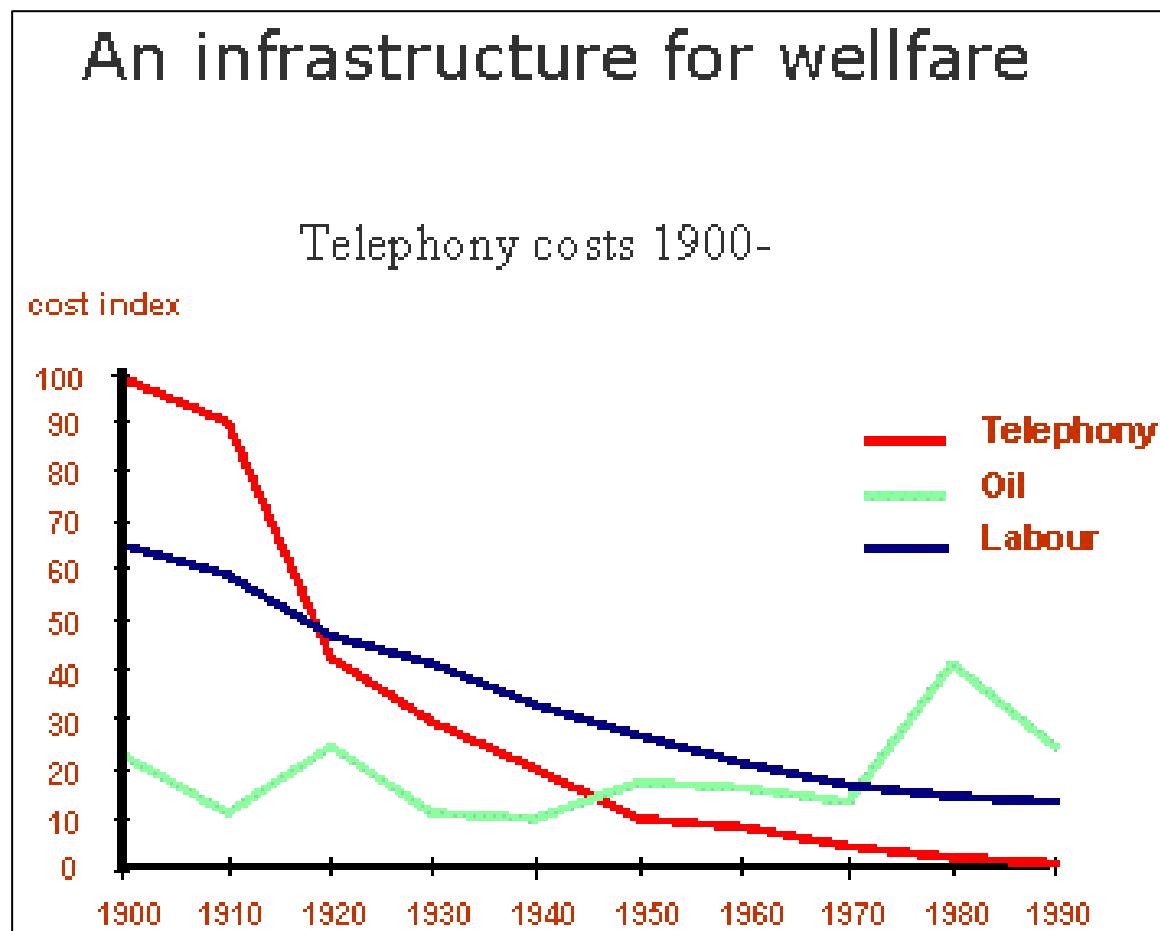


# **Hva er solefallsforretningen, og hva skjer etterpå?**

IKT og marked, ITEM, NTNU, 04 05 2007

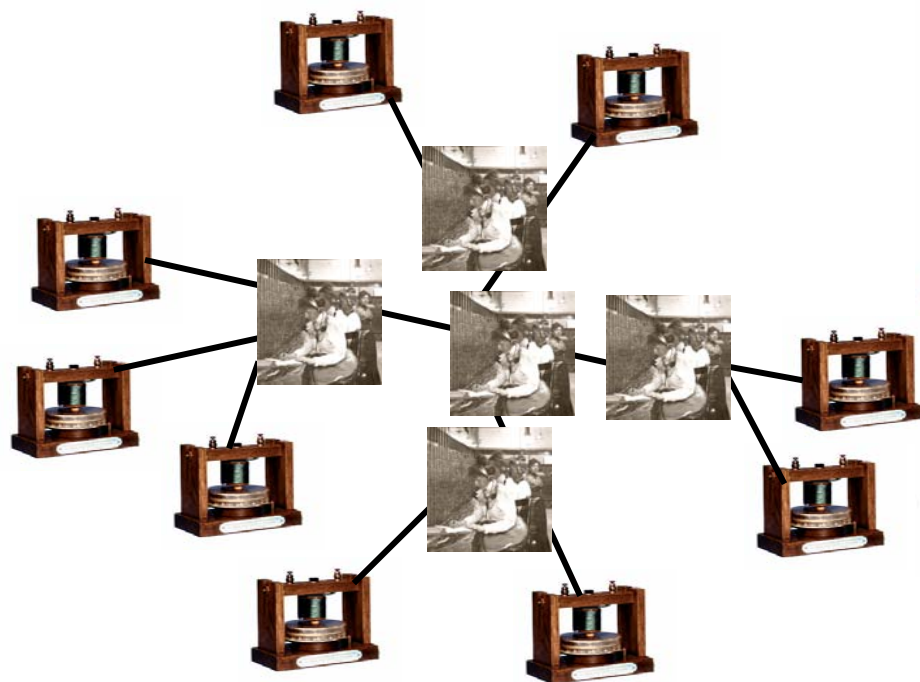
Einar Flydal,  
senior adviser, Telenor ASA

# Utgangspunktet: Enorm velferdsproduksjon



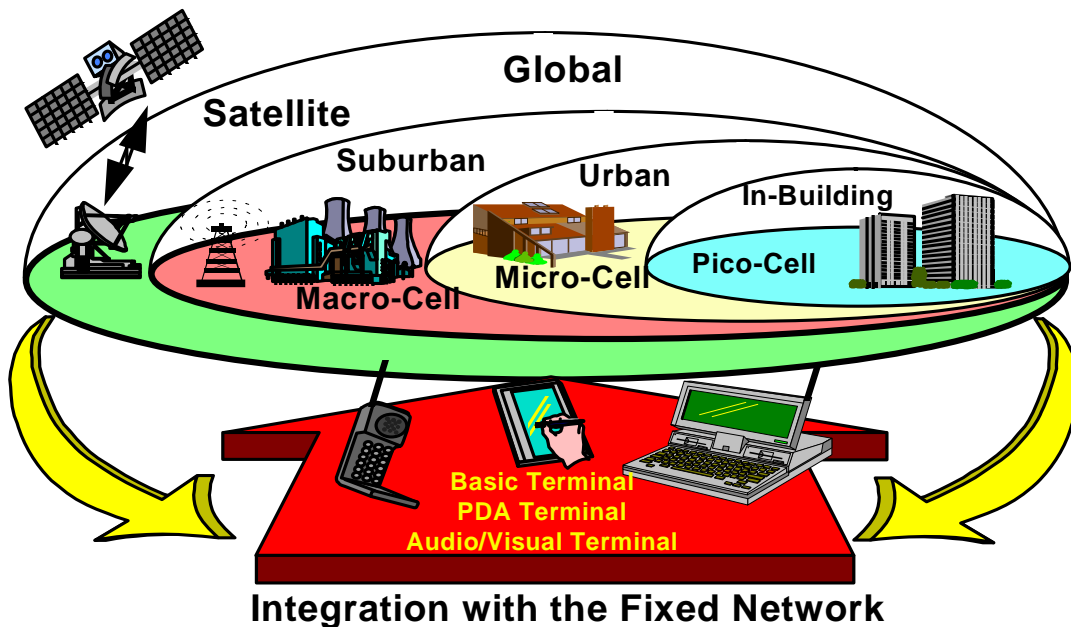
# Den gamle forretningen

- fra telefoni-system til IT-baserte tjenester



# Forventningene om "overalt, over alt slags utstyr, alltid"

- legg til bildet av strategi for tjenesteintegreert nett!



Expectations in the  
1990'ies:

Forventningene om enorm nytte



**Myndighetenes ambisjoner for effektene av  
IKT på verdenssamfunnet er enorme**

- 1995 informasjonsmyndighetene
- 1995
- 1997 politisk
- Globalt regelverk
- EU og (finans)
- Angi fjern
- or



utvikle  
nen ihht

for all annen

handel

**But only for the rich:  
By 1995, 95% of world  
population had never  
made a phone call !**

In short:

- ICT shall create welfare and work, world trade, sustainability, and turn us into a peaceful global family (Al Gore)

2005- : ...ende arkitektur-filo  
solefallsteknologi!

