

Network Optimizations

Communications Futures Program: Broadband WG

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Communications Businesses

People buy content

Media consumption

£17Bn

0.1p/MBit

Networks commercial position:

Mature channels determine price point

Network success factor:

Time to delivery

Rights & settlement

People and machines exchange information

Messaging

£??Bn

0.1-10000p/MBit

Networks commercial position:

Very variable models

Network success factor:

Delivery guarantees, traceability

Security

People meet each other

Calls

£19Bn

1p/MBit

Networks commercial position:

Established market – and new paradigms

Network success factor:

Symmetry, immediacy

People want simplicity, security, fun

Businesses and people focus on core activities

- not telecoms!

£ New markets developing

0-1000000p/Mbit

Networks commercial position:

Opportunities to define new

Network success factor:

Distributed ICT-like network

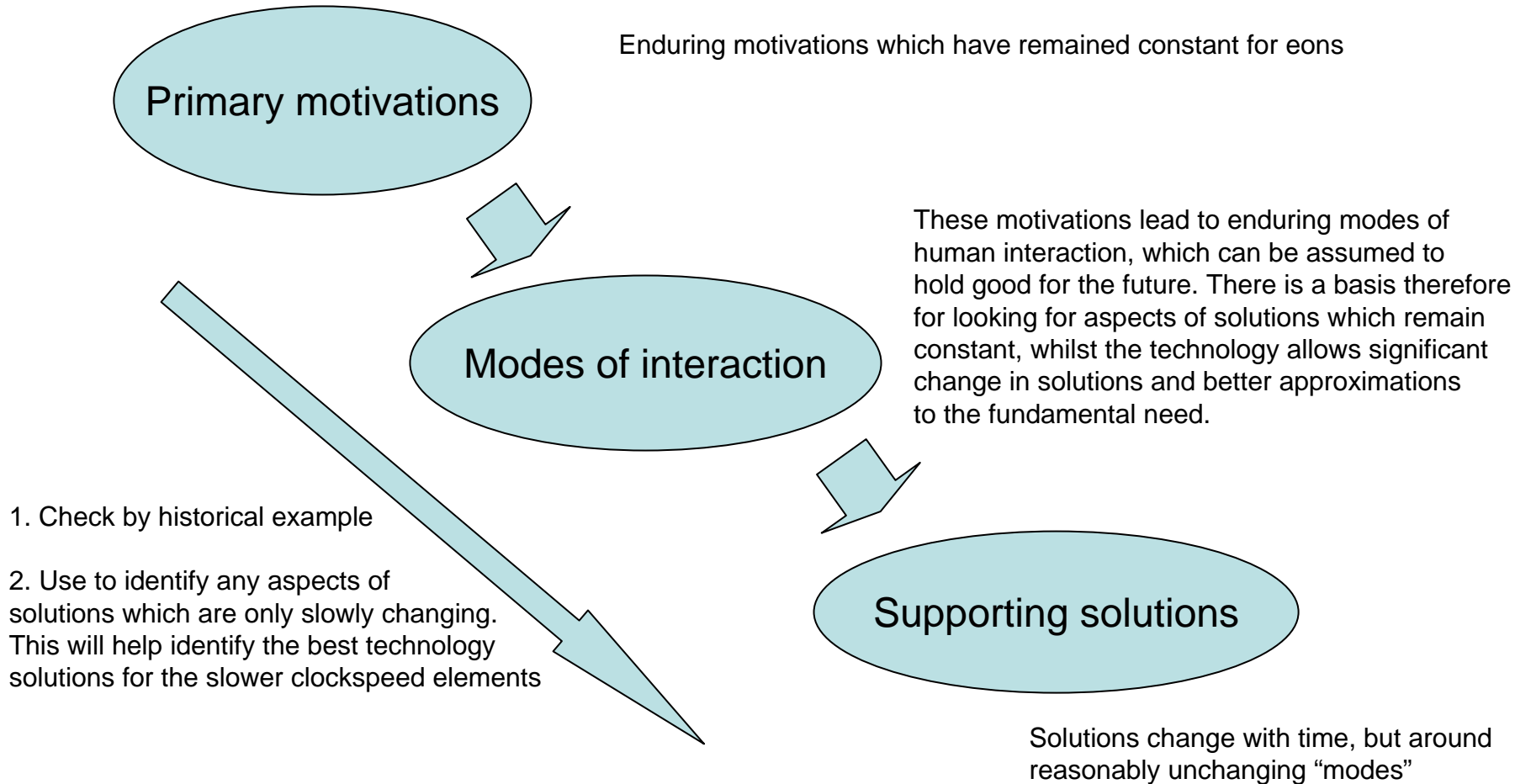
2 related business problems

- Very short product life cycles & disruption uncertainty results in higher risk for slower clock-speed (tend to be higher capital) rollouts.
- A single network proposition tends to favour one product/business type at the expense of others
 - Different price points, different investment needs, different textures

