LTE pricing

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- The industry practices
- Individual tariffs
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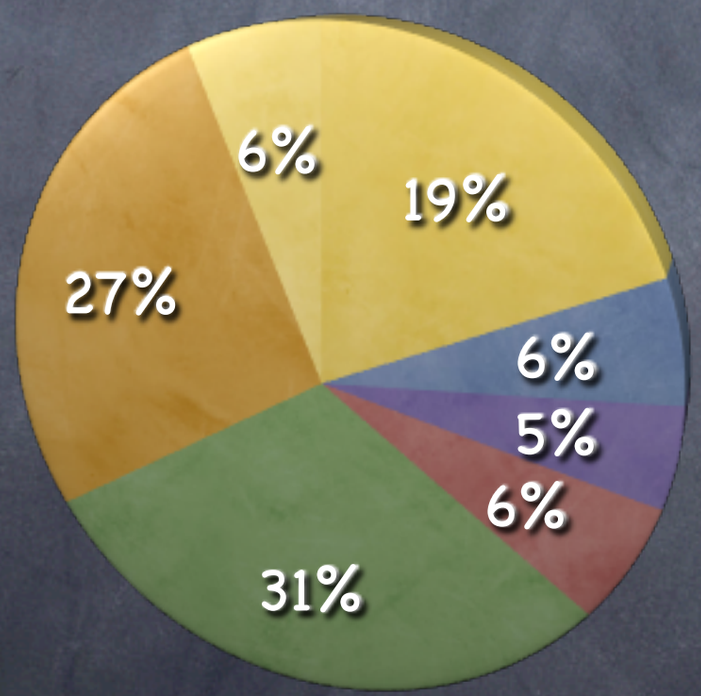
LTE usage

- Rural vs Urban coverage
- LTE is used for data-only access in the initial phase while voice is served by 2G/3G networks
- Fixed mobile convergence

LTE UE

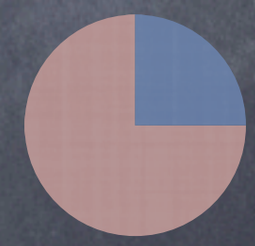
- Operators are looking for competitive prices for LTE terminals, which should be "smartphones", tablet and dongles, (using HSPA+ as benchmark)
- The smartphone needs to support voice services - VoLTE (CSFB, SRVCC, Dual-radio, OTT)



- Wireless modules
- M-Tablets
- Note/netbooks
- smartphones
- Routers
- USB modems/dongles
- PC cards

