ITU-D Guidelines for Transitioning Towards IMT-2000 Systems in Developing Countries

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Overview

- ***Status and Outlook of Mobile Services in Developing Countries***
- ***Particular Needs of Developing Countries***
- ***Transition Paths to IMT-2000 Systems***
- ***Ongoing Work in ITU-D on Guidelines***
- ***Economics of Mobile Network Deployment***
- ***Concluding Remarks***

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Status and Outlook of Mobile Services in Developing Countries (1/2)

- *From existing mobile networks to IMT-2000*
  - *Lower prices in airtime and terminals*
  - *Increased cellular penetration*
  - *Growing presence of developing countries*
  - *Growth in non-voice revenue*

Status and Outlook of Mobile Services in Developing Countries (2/2)

- *Driving forces for IMT-2000*
  - *Overcoming the digital divide*
  - *Availability of high bandwidth on the access loop*
  - *Interworking of different wireless technologies*

Particular Needs of Developing Countries (1/3-a)

- ***Operator requirements***

Costs	**Transition costs should be minimized as much as possible because vast majority of population has little discretionary budget for telecommunications/entertainment.**
Fixed wireless access	**Some operators may provide fixed wireless access for IMT-2000 services in urban areas.**
Coverage and deployment obligations	**Target coverage/service penetration and roll-out schedule set by regulators in some cases. Roll-out obligations must be set keeping in view the business case of the operator and the user's interest.**
Transition time	**Time frame for transition from existing "mobile"/"fixed" towards IMT-2000. Operators should have maximum flexibility in determining and finalizing the transition.**
Mass application	**Applications such as tele-education, tele-medicine, e-government may require IMT-2000 technologies.**
Government support	**Role of government subsidy for infrastructure and/or advanced applications (not for infrastructure but for affordability of services by all including universal service obligations).**

Particular Needs of Developing Countries (1/3-b)

- ***Operator requirements***

Value depreciation	**Possible obsolescence of new infrastructure investments while waiting for IMT-2000 demand.**
IMT-2000 bands	**Access to appropriate frequency bands and adequate spectrum is required. Use of frequencies below 1GHz and allocation of future frequency bands as per WRC/WARC may be advantageous in providing cost-efficient coverage.**
Technical and administrative conditions	**Conditions for use of spectrum (licensing / roaming / coverage / other operator obligations)**
Infrastructure sharing	**Sharing of (radio / network) resources for rapid rollout and coverage (VNO) can be encouraged to facilitate speedy deployment of new technologies and lower the costs to operators.**
Satellite component	**Usage of satellite component of IMT-2000.**
Services and applications	**Low entry fees. Use of IMT-2000 for access to education in remote villages, rural economic development, access to Internet at affordable price.**

Particular Needs of Developing Countries (2/3)

- ***Regulator requirements***

License handling and allocation	**Capitalize on experience of developed countries on** **- license awarding method,** **- license conditions,** **- license fees,** **- number of licenses**
Databases	**Capitalize on experience of developed countries on** **- RFP (Request for Proposal) issued for awarding IMT-2000 licenses;·** **- Rationale behind the preferred license awarding methods;·** **- Information on the method of determination of Lowest Bid Rates;** **- Standard concession agreements – including provisions related to QoS numbering, interconnection, roaming, coverage, infrastructure sharing etc. – that were signed with the IMT-2000 operators.**

Particular Needs of Developing Countries (3/3)

- ***User requirements***

Costs	**User affordability for services and terminals.Tariffs should be affordable to the end-users.**
Terminals	**Ease of use and convenience of terminals.The terminals should support local requirement in terms of language and must take into consideration the literacy level across the country.**
Services and applications	**Use of IMT-2000 for education in remote villages, rural economic development, access to Internet at affordable price.Improvement of consumers' education on wireless data applications.**

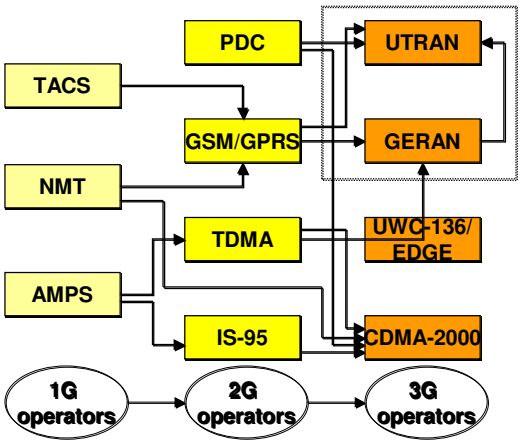
Transition Paths to IMT-2000 Systems – Evolution and Migration

- ***Evolution* --- "a process of change and development toward enhanced capabilities"***
- ***Migration* --- "movement of users and/or service delivery from an existing system to a new system"***