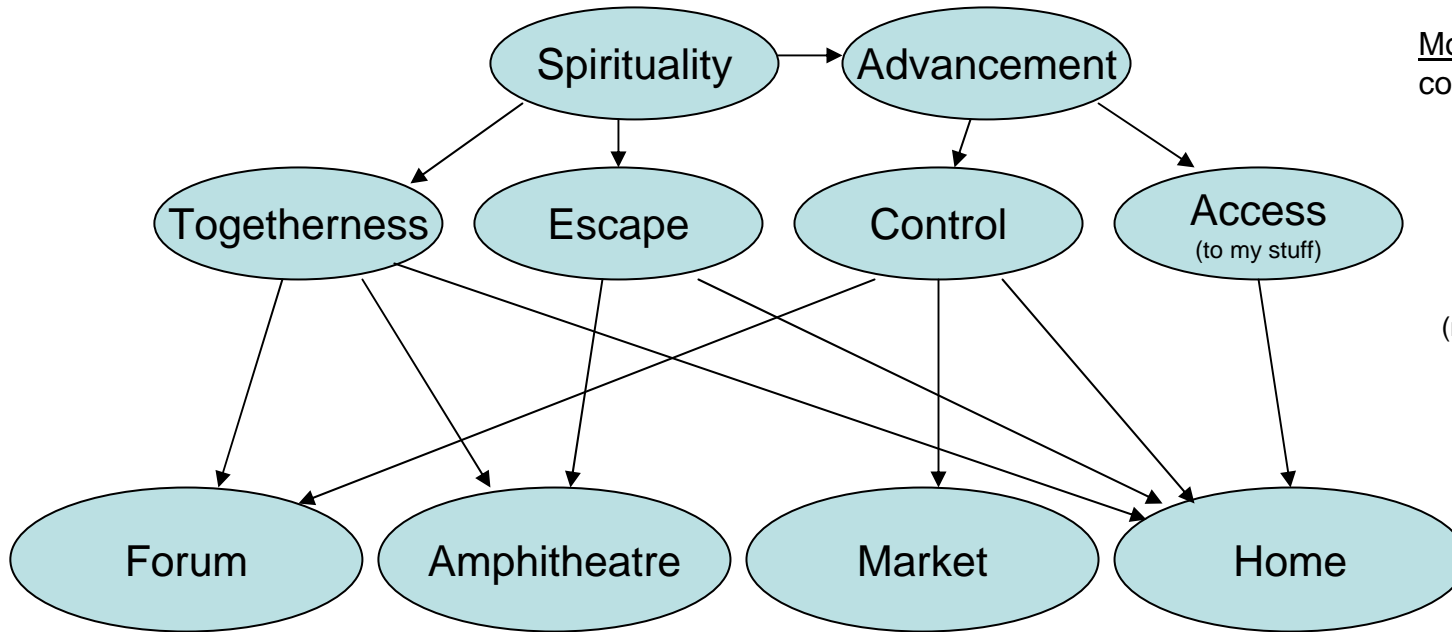
Finding answers

- Question 1; Investment clock-speed: Out of all the randomness are there any “strange attractors” – patterns with some permanence around which slower and more expensive investments can be de-risked?
- Question 2; One-size-does-not-fit-all: Can these strange attractors be used to ensure that multiple commerce types can be supported successfully in the same network ecosystem?

Is there a basis for assuming there exist characteristics of solutions which change slowly?