Source: GSA report "Status of the LET eco-system" 13-06-2011

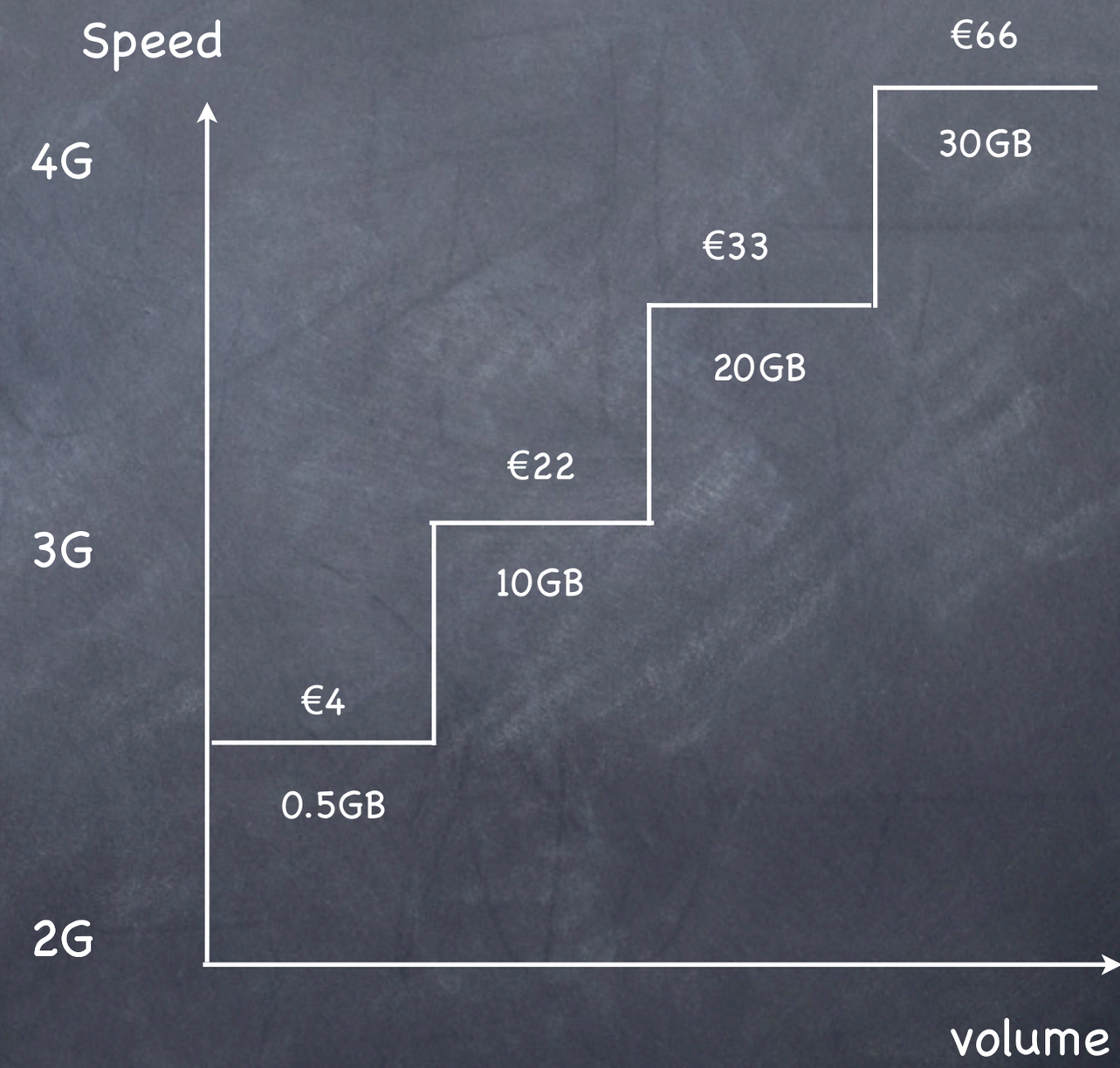
LTE market needs and profit drivers

	lifestyle shift	Smartphone proliferation	Vertical industry applications	Multisided business model
Examples	Teliasonera observed big shift in life style amongst its first LTE users in Sweden & Norway	Sprint EVO 4G has been a success in North America, with video applications in hot demand	Texas Energy Network uses LTE video surveillance on wheels to monitor the remote oil and gas drillings	LightSquared has started a LTE wholesale business in North America to sell bandwidth to retailers, advertisers and internet companies
Immediately felt?				
Profit area	✦ More data sales on dongles ✦ Fixed network substitute	✦ Faster smartphone adoption ✦ Higher data ARPU	✦ M2M solutions ✦ Cloud computing	✦ QoS charge on service providers ✦ Mobile advertising