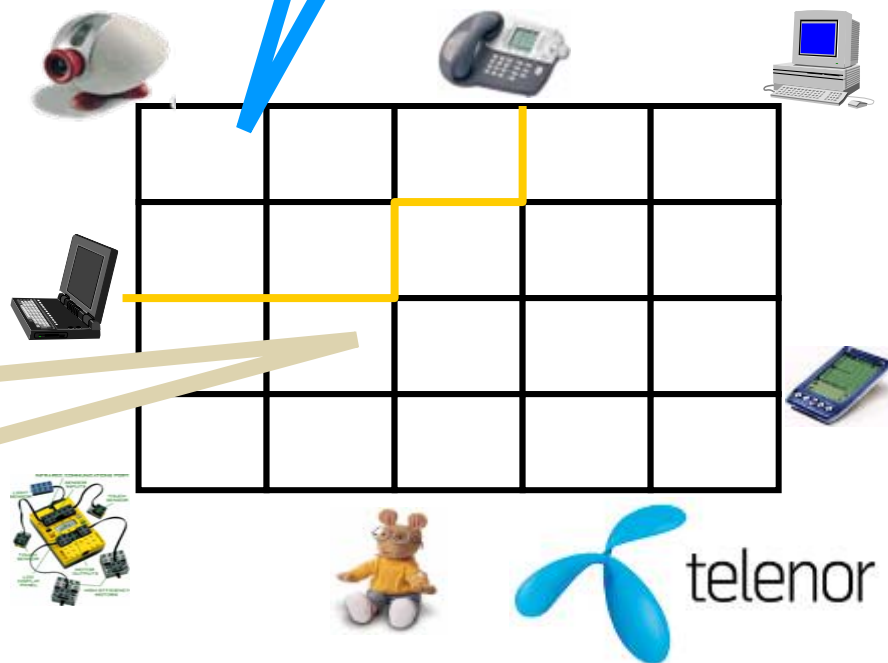
1995- : framvekst  
Enorm nytteøkning,  
men "urettferdig"!

- 1870-tallets store innovasjon:
- tale-pensing i et nett
  - rigid, systematisering
  - sentralstyrt, gitt antert og lik kvalitet
  - infrastruktur og tjeneste integrert
  - knapt gode: for deler (tilgang, lengde)

1970-tallets store innovasjon:

- desentral pensjon maskenett
  - fleksibelt, systematisering
  - overvåkning og garanti, ulik kvalitet
  - nett og tjeneste – ulike liv
  - knapt gode kapasitet (tilgang, mengde)

Internett. Kampen  
om styring pågår  
nå.



# Arkitektur-filosofiene er ikke bare "tekniske"

- monopol-er/-ister, statlige eller private
  - sentralstyring, kontroll, systemoptimalisering, uniformisering, integrasjon – den ansvarlige stat ("etatismen")
- deres utfordrere (datanett-selskap, forsvaret, hippier og kunstnere)
  - desentralisering, mangfold, individoptimalisering, tjensteseparasjon – frykten for ensretting, makt og sårbarhet (anarkismen, robusthet)
- **Illustrasjoner fra e-læringsprogrammets internett-del?**

# Resultat: Den nye forretningen i telekom

- "todelingstrusselen"
- en hærske nye utfordringer
  - fastnett: mot aksess- og transaksjonsprising, og selvstendige tjenester?
  - pakketering eller separat prising?
  - mobilnett: det samme?



## Internet

- Tree independent layers / networks
- "Physical network" has **no control**
- **Network economics** in uppermost and lowest layer
- (Free-market) **competition**





# **An Answer from the GSM world: GSM-Association Strategy**

VOA 022 – Economic growth and development, NHH,  
12.04.2007

Einar Flydal,  
senior adviser, Telenor ASA

*"Leverage core capabilities to enter new businesses"*

# The big challenge for mobile phone companies: The value systems in telco and ICT business are fundamentally transformed



**Telco net with VAS**

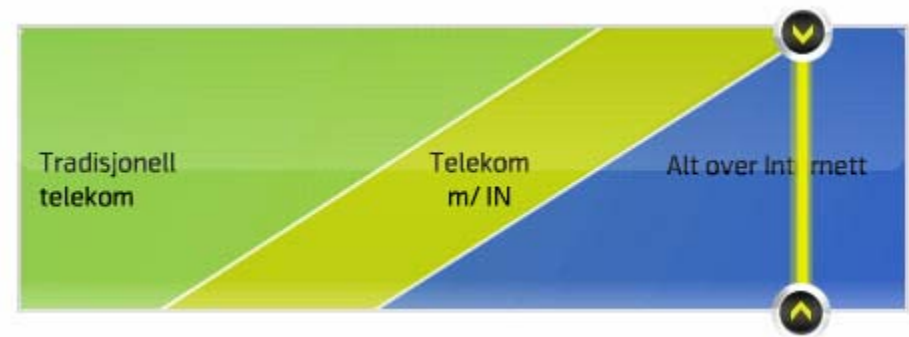
- Tree dependent layers for service creation
- Network layer has control
- **Network economics** in uppermost and lowest layer
- (National) Monopolies



**Internet**

- Tree independent layers / networks
- "Physical network" has **no control**
- **Network economics** in uppermost and lowest layer
- (Free-market) **competition**

# What telcos do to meet the challenge



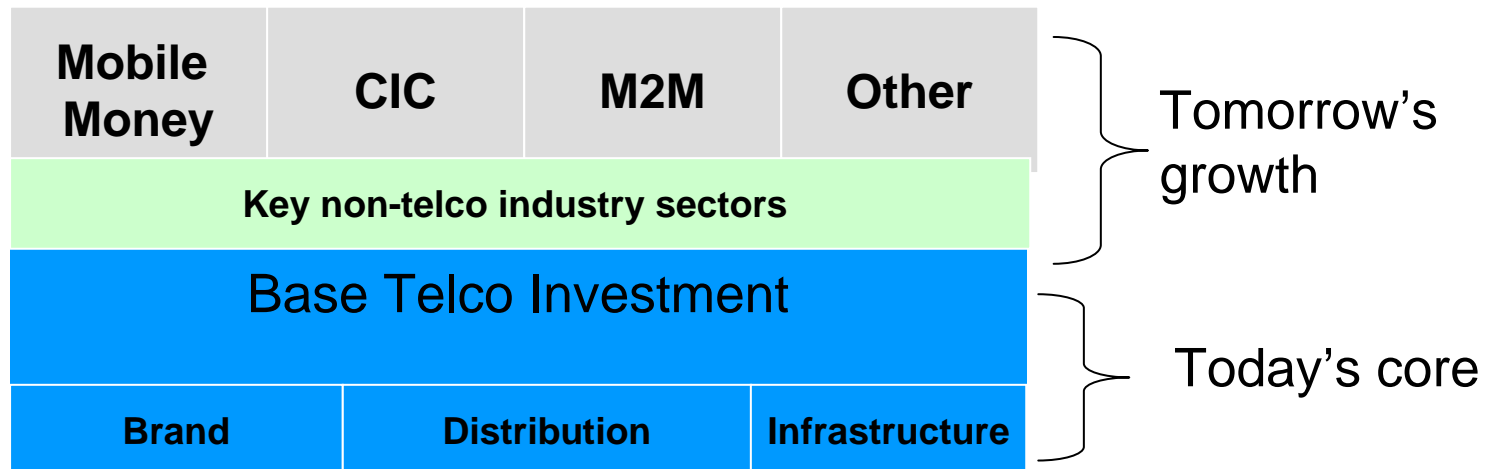
- Live on traditional incomes from traditional telecom, and try to delay the sunset
  - Try to find new markets, quiet zones, exert market power, and declare themselves adherents to competition
- Live on new income from modern mobile telephony which was created by "Intelligent networks" (1990-ies), try to expand the market, and to delay the sunset
  - i.e. exploit ripe business and technology
- (Other added services to traditional telco products)
- Try to establish a position in a new "layered" world with lost control on services and terminals
  - Try to establish strongholds with bundled products across layers
  - Try to find a way to live from new business models...

