KNOWLEDGE AND INDUSTRY EVOLUTION:

THE MOBILE COMMUNICATIONS INDUSTRY EVOLVED LARGELY BY GETTING THINGS WRONG

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THEORETICAL IMPLICATIONS:

CONCEPTUALISING KNOWLEDGE

- **Even in evolutionary economics, 'knowledge' is often conceptualised *instrumentally*: as a well-defined tool with which to produce innovative output.**

- **However, this paper suggests knowledge should be thought of as an open-ended and uncertain *process*, constantly being transformed as an inherent part of the evolutionary process itself.**

THE AIM OF THIS PAPER

- **To analyse some key aspects of the evolution of the Mobile Communications Industry, paying particular attention to the role of changing knowledge/beliefs.**

- **More specifically, it will be shown that many of the central beliefs/knowledge that shaped the evolution of this industry turned out to be wrong.**

- **Five key beliefs will be analysed.**

BELIEF 1 (circa 1970s-1980s)

Mobile communications are unlikely to become a high-growth area

- **Kurt Hellstrom, later Ericsson president: "When I joined Ericsson in 1984 Radio Communications was something odd happening on the outskirts of Stockholm."**

- **Early 1980s McKinsey predicted 900,000 handsets globally by 2000; there turned out to be 400 million.**

- **Mobile coms were thought to be based on an inherently inferior method of transmission, especially compared to optical fibre.**

BELIEF 2 (circa mid-to-later 1990s)

The GSM Model provides the basis for the future evolutionary trajectory of the mobile industry

- GSM, developed in Europe, was the global success story for 2G digital mobile communications.
- Europeans and Japanese hoped that its successor, 3G UMTS, would succeed similarly.
- However, so far they are wrong:

a. The enabling technology & equipment developed too slowly

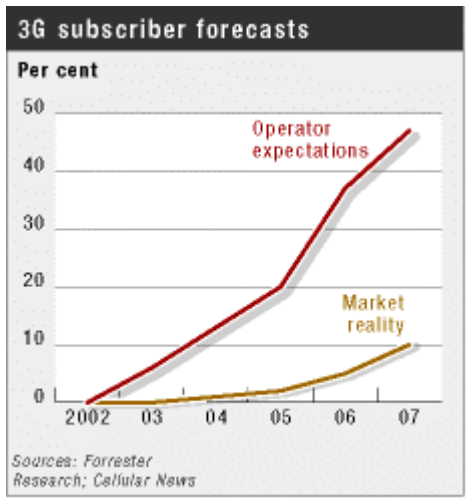
b. The competing 2G technology (CDMA 2000) improved rapidly and was far cheaper

c. Unexpected competing technology emerged from the computer industry (wireless local area networks)

BELIEF 3 (late 1990s)

Auctions provide the most efficient way of allocating scarce spectrum

- **Several well-known economists provided auction designs.**
- **The problem: the design assumed that the operator had *knowledge* of future revenues and costs (in order to determine the maximum price the firm would pay for the licence).**
- **However:**



BELIEF 4 (late 1990s)

To create mobile internet services it is sufficient to create a standard protocol (i.e. WAP)

- **In Europe suppliers (e.g. Ericsson, Nokia) provided WAP equipment. But operators failed to sell WAP-related services. Lack of content and applications was a major problem.**

- **A very different evolutionary path was followed in Japan:**

The main operator (DoCoMo) led the drive for mobile internet; it started with target customers (youth market); and designed incentives for independent creators of content & applications.

i-mode became a phenomenal success.

BELIEF 5 (mid-to-late 1990s)

Financial markets believed high returns would be earned by mobile operators; billions were invested

- But they were wrong
- 3G technology was delayed
- Little evidence that customers wanted 3G services at the prices offered
- BT's subsidiary (O2) has written down the value of its 3G licences; Vodafone's shares significantly under-weighted.

THEORETICAL CONCLUSIONS

- **As the evolution of the mobile industry clearly shows, knowledge was not a well-defined tool, facilitating improvements in innovation and output.**

- **Rather, both technological and industrial knowledge were often wrong and were being endogenously transformed as the industry itself was evolving.**

- **This suggests that knowledge should rather be thought of as an *open-ended and uncertain process*, constantly being transformed as an inherent part of the evolutionary process itself.**

BROADBAND BRAZIL:

LESSONS FROM OTHER PARTS OF THE WORLD

BROADBAND DATA FOR SELECTED COUNTRIES, 2003

COUNTRY	DATE	DSL SUB. (mn)	CABLE SUB. (mn)	HH WITH B.BAND (%)
France	3.03	1.8m	0.31m	8.82%
Germany	3.03	3.7m	0.06m	9.91%
UK	3.03	0.83m	0.96m	7.14%
Japan	7.03	8.5m	2.3m	24%
US	3.03	6.8m	12.4m	18%
S. Korea	7.03	7.3m	3.9m	72%

BROADBAND DATA FOR SELECTED COUNTRIES, 2003

COUNTRY	HH WITH B.BAND (%)	AV. PRICE (per month)	AV SPEED
Canada	36%	-	-
Japan	27%	$23	10Mbit/sec
S. Korea	75%	$25	3Mbit/sec
US	18%	$45	1Mbit/sec

3 LESSONS FOR BRAZIL

1. COMPETITION IS THE MAIN DRIVER

S. Korea	Hanaro and Thrunet, with their own networks, challenge incumbent KT
Japan	Yahoo!BB and electricity companies challenge incumbent NTT
Europe	Weak competition to BT, DT, FT
US	Little competition to Baby Bells, except from cable

2. REGULATION PER SE IS INEFFECTIVE

FOR EXAMPLE, IN EUROPE:

- INCUMBENTS HOLD 77% OF THE DSL MARKET (IN JAPAN: 30%)
- ONLY 0.7% OF THE LOCAL LOOP IS UNBUNDLED

3. CONTENT AND APPLICATIONS CRUCIAL

FOR EXAMPLE:

- S. KOREA: COMPUTER GAMES ETC
- JAPAN: VOICE OVER IP ETC