source: Huawei analysis, BMI 2010, Mckinsey 2010, BCG 2010, operator info

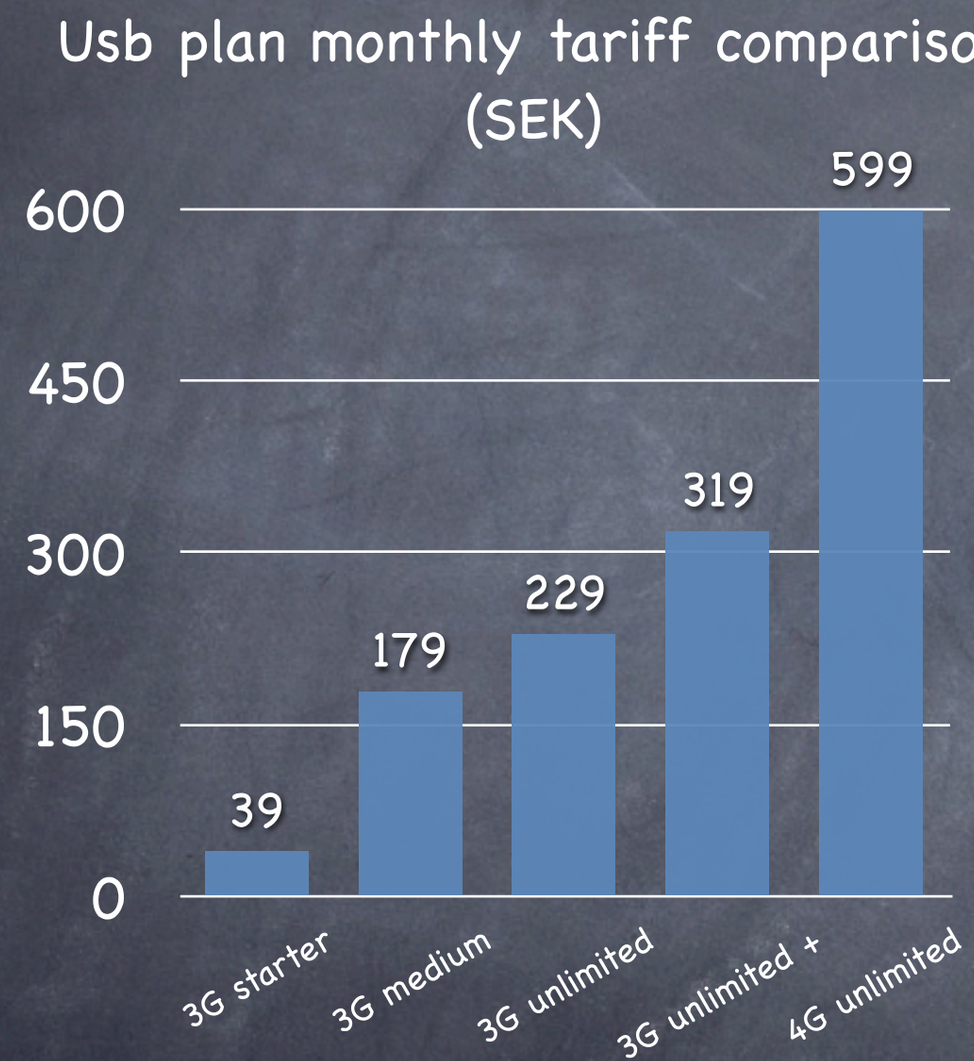
Case: Teliasonera Sweden
- Differentiated pricing for mobile broadband to reflect levels of customer usage

Customers are willing to pay for
- speed
- usage
- new services
- quality



source: Teliasonera 2010 Q2 data, Mobility services sweden

Case: Teliasonera Sweden
- High premium is attached to 4G



High premium attached to 4G in absolute value of the monthly plan

UE: depends on the length of contract, 4G UE is more expensive than 3G UE

kr 599, 18month contract - modem incl. 3G(199kr)

kr 599/month, 0 month bonding, modem 2145 kr 3G(349kr)

Case: Teliasonera Sweden
- LTE business strategy

- High end users with high WTP
- Bundling with value-added services to enhance user experience
  - Security services: file backup, antivirus, firewall
  - movie streaming service, etc
- Strengthen leadership in SE, increase visibility in Eurasia

Case: Vodafone DE
-Same price, higher volume and speed

LTE UE is €359, during promotion €1

3G dongle about €30

	3G	LTE	3G	LTE	LTE
speed (max)	7.2Mbps	7.2Mbps	14.4Mbps	21.6Mbps	50Mbps
Quota	5GB	10GB	10GB	15GB	30GB
Monthly fee	€39.95	€39.99	€54.95	€49.99	€69.99
speed beyond quota quota	64kbps	384kbps	64kbps	384kbps	384kbps

Source: www.vodafone.de

Case: Vodafone D2
-LTE development strategy

- In the initial phase, 800MHz LTE will focus on rural broadband white spots, then will gradually roll out to dense urban
- In the near term, LTE will only target individual & family users as dump pipe. In the long term, LTE will be for handset as well
- 2.6G focus on hotspots to improve data capacity because the operator has 20MHz spectrum in the 2.6G band
- Thinking about migrating DSL customer to LTE (4m user vs. 500M euro pay to DT)

Operators have also realized that

- Bit-pipe V.S. value added services (M2M solutions, cloud computing etc.)
- APRU is decreasing
- Customer retention costs skyrocketing