# The GSM Association has made "emerging markets" a strategic area – Why?

- Mobile telephony in **developed** countries is approaching its saturation points – i.e. a need for new markets
- Mobile telephony is becoming a sunset technology – with wireless broadband and Internet software taking over the market, with lower margins (& more difficult business models)
- Hence, mobile telephony rollouts in emerging markets are
  - ways of extending the life of the mobile telephony business by re-use of "old" solutions in after-markets (harvest phase)
  - hard exercises in slimming down the costs of operation to accustom to lower margins
  - labs for finding business models and income sources
  - fights for scale in a business driven by network economics, i.e. a business where strategy is about scale, fixed costs, or niche
- Simple problems demanding complex solutions which – in technical terms – are readily available
- Huge potential for the CSR argument: The welfare function is convincing

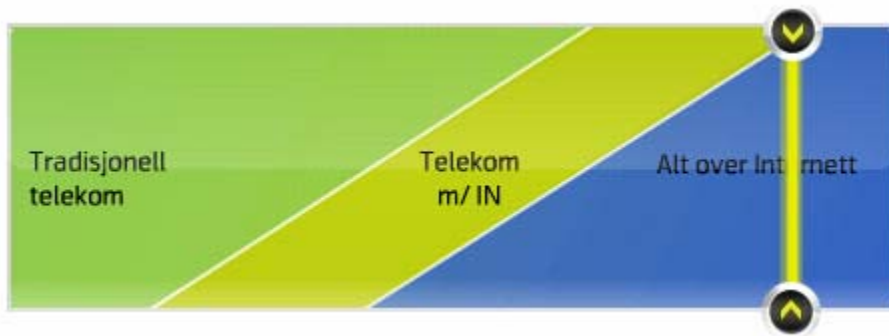
# Leapfrogging Development in “Emerging Markets” is a business strategy for the ICT business

- ICT network operators now target key services such as financial services, health information, energy etc. in countries with lacking traditional infrastructure
- They introduce more accessible and efficient mobile based solutions for neglected segments, i.e. “after-markets”
- They add growth platforms on top of their existing core business by introducing radically new business models
- By doing so, they increase the value of our infrastructure and distribution in their countries of presence



# GSM-A strategy 2005 -

- Exploit ripe business and technology
- Prolong transition period
- Establish a position in a layered world
- Establish strongholds with bundled products across layers
- Business: Still a long way to the saturation point

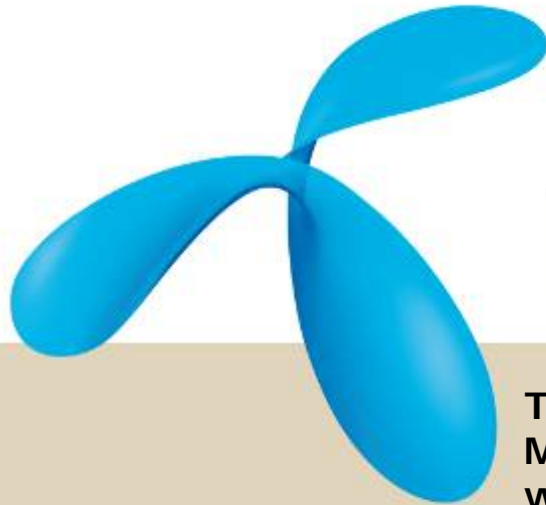
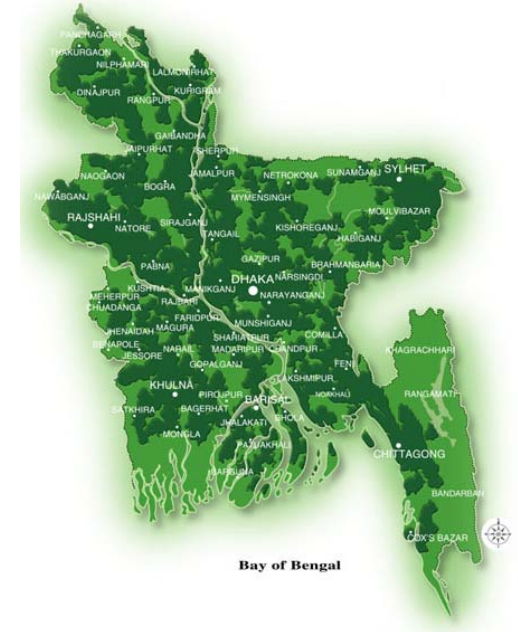


- "Social engineering", providing basic services for the under-served ("Bottom-Of-the-Pyramid") and SMEs



FTSE4Good

**Bangladesh 1997:**  
phone system: a mess  
500.000 fixed phone lines  
90%: gov.adm + business



telenor

**The Bangladeshi GrameenPhone and its Village Phone Ladies:  
Microfinance, infrastructure funding, and large scale business  
working together**

**Thorolf Rafto Memorial Symposium  
Human rights and economic development  
NHH Thursday, November 23, 2006**

Einar Flydal  
senior adviser  
Telenor ASA

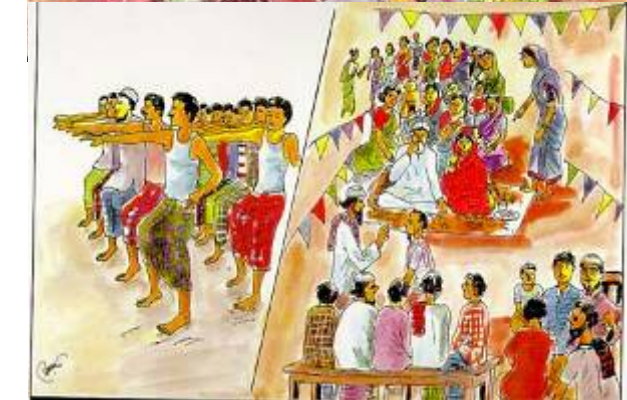
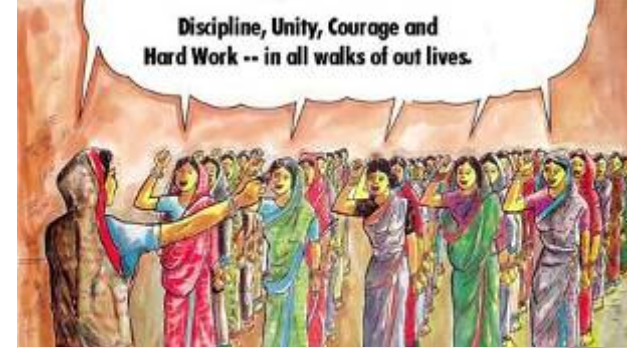
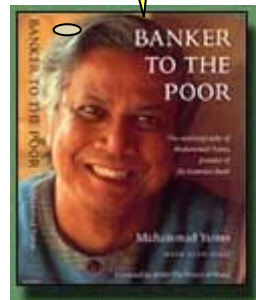


# Flashback into microcredit: The poverty quiz: Why do people starve?

Bangladeshi characteristics:

- 130 mill people
  - 80.000 villages
  - Lots of resources
  - Tiny, rich middle class
  - Well educated people are unemployed
  - Endless poverty
- Why? Analysis needed!
- "Infrastructural lock-in" / catch22 :
    - time consuming to survive
    - lack of capital
    - lack of information
    - landlords, moneylenders and middlemen easily exploit the poor

To empower poor people  
we must provide them with  
the loans they need to exploit  
their talents!  
So, I shall make a bank for  
the poor!





So, prof. Iunus creates



volumes 2001:

Serial	Item	Nos.	Million (Taka)	Million (US\$)
1.	Number Of Branches	1,160	-	-
2	Number Of Villages	40,212	-	-
3.	Number Of Centers	68,440	-	-
4.	Number Of Members	2,373,841	-	-
	Female	2,251,052	-	-
	Male	122,789	-	-
5.	Cumulative number of houses built with Grameen Bank housing loans	532,169	-	-
6.	Cumulative amount disbursed	-	136,985.56	3,227.99
7.	Amount disbursed during this month	-	1,398.85	25.90
8.	Cumulative amount of housing loans disbursed	-	7,504.09	186.71
9.	Housing loans disbursed during this month	-	5.40	0.10
10.	Cumulative amount of savings in group fund	-	10,850.84	252.78
11.	Balance of total savings (Excluding Group Fund)	-	1,408.44	26.08

(February, 2001)



- ... and nomenclature replications follow, all over the world from Argentina via Norway to Mongolia...



# Then, the GrameenPhone idea was born out of an electricity outage (1995)

NORAD

Remember  
how time consuming it is  
to be poor?

Telephones would help!  
The national fixed line telco  
is absent in the villages!  
Why not start with  
modern telecom?

We shall help  
with infrastructure  
financing!

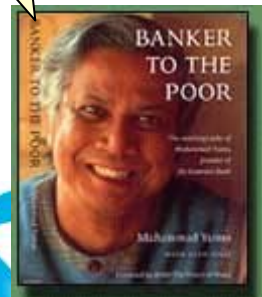
We may use the Grameen model:  
A mobile handset would be like a cow!  
Let us find a telco  
who will help doing this!

