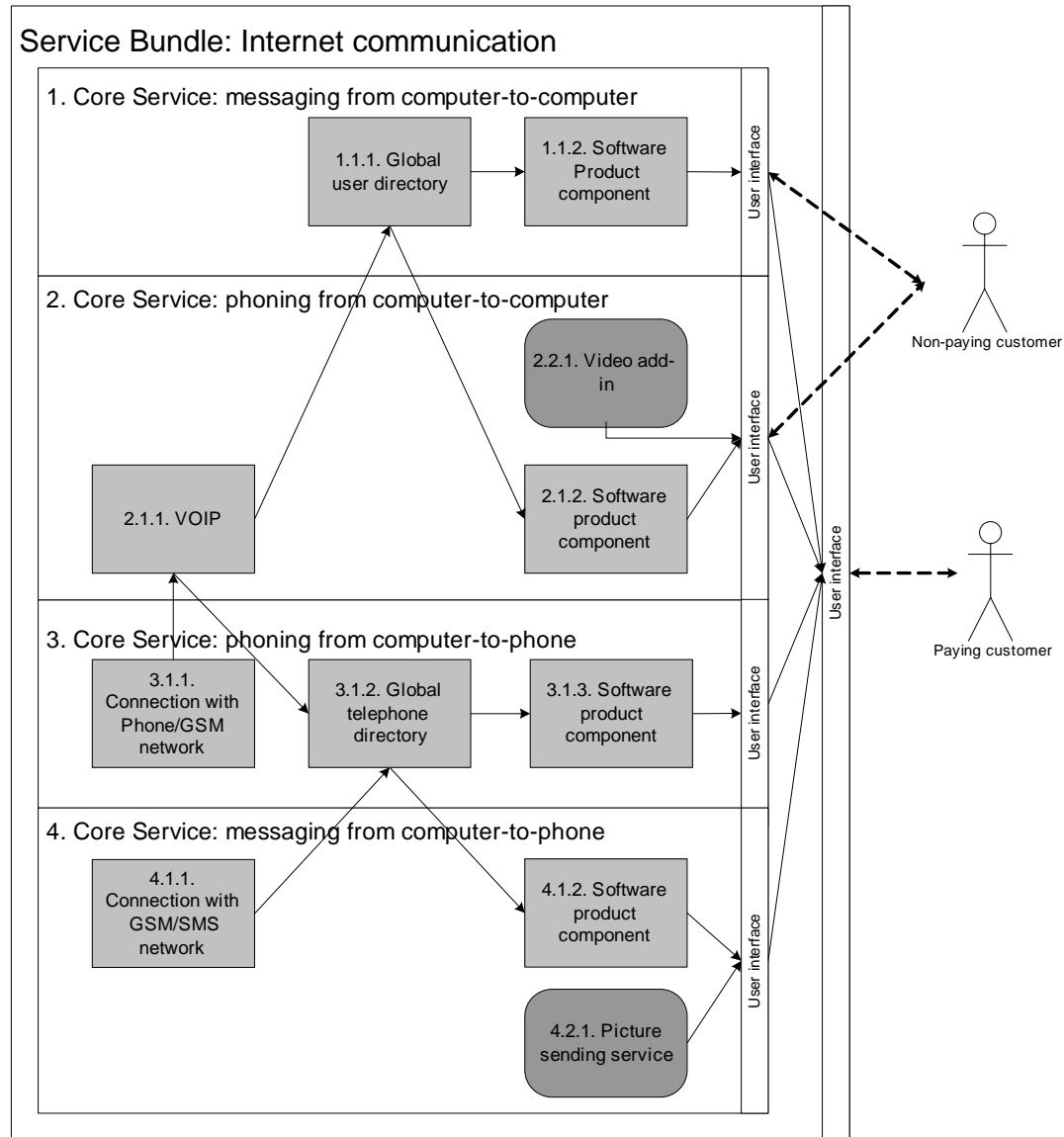
 **Vodafone live!**
Onbeperkt surf
mail abonnem
voor 2,50 euro
» [Meer over v](#)

 **Mobiel Interne**
Onbeperkt surf
mail abonnem
voor 10,00 eur
» [Meer over b](#)

Baida, Z. (2006). *Software-aided Service Bundling - Intelligent Methods & Tools for Graphical Service Modeling*. PhD thesis, Vrije Universiteit Amsterdam, The Netherlands, 2006