Some “meta-levels” seem to be candidates



Motivations
courtesy of Genevieve Bell

(mappings are examples only)

Ways these are expressed
Modes of Interaction
Enduring analogies
which typify environments
and virtual environments

Public and private
Interlocking groups
Trust & identity
Social, political, business value
Value belongs directly
to the communicators
Immediate & 2-(multi-)way

Public
Simultaneous
Gets folk talking
Users aware of mass
reaction...but...
asymmetric
Content is owned
& “sold”

Stuff bought&sold
Owners and rights
Accounts&settlement
Guarantees:
-delivery (eg time)
-quality (eg pristine)

Private (group)
Controlled entry
Possessions
Dominion
Smooth running
Security
Health&wellbeing

Underpinned by...

- **Systems of vouchers**
 - permissions, payments, authentications, rights
 - trust levels, locations, notification messages...
- **Sets of signposts**
 - addresses, routes, directories, filing systems, who's who
 - hand shakes, location info, tickets, cache locations...

Analysis of metrics

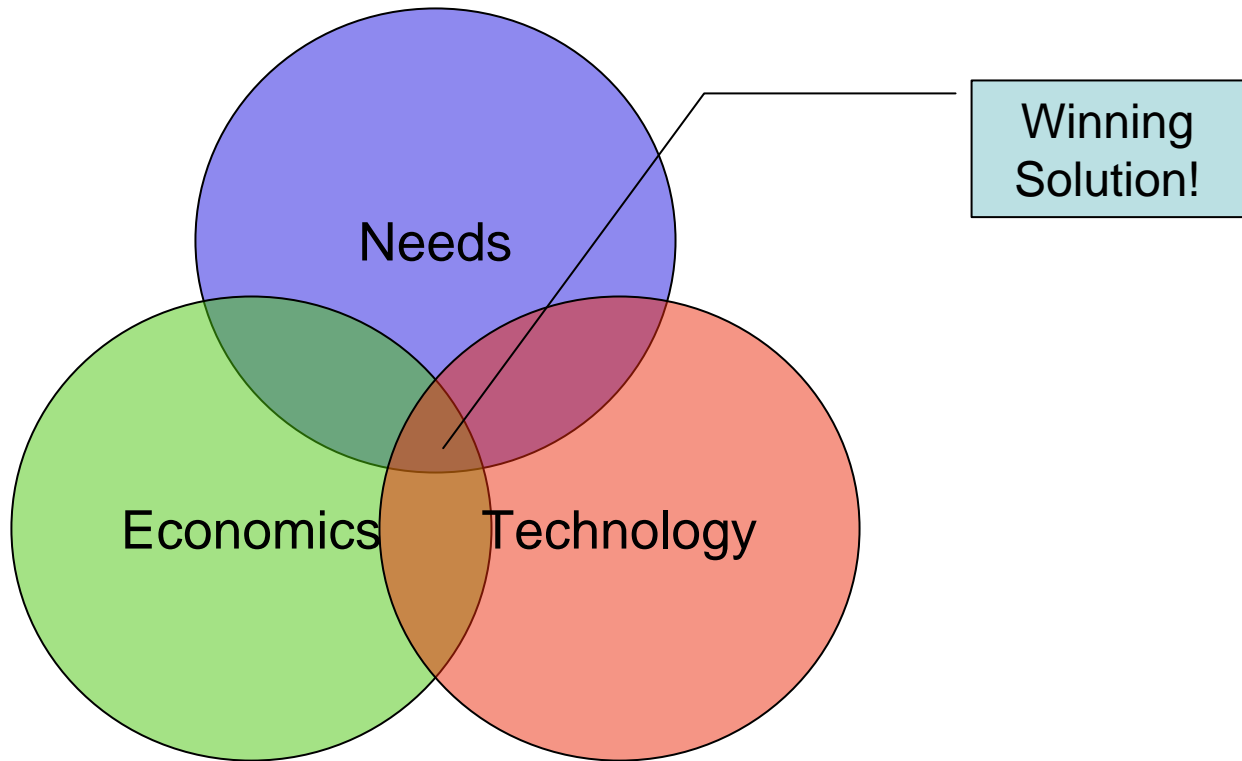
Study how changing cost/performance technology metrics have affected the solution approximates to the need.

- Time based
 - Latency
 - Store & forward
- Distance based
 - Virtual proximity
 - Geography
- Volume based
 - Bandwidth
 - Compression
 - Texture / detail
- Cost based
 - Bulk transfer
- Value based
 - Delivery assurances

Look for quantum shifts in doing “the same thing”; common building blocks for providing services.