VF UK Y10/11

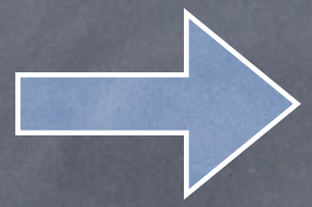
Service revenue	4,931 (m GBP)
Customer costs	1,928 (m GBP)
Operating expenses	562 (m GBP)

Individual tariffs

- **Individual tariffs** in telecommunications refer to the regulatory protected ability for an identified user to obtain from a service provider, by a bilateral specific contract, a set of service specific prices corresponding to a request or a proposal from the user specified with a service demand profile and some duration.

But do the users want that?

Sociological perspectives



- Individualism
- Self-identify
- Innovation
- Recognition

Global user survey Assisted by the International Telecom. User Group (INTUG)

- Users
  -50% want individual services and tariffs to reduce cost & simplify services
  - price/bit drops (-49%) to the users' advantage
  - Behavior will change and drive up network traffic
- Supplier
  - Increased network traffic (+ 31%)
  - increased customer loyalty and reduced churn rate (upper bound 15% - 30%)

How?

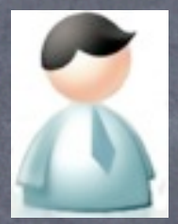
Conceptual framework

Negotiation:
User-lead
Stackelberg Game

Service design

- Bounded rationality
  "Attribute substitution" + simplification
- Social needs
  Irrationality

- Profit/market share maximization
- Risk minimization



Supplier

Computational Design

Algorithm
+
decision rules

Service perceptual space

- Utility function (distance-based)
- Constraints
- Decision rules
  - "close enough" to my preferences

Service Design space

- Utility function (profit)
- Constraints
- Decision rules
  - maximum profit with minimum risk at group level

Operator business model : OPEX, CAPEX, Profit

Operator model characteristics:

- Non-linearities and discontinuity
- Switching between different access technologies
- Service specific CRM, OSS, billing aspects
- Manpower costs

Computational model (I):
A mapping between user's perceptual space & supplier's explicit space

- Suppose users can be divided into groups which share similar preferences for a specific class of services.
- Conduct survey on a group of user and ask them about their preferences on "technical attributes"
- Conduct Principle Component Analysis (PCA), the PCA loading can be seen as a mapping between the user's perceptual space and the supplier's explicit space
- Interpretation of PCA components is service dependent

Computational model (II): targets and constrains

User target function

$$f(Z)=e^{-||z_i - z_{i0}||}$$

User optimizes in perceptual space,
subject to constraints which are expressed in the explicit space and translated into perceptual space