VITAL





Service marketing risks

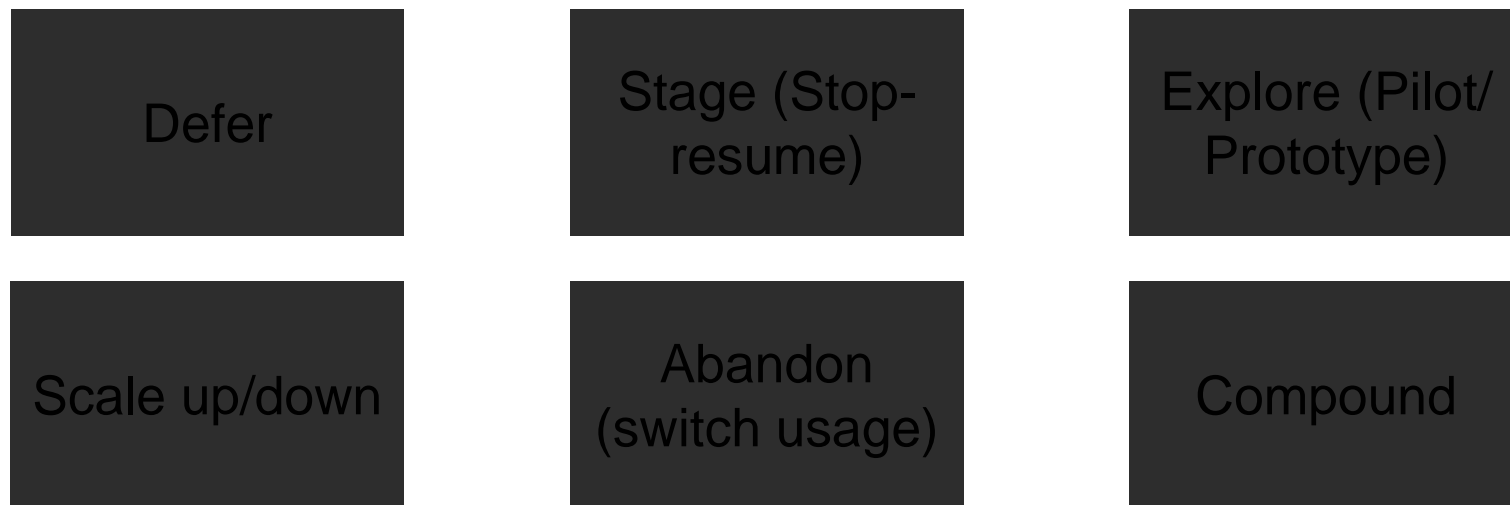
- Three types of risk (Benaroch, 2002):
 - Firm-specific risks: ability of investing business to realize the investment
 - Competition risks: less payoff due to competition
 - Market risks: less payoff due to lack of demand

Benaroch, M. (2002). Managing Information Technology Investment Risk: A Real Options Perspective. *J. Mngt. IS*, 19(2):43-84.



IT options

Managerial flexibility in IT according to Benaroch



Ability to have these choices in the investment are the real options



Service options

Service option	Service meaning
Defer	Postpone the service investment decision
Stage	Each supporting service can form a stage
Explore	Offer the service first to a selected pair of customers
Alter scale	Change productivity level of the service (quantity)
Abandon	Stop a particular supporting service or outsource it to a partner
Switch	Use a supporting service for another core service
Compound	A combination of two or more of the above described options
Growth	Add quality to the core service by valuing the enhancing services (quality and delivery time)



The question

How to quantify the value of these options?