- 40% of *households* depend on *income* of *guest workers* over
- In a country without banks an high *literacy*, how do they send money?
- Market prices in the cities are unknown to the farmers.
- How does a farmer avoid getting cheated?

Iqbad S. Quadir  
investment analyst  
Wall Street

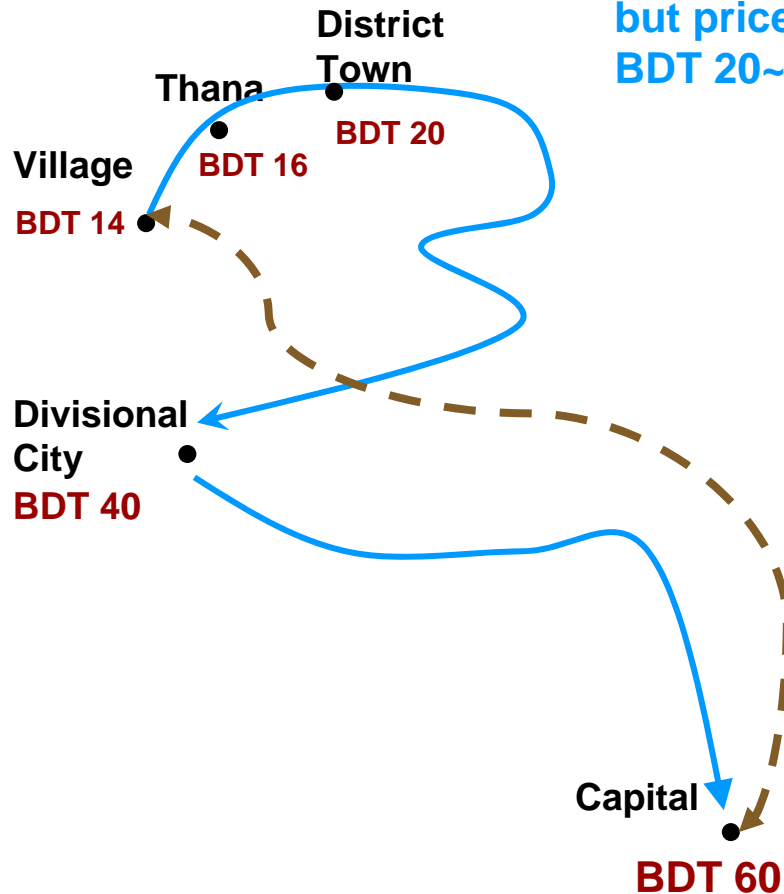


Jan Edvard Thygesen,  
former CEO  
Telenor Invest AS



# The Eggplant Case: Reducing Friction

Transportation Cost:  
BDT 2- 4 at max,  
but price increases with  
BDT 20~40



Price increases inconsistently with costs.  
Middleman takes away profit.



- Price transparency
- ↓
- Reduces profits for middleman
  - Strengthens the local farmer
  - Reduces opportunities for corruption
  - Adds local purchasing power and growth
  - **Efficient logistics, i.e. more sustainable?**
- ↓
- Adds revenues to network operator
  - Creates an ICT infrastructure ready to be used for other services as well



# GrameenPhone's business idea



- Provide mobile communication in rural areas and cities
- Build optic fiber network along railway line - NORAD
- Build up mobilephone operation and stepwise infrastructure – Telenor
- "Village Phone Ladies" recruitment, education, financing, collecting – Grameen Bank (Grameen Telecom)
- Investment – Asian Dev. Bank, Commonwealth Dev. Corp, Marubeni, Gonofone
- Gets liscence 1996, gets on the air spring 1997





# The VillagePhone Program

- providing communications infrastructure on a village basis -

- A woman gets a loan from Grameen Bank and buys a mobile phone handset
- The micro credits are based on women network groups, i.e. exploiting strong social structures
- Grameen Telecom provides training: how to operate handset, how to charge the users
- The Grameen Bank network is used for loans and billing
- **Result:**  
*The village gets telecom service, and the lady gets prestigious work*
- The village gets information!
- People can be reached!
- The power of middlemen weakens



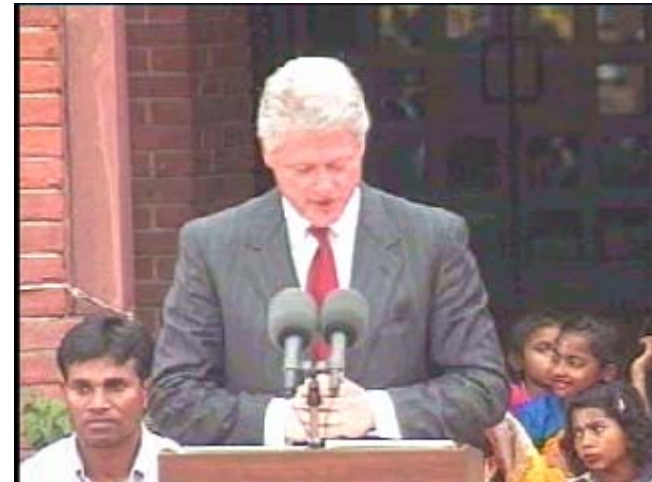
- **Village phone ladies income:** three times the per capita GNP of Bangladesh
- **Village phone traffic revenue:** 3-4 times an ordinary subscriber



# International attention

*"I want my fellow Americans to know that the people of Bangladesh are a good investment. With loans to buy cell phones, entire villages are brought into the information age. I want people throughout the world to know this story."*

U.S. President Bill Clinton,  
Dhaka, March, 2000



# No magic!

- Not possible without the Grameen Bank brand, relations, and social empowerment system!
- Difficult, but fast startup
- High enthusiasm among the employees
- An orphanage established and supported by Telenor employees
- Easy for the old generation Telenor people to understand the Grameen concept and our win-win play
- But support at home only from Tormod Hermansen, until the market took off

Ola Ree,  
MD, GrameenPhone, 2000





# Business: The lion's share is in the towns

But village phones are essential as traffic generators, for the business model, and for the political legitimacy

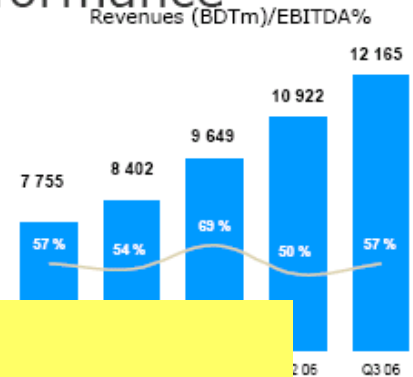
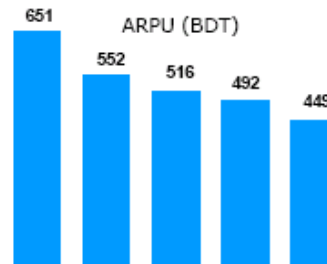




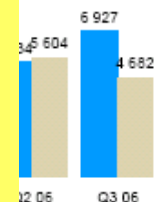
# Status 2006

Super

## Very Strong Financial Performance



- 10+ million users!
- 230.000+ village phones, i.e. approx. 230.000+ new female jobs
- 5.000 employees, 70.000 indirectly
- new standard set for health, environment, safety, work organisation, ethics
- Provides Bangladesh with infrastructure for further service development
- Telenor is largest foreign investor in Bangladesh
- Company value estimated to ~3,5 billion US\$
- Costs: Norad: ~500 mill NOK, Telenor: 565 mill NOK (-367 mill NOK)
- Owners: Telenor: 62%, GrameenBank/Grameen Telecom: 38%



GrameenPhone

one

Coverage end 2004

Coverage end 2005

Coverage end 2006



# GrameenPhone to Grameen Bank strategy: Part of a huge poverty alleviation system

- **Basic means:**

- microcredit,
- education
- the poors' own desires of a better life

- **Supplementary means:**

- agricultural initiatives
- fishfarming initiatives
- handcrafts initiatives
- electricity initiatives
- .....
- telecom & IT initiatives
  - Village Phones
  - distance education
  - applications for the poor
  - distance health services
- .....

- **Grameen Bank (NGO)**

- loans and savings
- women's networks
- health information
- self confidence building

- **Grameen daughter organisations**

Grameen Krishi/Agriculture  
Grameen Motsho/Fisheries  
Grameen Uddog/Handloom  
Grameen Knitwear Ltd.  
Grameen Shamogree/Products  
Grameen Shakti/Energy  
Grameen Kalyan/Welfare  
Grameen Telecom  
GrameenPhone  
Grameen Communications  
Grameen Software  
Grameen CyberNet Ltd.