User constraints: time, budget, user specific preferences

Assume supplier here is an operator

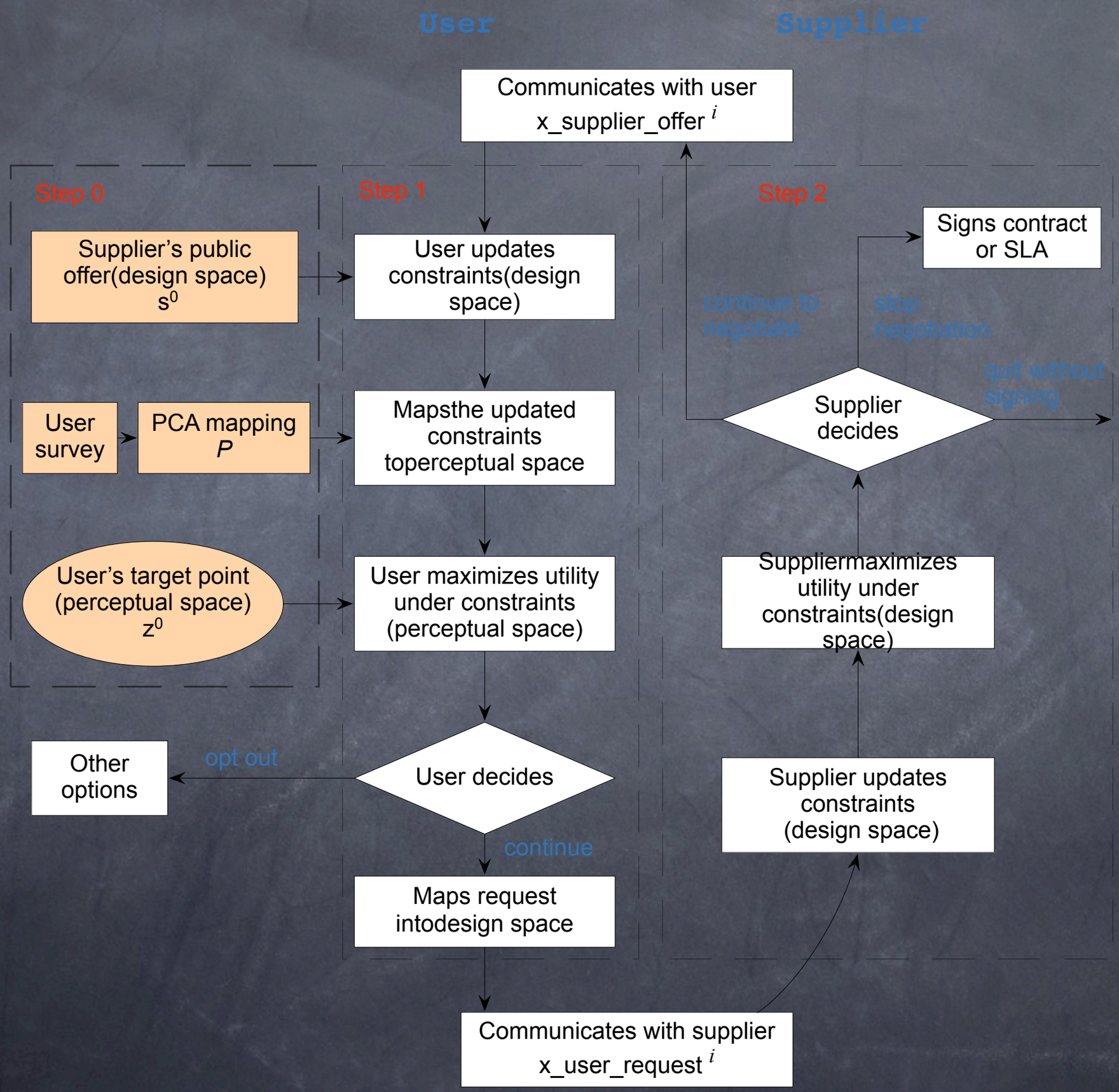
Operator target function

Profit = revenue - cost

Operator optimizes in service design space,
subject to constraints which are expressed in the explicit space

Operator constraints: guarantee quality of service，etc。

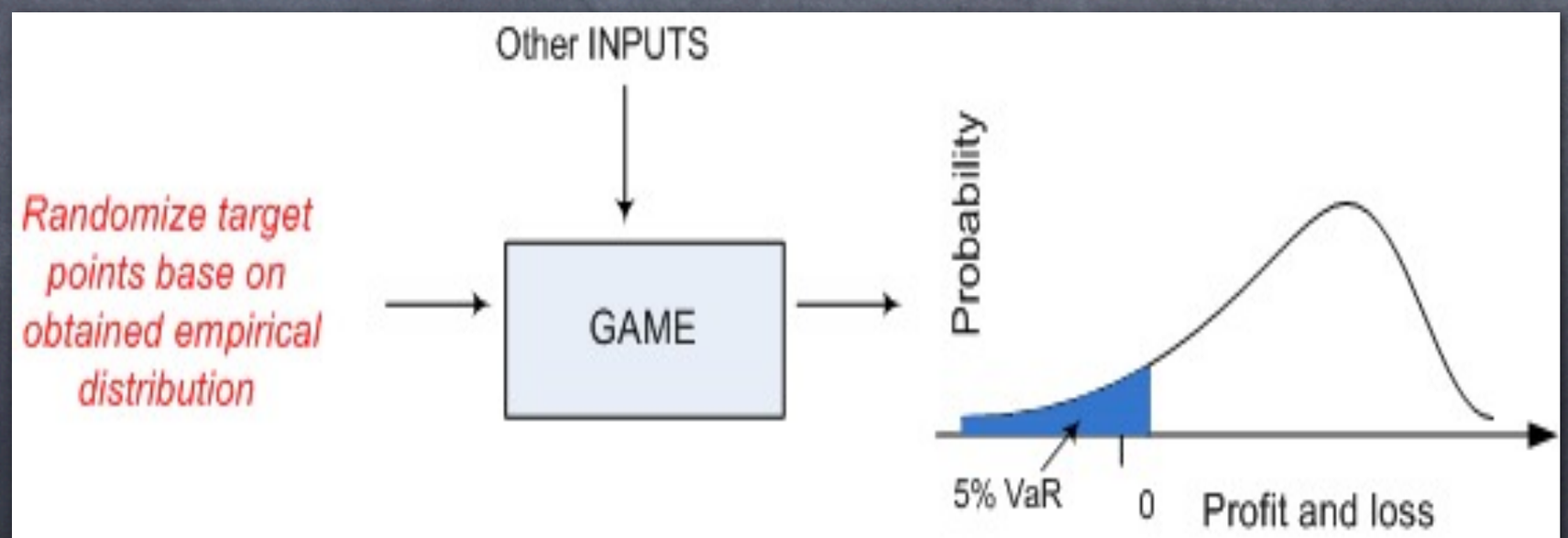
Computational model (III): Negotiation process