** ITU-R Recommendation M.1308*

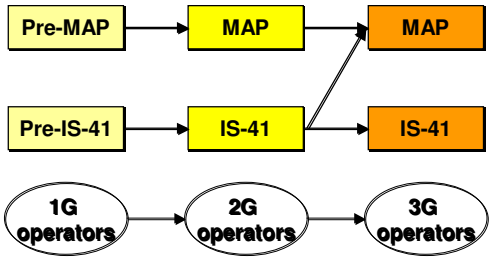
Transition Paths to IMT-2000 Systems – Possible Transition Paths (1/3)

- ***Transition paths – Radio Access Network***



Transition Paths to IMT-2000 Systems – Possible Transition Paths (2/3)

- ***Transition paths – Core Network***

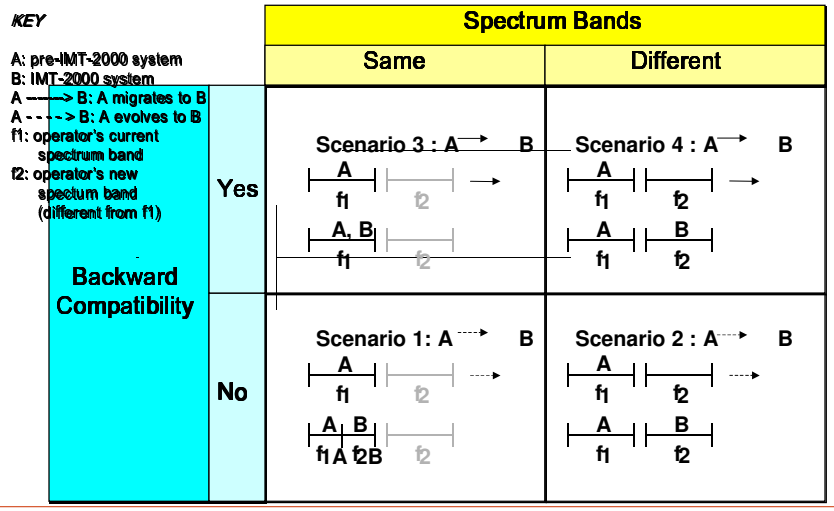


Transition Paths to IMT-2000 Systems – Possible Transition Paths (3/3)

- ***Transition paths – Options***

To			
From			
Analogue systems (AMPS, NMT, TACS)	CDMA Direct Spread (WCDMA)	CDMA Multi-Carrier (CDMA2000)	TDMA Single-Carrier (EDGE)
TDMA/D-AMPS systems	CDMA Direct Spread (WCDMA)	CDMA Multi-Carrier (CDMA2000)	TDMA Single-Carrier (EDGE)
PDC			
CdmaOne systems	CDMA Multi-Carrier (CDMA2000)		
GSM systems	CDMA Direct Spread (WCDMA)	CDMA TDD (time-code) (TD-SCDMA)	TDMA Single-Carrier (EDGE)

Transition Paths to IMT-2000 Systems – Spectrum Usage



Ongoing Work in ITU-D on Guidelines (1/2-a)

- ***Structure of Guidelines (Doc. ITU-D 131/2 Rev. 6)***
  - *SUMMARY*
  - *1 - INTRODUCTION*
  - *2 - DEVELOPMENT OF POLICIES FOR TRANSITIONING OF EXISTING NETWORKS TO IMT-2000*
  - *3 – TRANSITION PATHS*
  - *4 - ECONOMICS OF TRANSITION TO IMT-2000*
  - *5 – CONCLUDING REMARKS*
  - *6 - DEFINITIONS*
  - *7 - ABBREVIATIONS/GLOSSARY*
  - *REFERENCES*
  - *ANNEXES A - F*
  - *ANNEX G – OPERATOR EXPERIENCE IN TRANSITIONING TO IMT-2000 SYSTEMS*

Ongoing Work in ITU-D on Guidelines (1/2-b)

- **Structure of Guidelines (Doc. ITU-D 131/2 Rev. 6)**
  - CHILE - Implementation of IMT-2000 technology (EDGE) and TDMA Migration in Chile
  - HONG KONG - Implementation of IMT-2000 technology (EDGE) in Hong Kong
  - HUNGARY - Implementation of IMT-2000 technology (EDGE) in Hungary
  - JAPAN - Implementation of IMT-2000 technology (FOMA) in Japan
  - JAPAN - CDMA2000 1X Deployment and Associated Multimedia Services Launched in Japan
  - RUSSIAN FEDERATION - Evolution and Migration of 1st Generation NMT450 Analogue Mobile Networks to IMT-2000
  - THAILAND - Implementation of IMT-2000 technology (EDGE) in Thailand
  - UGANDA - GSM networks bring health care to rural Uganda
  - VENEZUELA - Venezuelan Experience on the Implementation of CDMA 1xrtt Network by one Existing TDMA Operator in the 800 MHz Band (824-849 MHz/869-894 MHz)