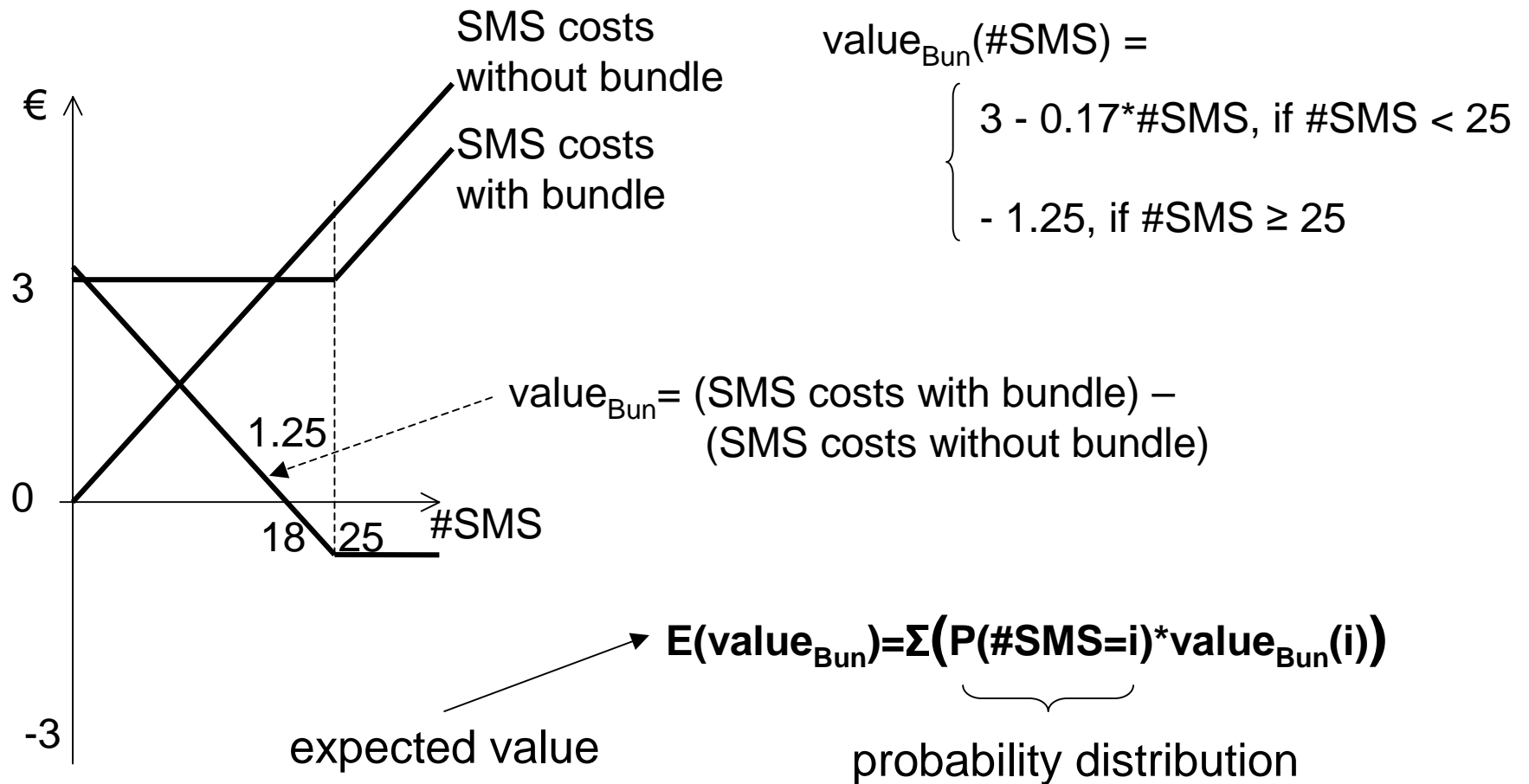


A mobile phone service bundle

- Bundle components:
 - Connectivity (voice+SMS, SMS €0.17 per message)
 - Optional SMS package: 25 messages for €3 (= €0.12 per message)
- What to do? Take optional SMS package or not?