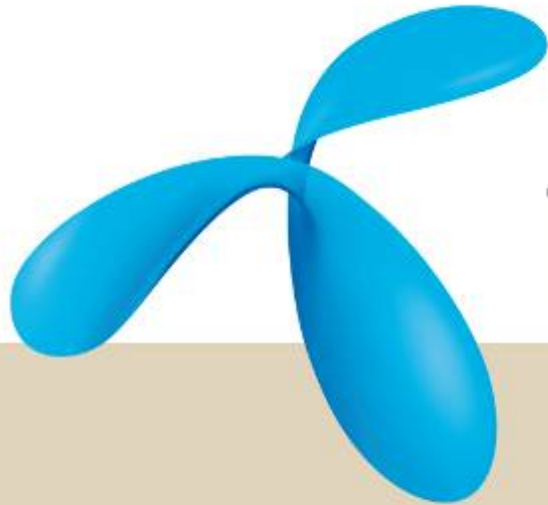
Grameen Trust  
Grameen Fund



Whether called CSR or not:

## LEARNINGS:

- Possible to do business that really matters to people
- Strange partnerships may be strong tools for development
- A Western vision not considered relevant to the really poor, became an essential development tool



# telenor


## **Telenor Strategy and GrameenPhone**

VOA 022 – Economic growth and development, NHH,  
12.04.2007

Einar Flydal,  
senior adviser, Telenor ASA

# Telenor Strategy started with GrameenPhone

- Telenor's international mobile business started here



Norway	Telenor Mobil	100%
Denmark	Sonofon	100%
Ukraine	Kyivstar	56.5%
Hungary	Pannon	100%
Malaysia	DiGi	61%
Bangladesh	GrameenPhone	62%
Montenegro	ProMonte	100%
Pakistan	Telenor Pakistan	100%
Sweden	Telenor Mobile	100%
	Vodafone Sweden	100%
Thailand	DTAC*	69.3%
Russia	Beeline	29.9%
Austria	One	17.5%

\*Economic exposure



# Telenor background

- **partner of the NMT consortium**
  - (Nordic Mobile Telephone system, world's first automatic mobile phone system)
- **partner of the GSM consortium**
  - winner of proof-of-concept competition
- **Scandinavian social welfare agenda**
- **The social-democratic mix:**
  - efficient organisation
  - cooperation state – business
- **advantage from mobile phone systems turned into a real option strategy**







# "The Financially Constrained"

- Household income 1-2\$ / day
- Aspire for better life for children
- Risk averse
- Lowest cost of ownership
- Influenced by hearsay
- High Illiteracy

$$\text{ARPU} = \pm 3\$$$

**Extreeme demands for low cost operations!**

A growth potential





Scenario 2009:  
25 Million Subscribers  
Marginal ARPU \$ 1

1 to 2 hours travel from Dhaka – glimpses of Rural area







# Next steps:



## An old Grameen Bank and Telco dream: Community Information Centres (CIC)

- GrameenPhone and partners establish approx 500 centres by end 2006 based on mobile connectivity and Internet
- Offer “tele cottage” services:
  - standard Internet services
  - telemedicine (24/7 now in service)
  - distance work
  - ...
- Self-financed or supported by micro finance
- Owned and operated by a local entrepreneurs

### Community Information Center



Stay in touch with loved ones abroad      Telemedicine



Job Search Home & Abroad      Government Applications

# The Bills Payment and Money Remittance Case: What does it take in a country with no or expensive bank services?

<ul style="list-style-type: none"> <li>• <u>Banks / Western Union</u></li> </ul>	<ul style="list-style-type: none"> <li>• <u>Hawala</u></li> </ul>	<ul style="list-style-type: none"> <li>• <u>Friends</u></li> </ul>	<ul style="list-style-type: none"> <li>• <u>Through mobile phone</u></li> </ul>
<ul style="list-style-type: none"> <li>• Cities</li> </ul>	<ul style="list-style-type: none"> <li>• Towns</li> </ul>	<ul style="list-style-type: none"> <li>• Anywhere</li> </ul>	<ul style="list-style-type: none"> <li>• Village/Town</li> </ul>
<ul style="list-style-type: none"> <li>• Costly</li> </ul>	<ul style="list-style-type: none"> <li>• Cheaper</li> </ul>	<ul style="list-style-type: none"> <li>• Cheap</li> </ul>	<ul style="list-style-type: none"> <li>• Cheap</li> </ul>
<ul style="list-style-type: none"> <li>• Safe</li> </ul>	<ul style="list-style-type: none"> <li>• Safe?</li> </ul>	<ul style="list-style-type: none"> <li>• Safe?</li> </ul>	<ul style="list-style-type: none"> <li>• Safe</li> </ul>
<ul style="list-style-type: none"> <li>• Fast</li> </ul>	<ul style="list-style-type: none"> <li>• Fast</li> </ul>	<ul style="list-style-type: none"> <li>• Slow?</li> </ul>	<ul style="list-style-type: none"> <li>• Fast</li> </ul>
<ul style="list-style-type: none"> <li>• Legal</li> </ul>	<ul style="list-style-type: none"> <li>• Illegal</li> </ul>	<ul style="list-style-type: none"> <li>• Legal(?)</li> </ul>	<ul style="list-style-type: none"> <li>• Legal</li> </ul>
<ul style="list-style-type: none"> <li>• Difficult</li> </ul>	<ul style="list-style-type: none"> <li>• Difficult</li> </ul>	<ul style="list-style-type: none"> <li>• Difficult?</li> </ul>	<ul style="list-style-type: none"> <li>• Simple</li> </ul>
<ul style="list-style-type: none"> <li>• Travel needed</li> </ul>	<ul style="list-style-type: none"> <li>• Travel needed</li> </ul>	<ul style="list-style-type: none"> <li>• Travel (?)</li> </ul>	<ul style="list-style-type: none"> <li>• No/little travel</li> </ul>

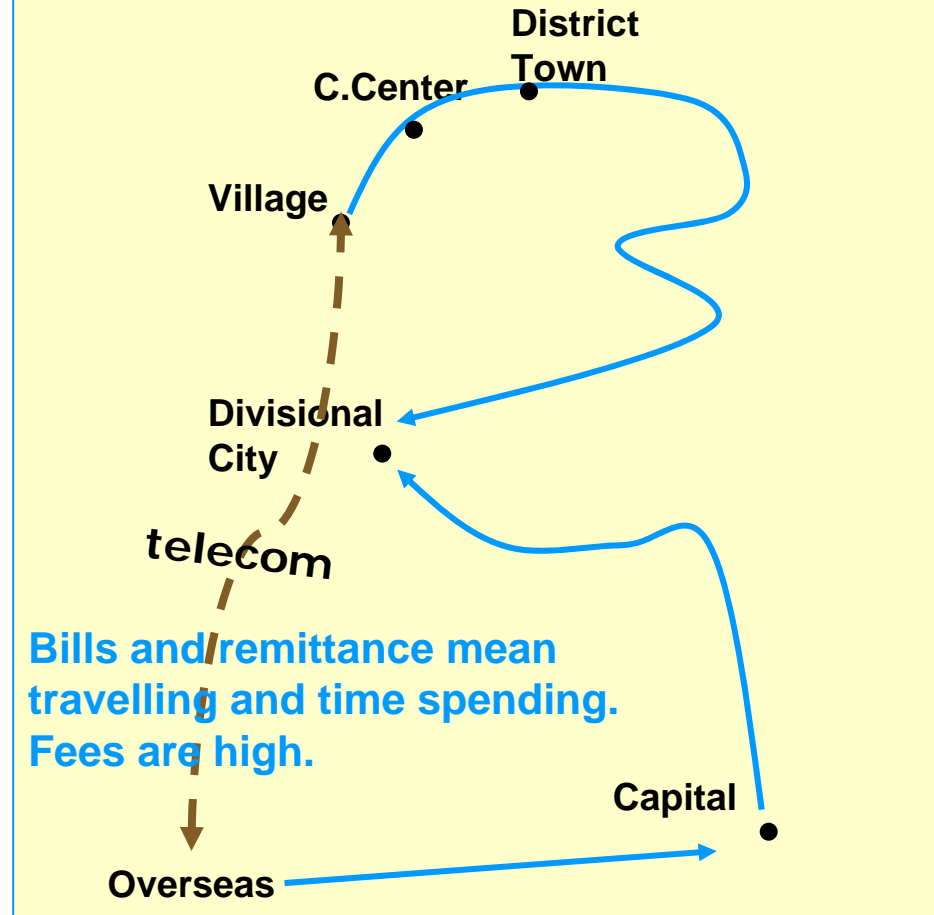
- Banks and roads are the costly infrastructures that only reach the few
- The mobile network and phones constitute a far more welfare efficient network
- *Friction in the economic system er greatly reduced*