Handling user-lead uncertainties

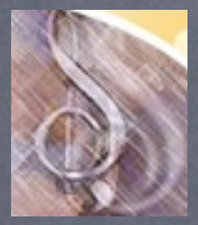
Value at risk: For a given time horizon **t**, and confidence level **p**, the value at risk is the amount of loss that the supplier over the time horizon **t** that is exceed with probability **p**

1. Obtain the empirical distribution of the sample target points in perceptual space
2. Randomize target points based on obtained distribution in perceptual space
3. Calculate supplier profits
4. Calculate VaR



Case: mSinging, provides music & vocal training to users via wireless technologies

College students

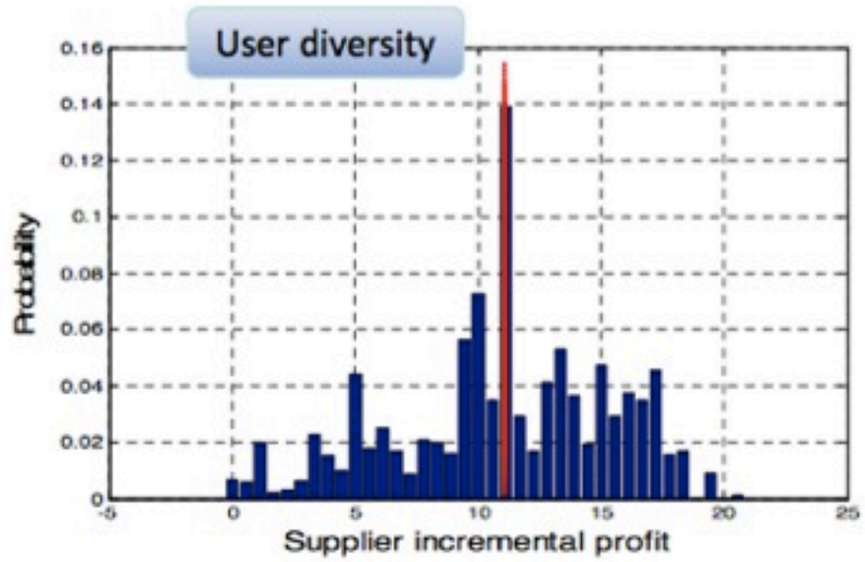


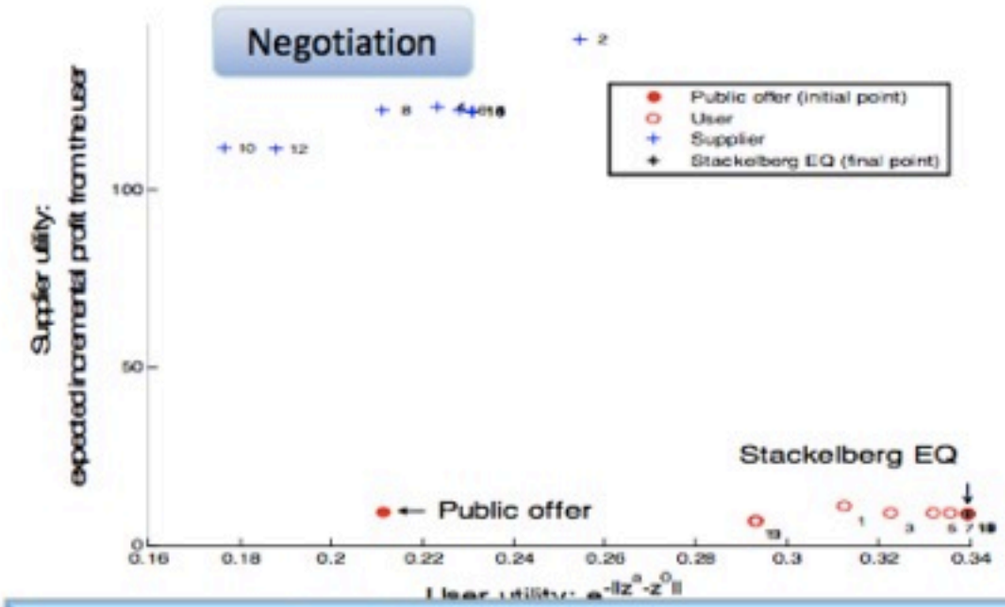
An operator assisted by teachers

Service attributes: service design space

x1 Size of the database (measured in Ksongs)
x2 Number of instructions student receives each song