- start simple and enable growth

Organizing the Work



Desired Outcomes

- Set of needs-based usage models that reflect today's and tomorrow's usage
- Finite set of economic models that facilitate support of needs
- Finite set of functional network blocks and features that can be mixed & matched to support significant range of needs and economic models
- Determine common intersection (if any) of the above three

Back up

Example: Forum

- Pre-telecoms: people meet, talk & debate. Face recognition. Mutual trust groups. Immediacy. Social, political and business value to the individuals. Maybe membership of certain clubs which provide particular environments and particular clientele. Geographic boundary is local – within reach/earshot.
- PSTN: Security is physical access to the phone, and physical access to the network. Trust is person-person. Identification is aural recognition. Social etc value is reflected in charges to callers (supported by voucher system of call minutes). Signposts are directories. Geographic boundary is massively widened by radical change to distance/cost of technology.
- Future (video, telepresence) enabled by new distance/BW/cost technology. Still needs symmetry, immediacy, simplicity (informality) of use. Needs to match the “managed intrusion” mechanisms of the real world. Geographic boundary is further expanded inward – more availability of terminals (compared to PSTN)?

Example: Market

- Pre telecoms: Merchandise arranged to facilitate finding it. Owners, prices, accounts, rights, quality, delivery, authentication by recognition/reputation
- On-line shopping: searches, Authentication, accounts & payments systems. Large transport asymmetry for digitisable assets. Also systems of transport and stores (caches) signposts and intermediate rights, authentications and payments (vouchers). System of vouchers and signposts needed for both digitisable and real-world traded assets. Quality assurance along the whole chain – traceability.
- Future: Ways to provide and monitor delivery guarantee levels end-end. Eg time-to-completion (full file arrives by pre-determined time), integrity of the file by user-measures. Device sensing and format translation. Security of rights and usage (to all members of the delivery chain). Authentication and identity. Smart search and rendering. Systems of signposts for P2P type handling for network efficiency. Accounting and clearing the whole chain.

Example: Amphitheatre

- Pre telecoms: Everyone gathers together for entertainment. Same time, same place. Talk of the town. Sense of community and common ground for chatter. Sensation of mass reaction increases social value.
- TV (in the recent past): Relatively few channels so popular programmes are discussed – popularity of soaps, series and block-busters. Reactions gathered “offline”. Listings.
- Future: Fragmentation of audiences. Special interests. Scale broadcasters fight back with voting to make audiences aware of the mass reaction. This will increase in new ways. Also groups of friends may want to add some form of conferencing to experience a group experience remotely. Could the broadcasters catch on to this and develop?
- Network is very asymmetric. Simultaneity of viewing for audience. Common content allows maximal use of cacheing and other smart delivery. Stream-like, but less critical than “forum” requirement. Smarter search and material assembly technologies. Payment and guarantee systems as in “market” but potentially simplified by there being larger audiences looking at common material. Translation to wider range of devices (but again, I suspect less so that “market” as the TV is an iconic gadget for “sit back” activities). Tickets.

Example: Home

- Pre TV: Gather 'round the radio for entertainment and news
- Pre Internet: Voice is expensive, precious commodity. Only real-time 1:1 means across space.
- TV (in the recent past): Relatively few channels & programmes targeted for mass audience.
- Internet Future:
 - tailoring to audiences of one. Special interests. IM is alternate to voice with groups and individuals based on interests and choice of friends.
- Network is very asymmetric – skewed for “click-download” use. Common content allows maximal use of caching and other smart delivery on a personalized basis. On demand services for content, e.g. audio and/or video streaming, and other services continue to grow. QoS gets added to bring cost effective broadband interaction for a portion of the same network.