Ongoing Work in ITU-D on Guidelines (2/2)

- **Schedules for work on Guidelines**
  - **31 December 2003: Closing date for WP8F, SG19 (formerly SSG) and Q18/2 inputs for first Draft Guidelines**
  - **5 January 2004: Start progressing and editing Guidelines text by correspondence**
  - **26-29 January 2004: Q18/2 RG meeting and second Draft Guidelines finalized**
  - **6-9 July 2004: Q18/2 RG meeting and final Guidelines version**
  - **13-16 September 2004: Adoption of Guidelines by ITU-D SG2**
  - **18-20 April 2005: Production of a first Draft streamlined version of Guidelines (GST)**
  - **5 July 2005: Second Draft GST**
  - **30 September 2005: Final GST approved by ITU-D SG2**

Economics of Mobile Network Deployment (1/4)

- ***The "business plan" methodology***
  - ***Estimation of the year traffic demand***
    - → ***Estimation of potential user population***
    - → ***Estimation of service penetration***
    - → ***Estimation of activity factor (per service type and class)***
    - → ***Estimation of OPEX***
  - ***RAN planning***
  - ***Core Network planning***
  - ***Assumption on revenue structure for offered services***
  - ***Computation of NPV***

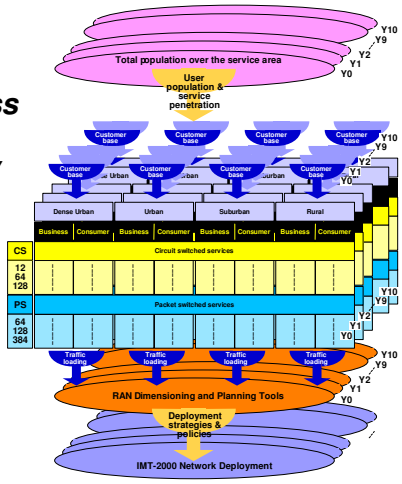
Net Present Value (NPV):

Cumulative discounted cash-flow generated to date, or less formally

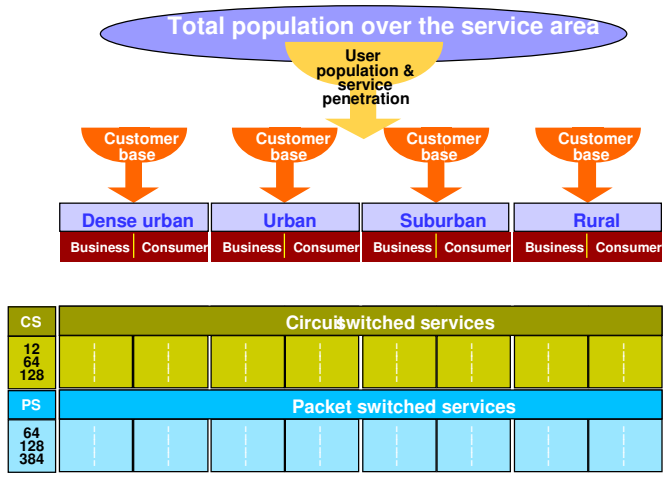
The profitability of a business, as appreciated a Year 0, over a span of N years - N ranging from 1 to the economic life of the system

Economics of Mobile Network Deployment (2/4-a)

- ***The "business plan" methodology***



Economics of Mobile Network Deployment (2/4-b)



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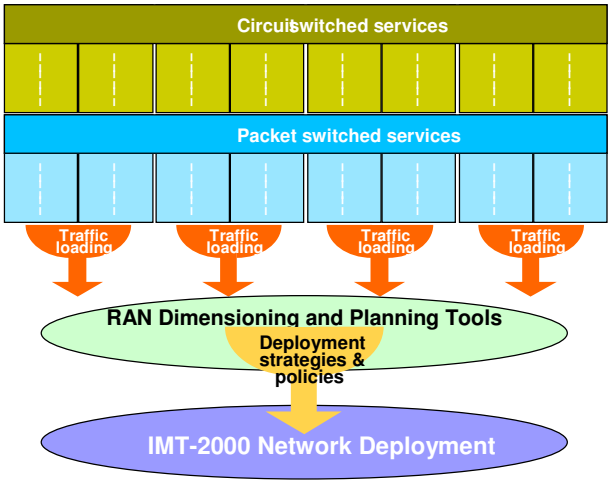
Economics of Mobile Network Deployment (2/4-c)



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Economics of Mobile Network Deployment – Share of Investments (3/4-a)