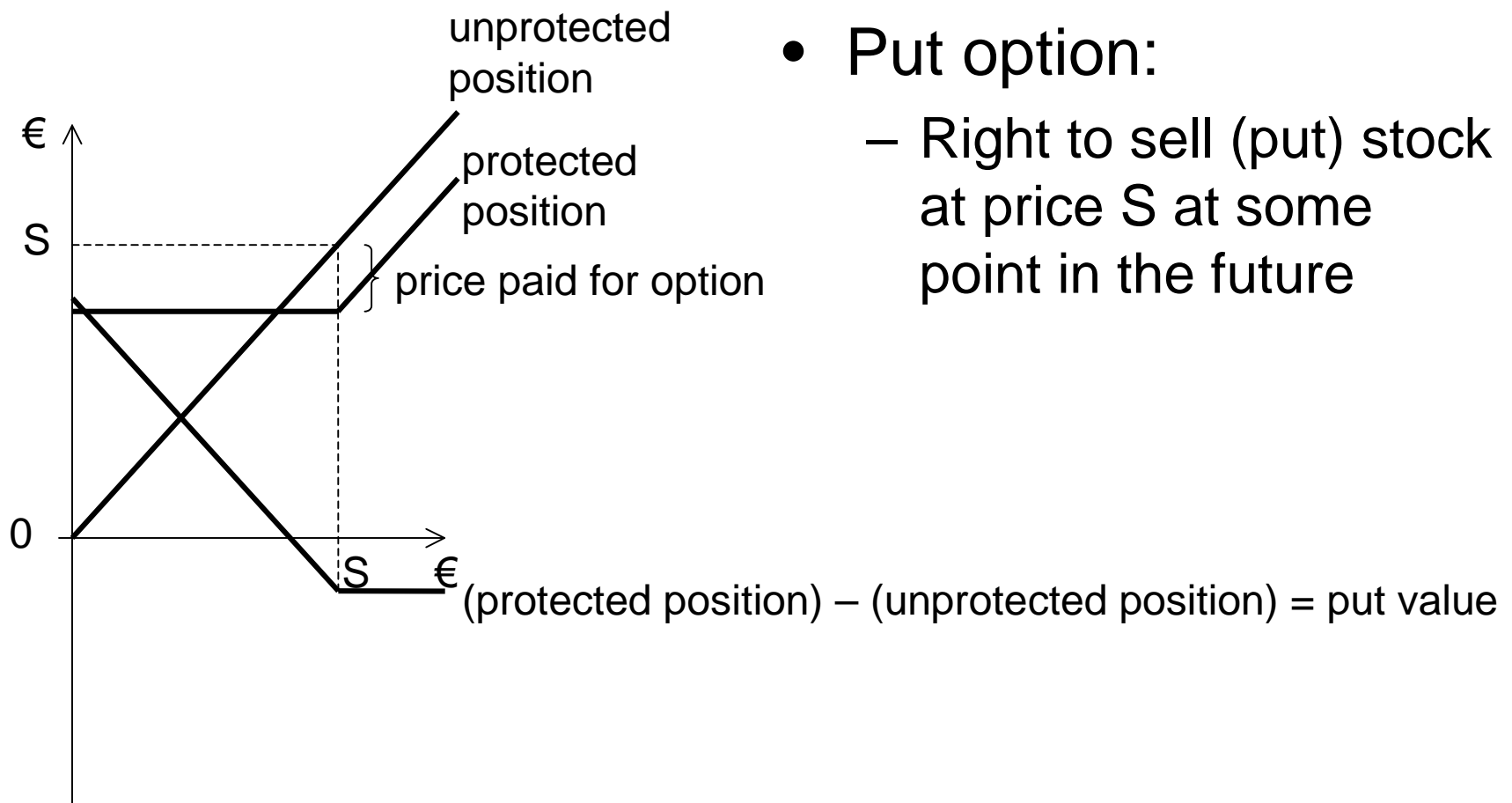


What is the value (provider persp.)?





A put option



- Put option:
 - Right to sell (put) stock at price S at some point in the future



Options valuation (European)

- Black-Scholes formula input:
 - Current stock price S
 - Std. dev. σ of the above (= volatility)
 - Strike price K
 - Risk-free interest rate r
 - Remaining time until expiration T
- Output: price of European call C (= premium)



Black-Scholes formula

$$C(S, T) = SN(d_1) - Ke^{-rT} N(d_2)$$

where

$$d_1 = \frac{\ln(S/K) + (r + \sigma^2/2)T}{\sigma\sqrt{T}}$$

$$d_2 = d_1 - \sigma\sqrt{T}.$$



Service options

Option on stock [BAH05]	Real option on a project [BAH05]	IT options [BEN02]	Service options	Our example
Derivative	Project	IT investment	Configured core service	Messaging from computer-to-phone
Stock price	Value of the expected cash flows	Expected investment payoffs (V)	Expected payoffs from customer	Present Value of the expected payoffs (€ 85.828)
Exercise price	Investment cost	Expected investment costs (I)	Expected cost of the supporting and core services	Present Value of the expected costs (€ 100.318)
Time to expiration	Time until opportunity disappears	Time until maturity (T)	Time until opportunity disappears	one year
Volatility	Uncertainty of the project value	Volatility of V, volatility of I	Volatility of the customer demand (quantity, quality, time) and	$\sigma_{\text{quantity}} = 0,2$ $\sigma_{\text{quality}} = 0,5$ $\sigma_{\text{time}} = 0$
Risk-free interest rate	Risk-free interest rate	Risk-free interest rate (r_f)	Risk-free interest rate	4%



Koen's example, revisited

- Service is designed such that two options are created
 - Growth option: picture service
 - Scale-up option
- Original business case: **-14.5**
- With options: $-14.5 + 16.5 + 12.6 = \mathbf{+14.6}$



Discussion

- Fundamental validity of the options metaphor (the liquidity issue)
- We're designing a service (= future-oriented). But volatility needs historical data!
- We need very complex maths
 - Are decision makers willing to trust that?