# ICT as a new and ultra-efficient infrastructure

- has a terrific potential as a means to leapfrogging, i.e. bypass the slower Western development phases as to reducing transactions friction and thereby relieving poverty
- ICT is the 21st century equivalent to roads, railroads, canals, diligences, newspapers, post, couriers, telegraph and banks
- New alliances between NGOs, UN development programs, research, profit organizations, etc. break the barriers in the eco-system
- Powerful distribution capabilities through BOP (Bottom-Of-the Pyramid) entrepreneurs and SMEs

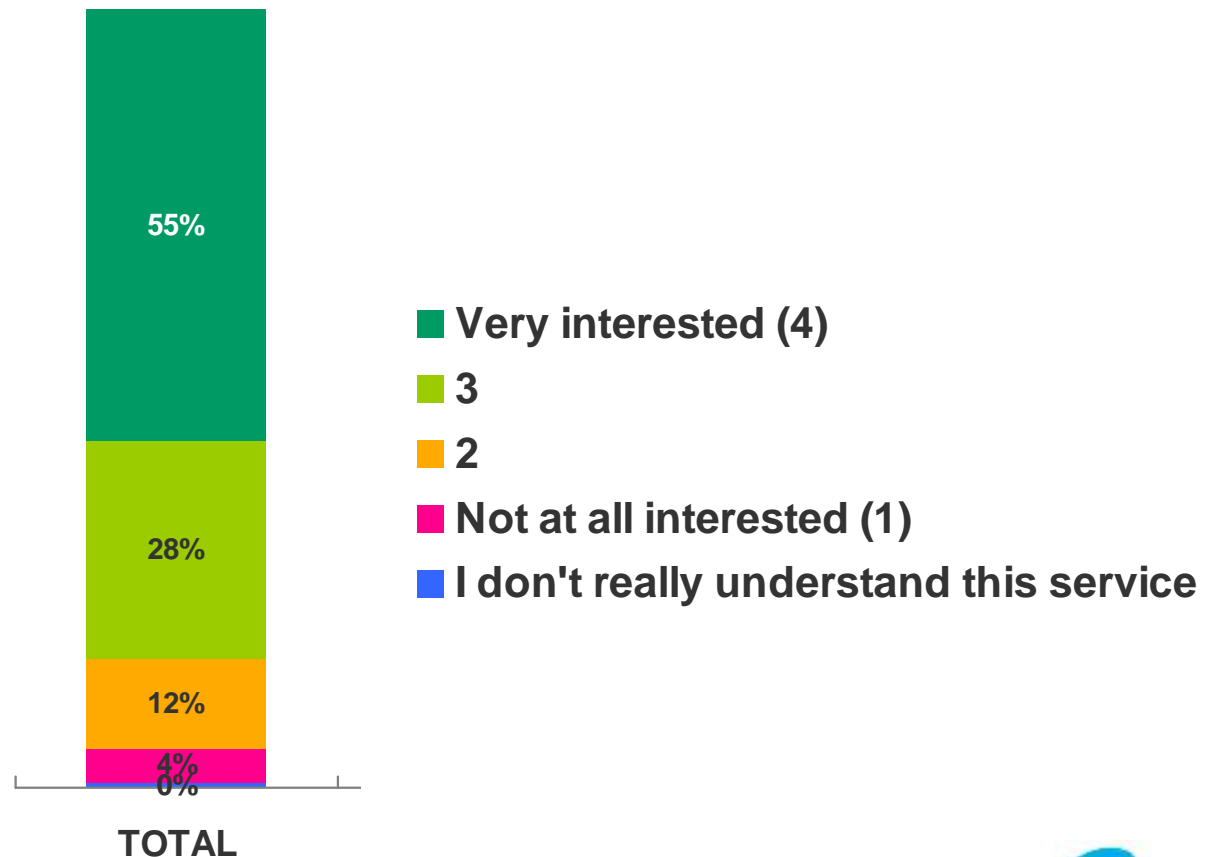
- "Social engineering"

## Bill payment and remittance




# Is “the FC segment” interested?

**Survey Question:** *Would you be interested in a service, which allows you to pay for purchases of food and other household items, even your bills, simply using your mobile phone?* (N=431)



# The 1. Step... **BillPay**

Convenience, simplicity, trust and transparency



Pay bills when you want,  
where you want...

Account gets updated instantly,  
you get instant SMS confirmation

Available to everyone,  
not just Grameenphone  
customers



# The GrameenPhone shops/channels/Community Info Centers may become future economic pivots



## ...A new light on the present conflict?

- Is the conflict inspired by this strategy of service expansion, making the mobile network pivotal for social and economic development?
- Who should then control GrameenPhone?
  - operations, cash flow, ownership, future strategy and priorities, profits and capital
- What is then best for the future of the business?
  - Could GrameenPhone expanded without Telenor taking the reins and expand its ownership?
  - Dependency of Telenor's expertise, innovation, scale and culture?
- What is then best for the future of the welfare creation in Bangladesh?
- What is then the symbolical value and importance?

Discussion?

# En ny joker: Miljøpotensialet som den nye agenda

## Givens:

- Climate change is probably the single most important ~~environmental~~ problem the world faces today.
- Governments have no option but to tackle the problem head-on.
- “De-materialization” / “virtualization” has been pointed out as a key tool to reduce resource/energy use

## Questions we need to address:

- How can the ICT industry take part?
- Will the warnings stimulate a **rush of investments** in clean and low-emission ICT technologies?
- Can we trust the private sector to **deliver credible solutions** to the problems?
- Or do we need **bold government policies** and **public regulation**?
- ***To be concrete:***  
*Can we improve the ratio **product : energy and emissions** by **factor 4 or 10**?*

# Faktor 10 og faktor 4

- Gammelt krav fra miljøbevegelsen: "Effektivisering av ressursbruken med faktor 10, subsidiært faktor 4!"

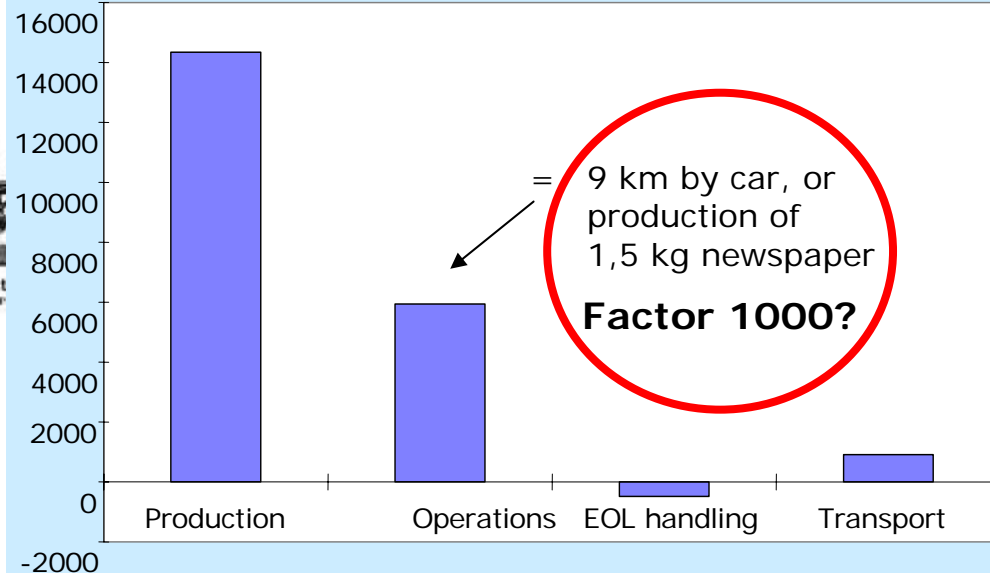


# The upside

- ICT is the 21st Century equivalent to:
  - roads, railroads, canals, diligences, newspapers, post, couriers, telegraphy and banks..., only far more efficient
- ICT based solutions are basic in all aspects of human life – like DNA, plastic, wood, oil, air.
- The ICT business offers solutions with factor 4 – 10 or better, and has done so for decades!