	Year 0	Year 3	Year 4 to Year 10
	Rel-99	from Rel-99 to Rel-5	Capacity increases
RAN			
- Node Bs	55%	55%	60%
- RNCs	30%	35%	30%
- UTRAN transport infrastructure	15%	10%	10%
Core Network			
- MSCs & MSC servers	50%	0%	0%
- SGSNs & GGSNs	35%	60%	65%
- MGWs	0%	10%	10%
- CSCFs, MGCFs, T-SGWs, MRFs	0%	20%	15%
- Core network transport infrastructure	15%	10%	10%
Service Market Segment	**Year 0**	**Year 3**	**Year 4 to Year 10**
- Business	65%	60%	50%
- Consumer	35%	40%	50%
Tariffs	3% yearly reduction in over the whole economic life cycle		

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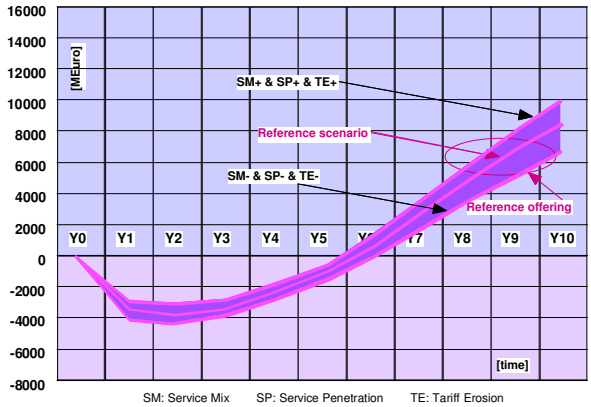
Economics of Mobile Network Deployment (3/4-b)

- ***NPV analysis***
  - ***Traffic demand***
  - ***Service penetration***
  - ***Tariff erosion***
  - ***Service offering***



SM: Service Mix SP: Service Penetration TE: Tariff Erosion

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Economics of Mobile Network Deployment – Sensitivity Analysis (4/4-a)

Deviation from assumed service mix	SM+ ⇒ Y3: +10%, Y10: +25% SM- ⇒ Y3: -10%, Y10: -25%		
Deviation from assumed service penetration	SP+ ⇒ Y3: +10%, Y10: +25% SM- ⇒ Y3: -10%, Y10: -25%		
Yearly deviation from tariff erosion	TE+ ⇒ +10% TE- ⇒ -10%		
Alternative scenario	**Year 0**	**Year 3**	**Year 4 to Year 10**
Service Market Segment - Business - Consumer	 65% 35%	 60% 40%	 50% 50%

SM: Service Mix SP: Service Penetration TE: Tariff Erosion

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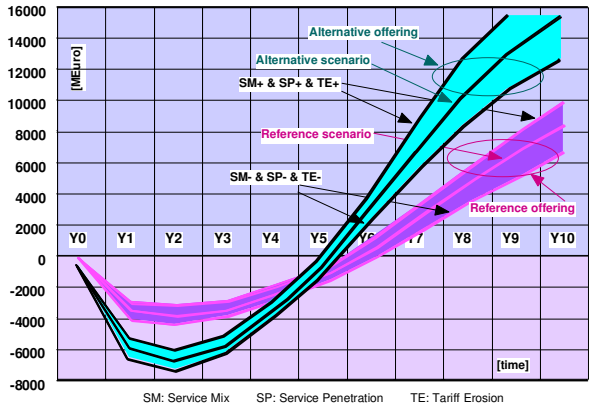
Economics of Mobile Network Deployment (4/4-b)

- ***Sensitivity analysis***
  - ***Traffic demand***
  - ***Service penetration***
  - ***Tariff erosion***
  - ***Service offering***



SM: Service Mix SP: Service Penetration TE: Tariff Erosion

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Usability of the Guidelines

- ***Key aspects***
  - ***Do the Guidelines achieve the goal of providing guidance?***
  - ***Do the Guidelines reconcile self-supportiveness, minimum overlap to IMT-2000 Handbook and a complement to the latter?***
  - ***Do the Guidelines provide a path for further reading in the related literature?***

Concluding Remarks

- ***While the economic aspects of transitioning to IMT-2000 systems are common to both developed and developing countries, social aspects have a particularly important role in the latter countries.***
- ***Evolution and migration are the phases through which a transition materializes, with the mix and sequence determined on the basis of economic and strategic decisions to be taken with reference to each individual case.***
- ***ITU-D has taken an active role in assisting developing countries by preparing guidelines aimed at identifying issues and options for a smooth and cost-effective transition towards IMT-2000 systems.***

Acknowledgements

- *This presentation bases on the work on guidelines for transitioning towards IMT-2000 systems for developing countries carried out in ITU-D Q.18/2 in collaboration with ITU-R WP8F and ITU-T SG19.*
- *Info: www.itu.int/ITU-D/*

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Thank you for your attention

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