x3 Number of songs per month
x4 Length of contract (month)
x5 Number of questions student asks during whole contract period
x6 Nb of evaluation user intends to have (whole contract period)
x7 Download/upload method (fixed/mixed/mobile, 1-10)
x8 Sound quality of the music (coding rate: 144, --224,320, 400kbps/s)
x9 User's bid for the service in € (whole contract period)

Case:mSinging



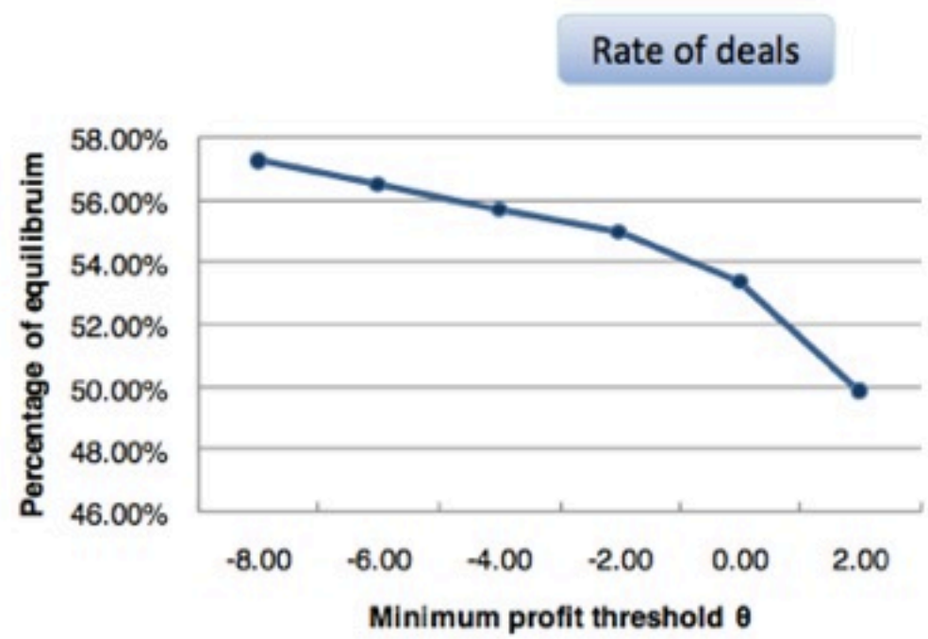


Users always win

- Outcomes: reach an agreement, user quits, supplier quits
- Gain in utility (closer to wishes): +163% (mSinging), +37% (generic)

Supplier gains on average

- Gain in profit, +9% (mSinging); +142% (generic)
- Higher flexibility in Risk vs. profit / market share



Discussion

- Individual tariffs for service bundle (video, game, content, etc)
- Data Roaming, VoLTE, OTT