The life of a mobile phone: CO<sub>2</sub>-eqv. (grams) (1995)



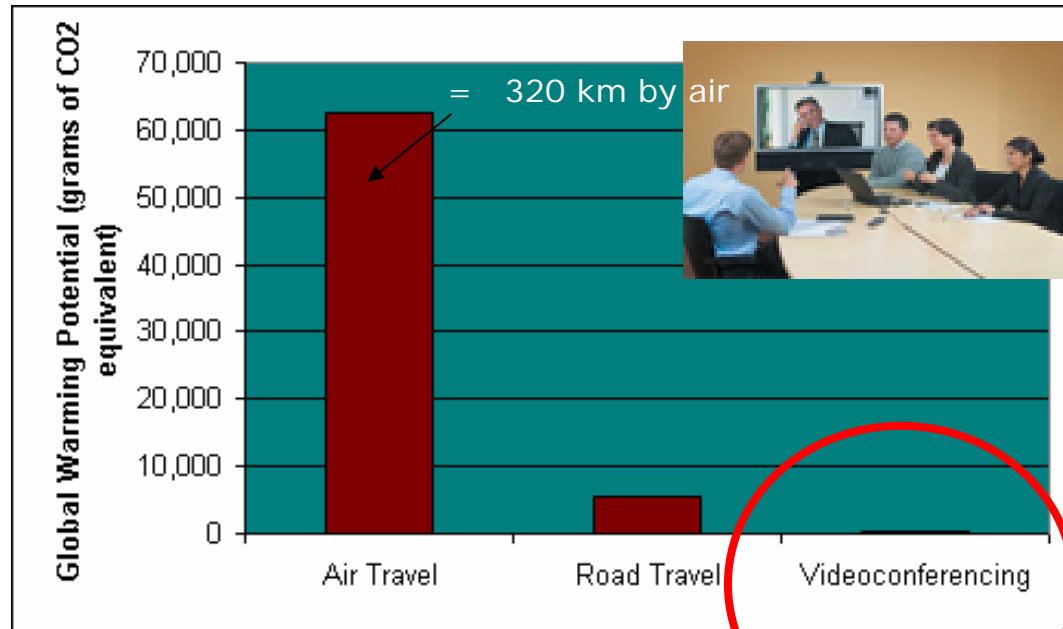
ca. 1995:

Voice messageing: Alternative solutions	Home answering machine	Answering service from telco	Factor
Weight (kg)	1,2	0,06	20
Energy use (kWh)	13008	5,7	230
Greenhouse effect (g CO <sub>2</sub> -eqv)	140000	590	240

ca. 1995:

# The upside

- ICT is the 21st Century equivalent to:
  - roads, railroads, canals, diligences, newspapers, post, couriers, telegraphy and banks..., only far more efficient
- ICT based solutions are basic in all aspects of human life – like DNA, plastic, wood, oil, air.
- The ICT business offers solutions with factor 4 – 10 or better, and has done so for decades!
- The business case is clear.
- The products are both consumer products and technologies for industries – large and small



**Alternative Budgets for a 1 hour lecture to be held in Bergen, Norway, 1 June 1995 (NOK):**

**Alternative 1:**

airplane Oslo – Bergen - Oslo,  
stay over night,  
fee, travel and waiting:

**8.500 NOK**

**Alternative 2:**

video conference, test, telecom, fee, waiting,  
1% depreciation of equipment:

**1.768 NOK**

**Savings 80%**



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- calls
- meetings
- web-based seminars
- document exchange

Next generation telephony  
= just software



**Factor = ?**



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- Remote operations, administration, logistics
- Robotics, production equipment

**Ormen Lange oil field**  
remote controlled from land offices

**Factor = extremely high!**

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Lockheed Martin Pole Cat  
Sneak photo 19.07.06 of prototype

- To be used by US Air Force for long distance operations
- wing span: 28 m
- weight: 4,5 tonnes
- 90% printed on a composite printer!

## Next-to-Beaming:

- remote copying
- remote production-on-demand

**Factor = high**

Fast, Affordable 3D Printing System



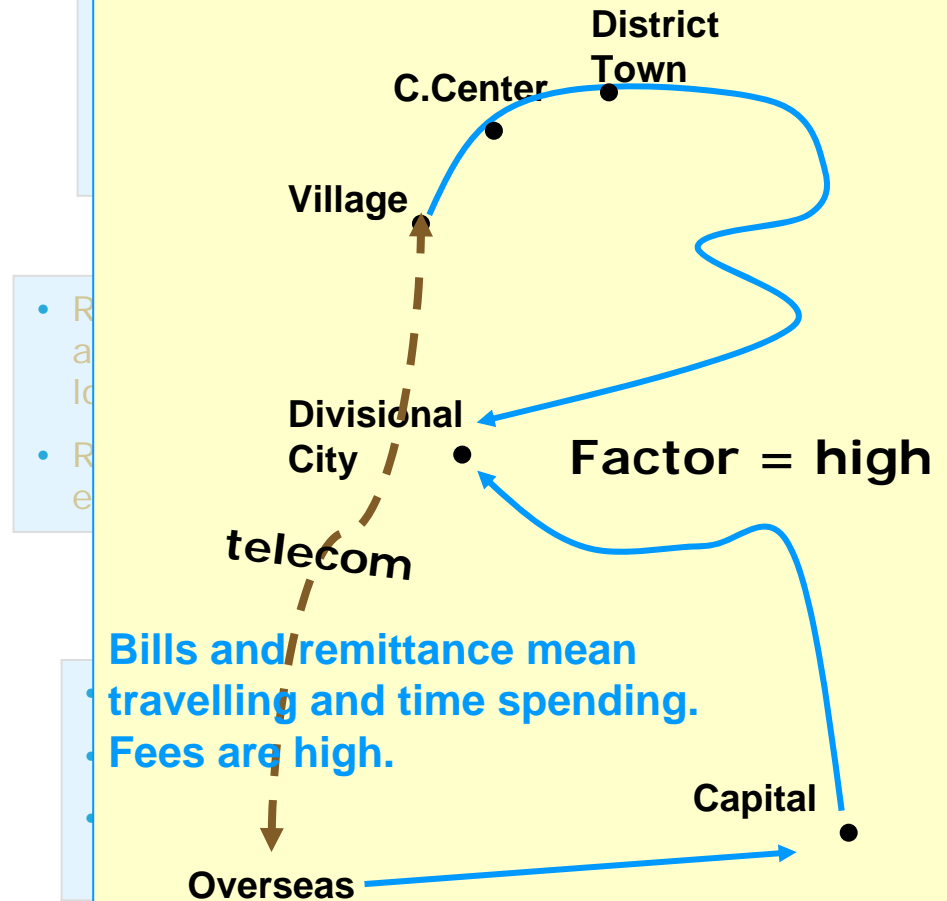
Scan any object in the tightest spaces and do it in real-time with one continuous scan.



# The upside

- ICT is the 21st Century equivalent to:
  - roads, railroads, canals, diligences, newspapers, post, couriers, telegraphy and banks..., only far more efficient
- ICT based solutions are basic in all aspects of human life – like DNA, plastic, wood, oil, air.
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## Bill payment and remittance



- "Social engineering", providing basic services for the under-served ("Bottom-Of-the-Pyramid") and SMEs



# The upside

- ICT is the 21st Century equivalent to:
  - roads, railroads, canals, diligences, newspapers, post, couriers, telegraphy and banks., only far more efficient
- ICT based solutions are basic in all aspects of human life – like DNA, plastic, wood, oil, air.
- The ICT business offers solutions with factor 4 – 10 or better, and has done so for decades!
- Since the 1990-ies, the hype words are:
- **"virtualization", "decoupling", "de-materialization":**

- calls
- meetings
- web-based seminars
- document exchange

- Remote operations, administration,



- remote copying
- remote production-on-demand

- "Social engineering", providing basic services for the under-served ("Bottom-Of-the-Pyramid") and SMEs

- mail
  - > email
- paper advertising
  - > advertising on the net
- newspapers
  - > news sites
- music discs
  - > CDs (10 Giga/year)
  - > MP3 downloading
- books
  - > ebooks
- archives
  - > databases
- libraries
  - > net resources (55 Giga docs, up 7,3 mill web pages/day!)
- atlases
  - > GoogleEarth
- film rolls
  - > streaming

**Factor = high**



# The upside : **Solutions are there**, and they work!

- calls
- meetings
- web-based seminars
- document exchange

## “De-materialized value creation”



Telco networks / Internet

- Remote administration
- Remote logistics
- Robotic equipment

- Next generation
- Remote monitoring
- Remote diagnosis

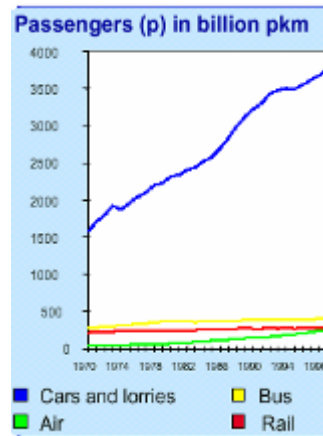
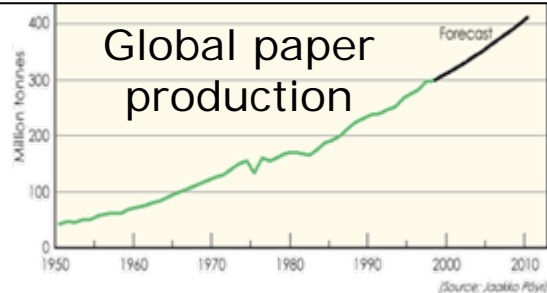
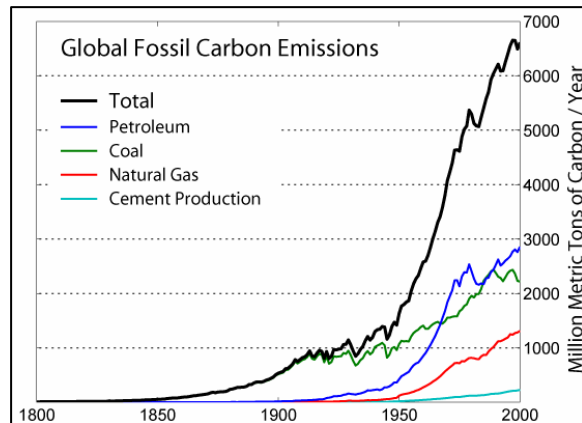
- With ambitions of 30-90 % reduction in energy consumption and emissions, **we can simply not let such opportunities go!**
- Invented with governmental funding of **basic technology development – not market driven**
- Much private funding of **incremental developments and commercialization – market driven**