Needs (usage)

- Identify the prime scenarios: aim to “catch” most enduring behaviours
- Create several “pilot” use cases that test ‘corner cases’ of implementations to find the ‘sweet spot’ – 4 Forums
- Health check against known commercial activity, and iterate
- Provide basis / measure to validate the thesis that a “sweet spot” exists

Economics

- Business models for different industries, (e.g. Telecom, Broadband, Broadcast, Entertainment/content)
- Compare criteria for success and failure
- Health check against known commercial activity, and iterate

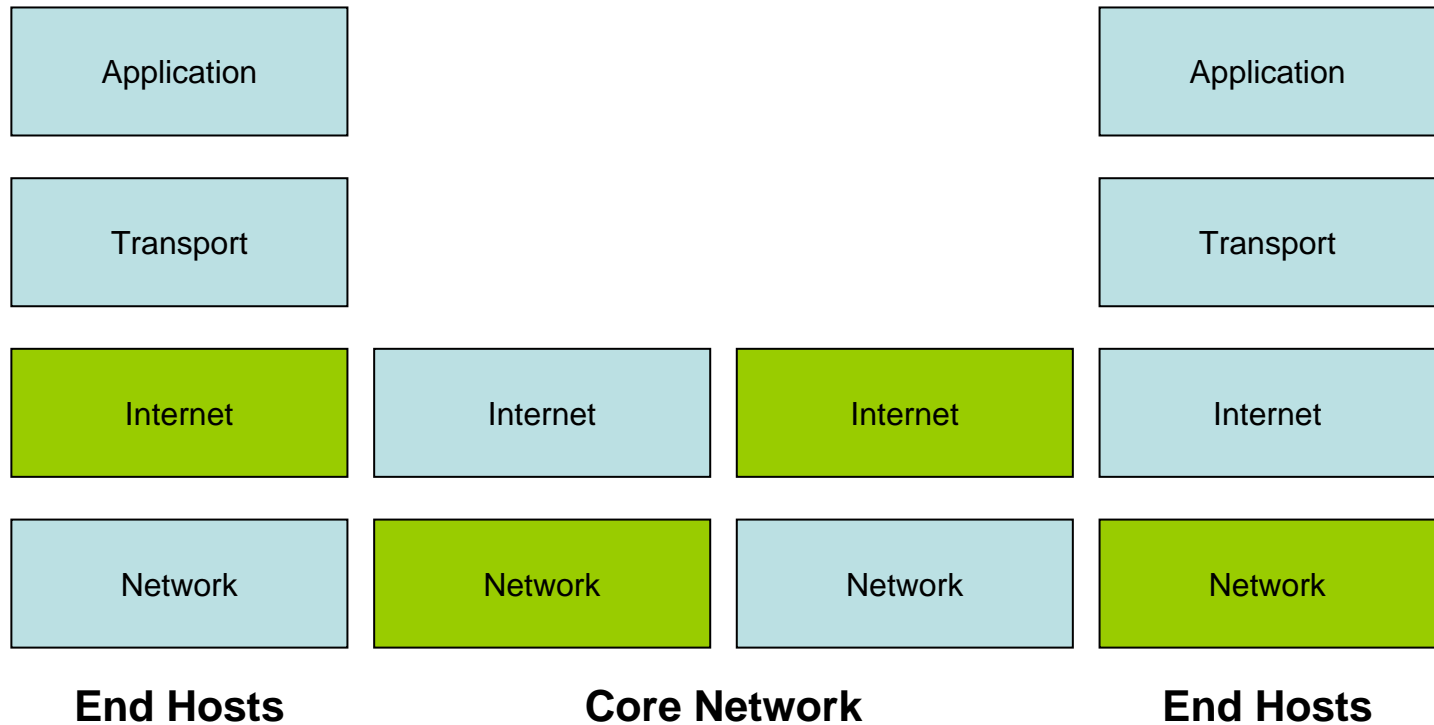
Technical

- Analyze network types:
 - Telecom/voice
 - Datacom/broadband
 - Wireless voice
 - Wireless broadcast
- Use 80/20 rule to determine
 - Minimum set of functional elements
 - Minimum set of functional characteristics