- “Social engineering”, providing basic services for the under-served (“Bottom-Of-the-Pyramid”) and SMEs

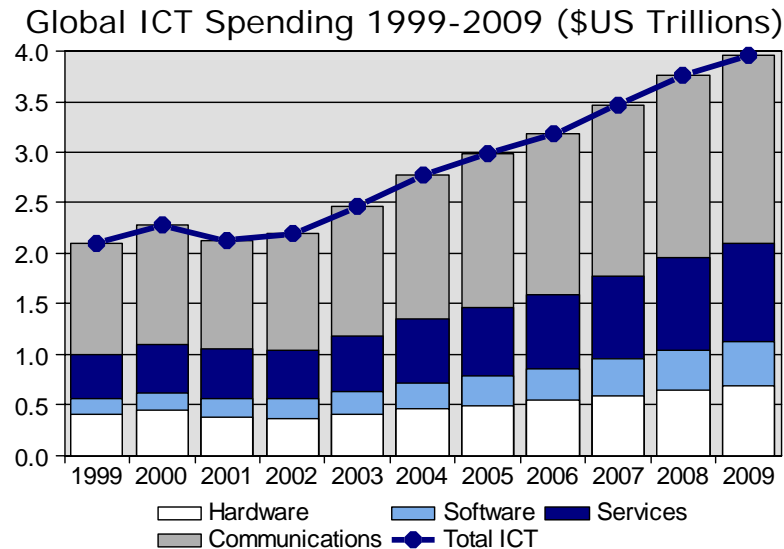
- “virtualization”
- “decoupling”
- “de-materialization”

# The downside: Little help for environment so far!

- ICT and traditional activities re-enforce each other

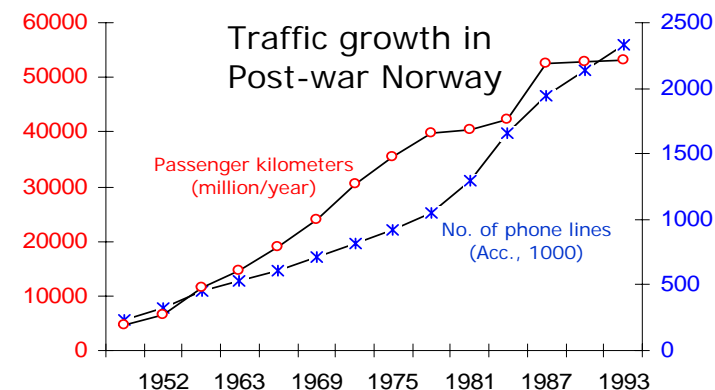


EU Whitebook 2001



Digital Planet 2006

- The efficiency gains from ICT are "mis-used" for further growth!
- Basic knowledge: Efficiency gains are quickly absorbed if not quickly harvested



# The downside: Rebound absorbs the gain

- **Rich countries** have **strong traditional infrastructure**. They partly **substitute** the old, partly **add** new ICT based markets.
- **Poor countries** have **weak traditional infrastructure**, and leapfrog to an ICT based infrastructure.
- Transactions get more efficient, but **total consumption and production increase**.

“Physical value cration”



Roads, sea, mail, banks, etc

“De-materialized value creation”



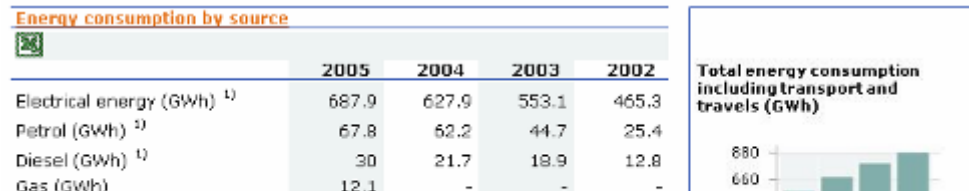
Telco networks / Internet

Rebound

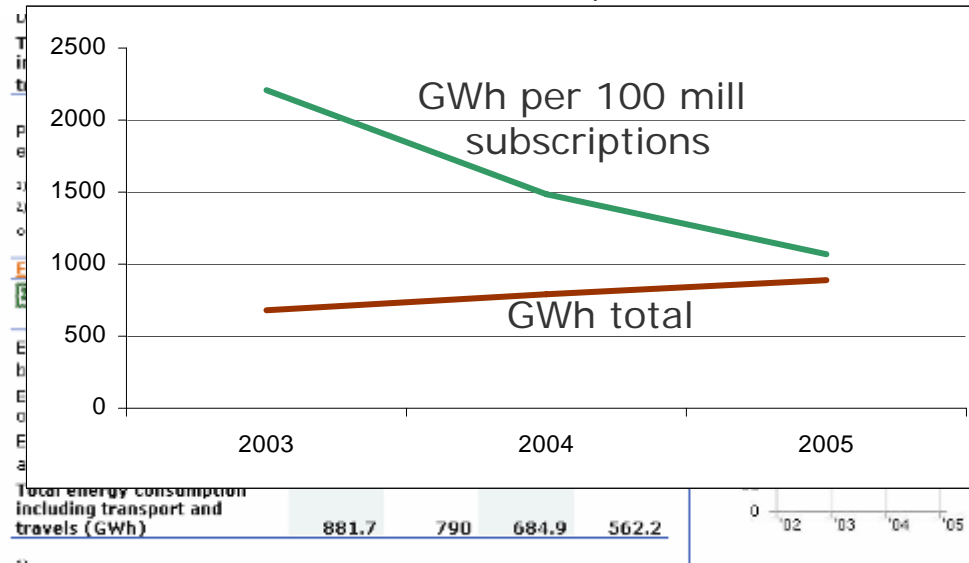


# This also goes for the ICT business

- Indirect effects in **sector**:  
Dramatic increase in consumption of energy and materials:
  - "The Paperless Office" ⇒ paper consumption up 800%
  - Com. networks ⇒ ever more powerful ICT user equipment
  - World Internet energy consumption > USA energy consumption (est. 2001)
  - Ever shorter life:  
Electronic components life expectancy: 30 years, in practice ~ 2-4 years



Telenor: Relative decrease, absolute increase



<sup>1)</sup> Telenor World Wide from 2003

<sup>2)</sup> Telenor World Wide from 2003, Energy consumption from flights and trains, trips only includes Norwegian based employees

**Bad og good? Depends on how the resulting efficiency gains are used!**



# Worse: rebound is the intention!

- For vendors and buyers, **rebound is the reason** for spending!
  - "When I don't have to travel, I get time for more!"
  - "With a productivity increase, we can increase turnover!"
  - Rebound is the growth engine!
- **Producers** and **their buyers** have weak incentives for blocking rebound effects
  - Each actor's contribution is marginal
  - Level field becomes uneven – for companies and individuals
  - "Free market" has no mechanisms to offer.
  - Morale, good will and fear of the future seem the main incentives!



# Conclusions – even some I do not like

## **Innovation: Solutions are there, and ever more in use...**

- ICT products and services easily outperform factor 4-10 goals.
- We do need governmental funding for long term and risky technology development.

## **Operation: Eco-efficiency improvements without harvesting is nice business, but not good for the globe ...**

- Making transactions and processes individually more energy and resource efficient is not enough. The total gains count, not individual efficiency!
- Government, business, NGOs, and consumers must co-operate to map and hinder aggregate rebound effects.

## **Government must be the regulator in charge**

- Government must develop measures to avoid rebound. This might block for consumption and production growth in absolute terms.
- The task may be very tough, and needs support and legitimacy.



**Her er det uendelig mange spennende  
prosjektmuligheter!**

**God sommer!**

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