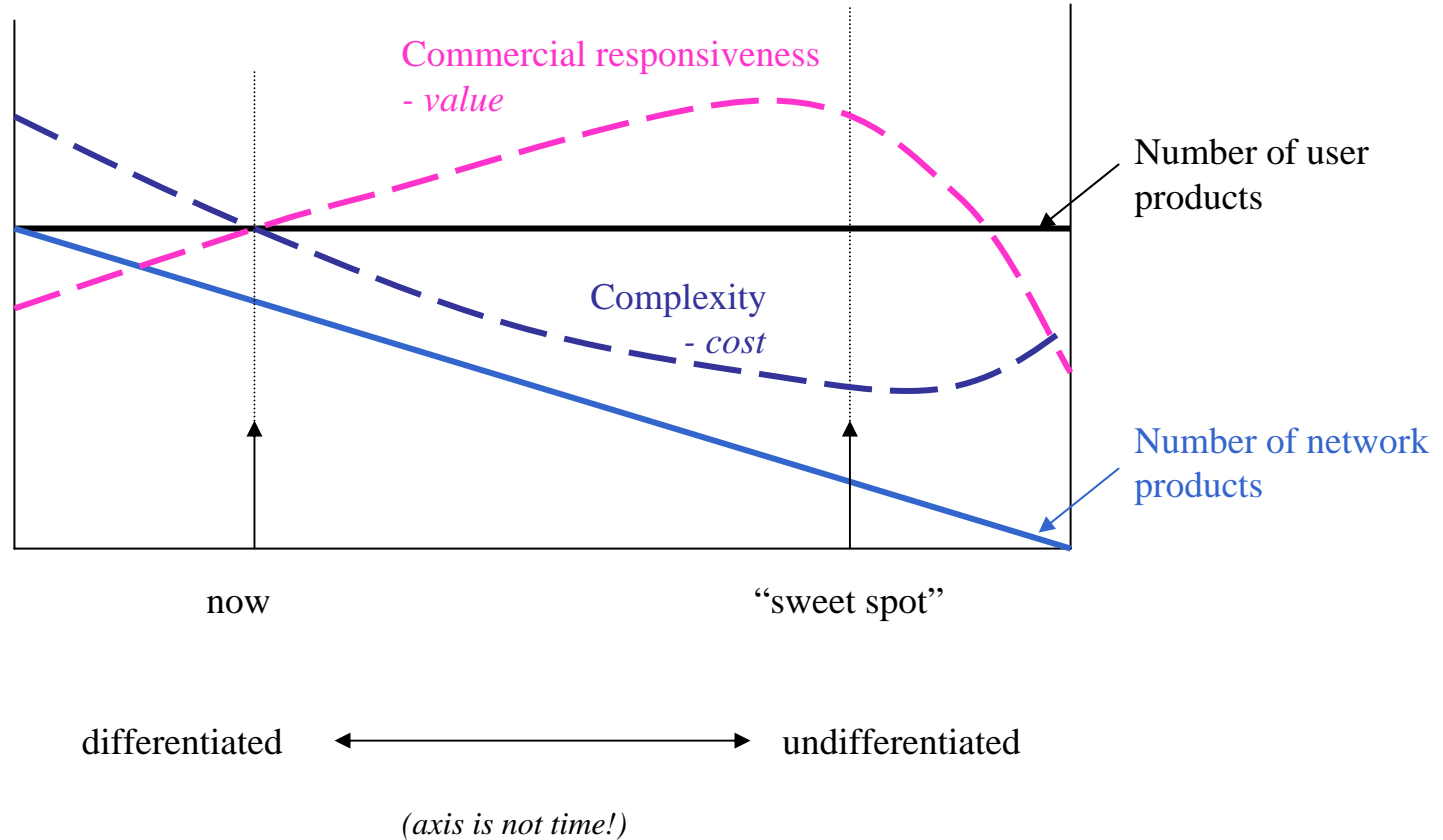
Review Meta Levels

- Face to face
 - Real time & place
 - Proxies, **personas**
- Media stuff
 - Tangible
 - Digital
 - Virtual
- Tokens & notification
 - Identity store
 - Payments
 - Locations
 - Handshakes, verifications, authentications,
 - E.g. Coin, Ticket, MP3 player, RFIDs, thumbprints, geo caching, etc.

Hypothetical Architecture of the Internet



Network products



Structuring the debate

What constitutes a healthy industry value chain?

Industry sector independent

accepted metrics
clear industry analogies

- risk/reward; investment & innovation
- risk brokering down the chain
- money flows (inside and out)
- ability to sectorise markets

How could these translate to the telecoms industry?

- product structures
- brokering interfaces internal and external
- activity grouping
- elasticity; architectural value
- how sectorisable is telecoms?

What resulting portfolios are feasible?

- doability
- clear product differences
- techno-commercial incentives
- support for existing and future end products

What products are acceptable to the market and regulators?

- product definitions
- commercial modelling
- behaviour modelling
- engagement



underpinning



visioning

value migration
customer experience
sustainability