ITU Activities on IMT-2000

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

Regional Workshop for the Arab Region on Guidelines on the Smooth Transition of Existing Mobile Networks to IMT-2000 for 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***

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.

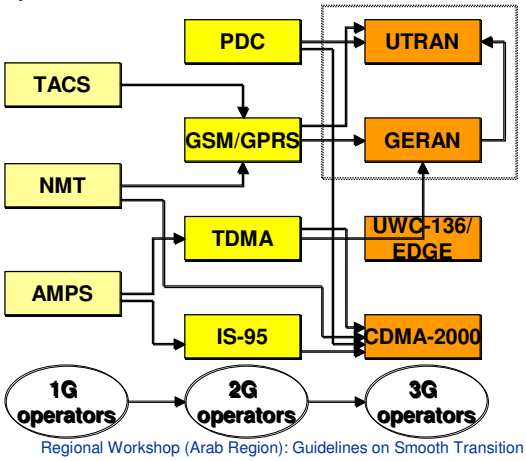
Transition Paths to IMT-2000 Systems – Evolution and Migration

- ***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*

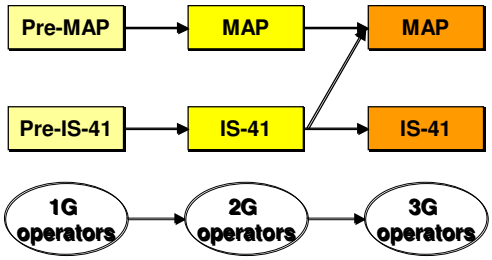
Transition Paths to IMT-2000 Systems – Possible Transition Paths (1/3)

- *Transition paths – Radio Access Network*



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

- *Transition paths – Core Network*

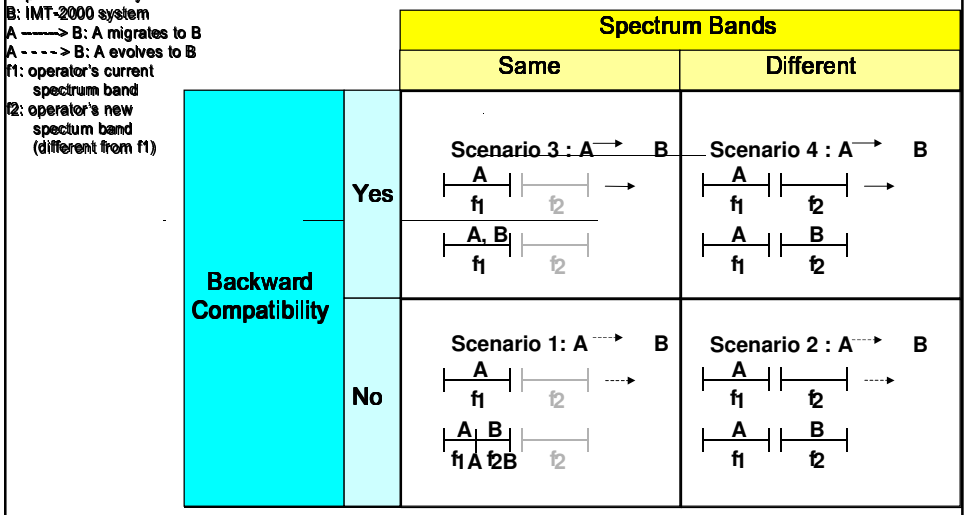


Transition Paths to IMT-2000 Systems – Possible Transition Paths (3/3)

- *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*

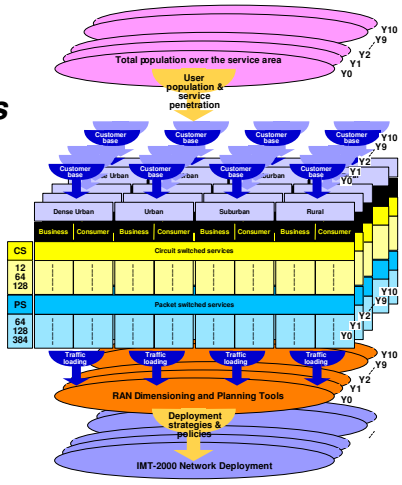
Net Present Value (NPV):

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

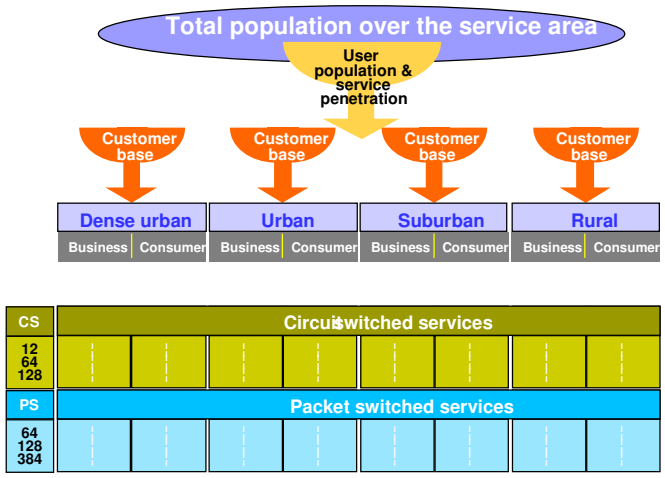
The profitability of a business, as appreciated a Year 0, over a span of N years - N ranging from 1 to the economic life of the system

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

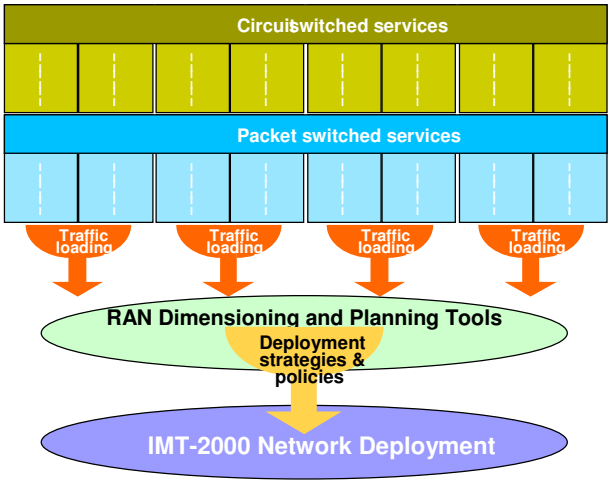
- *The "business plan" methodology*



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



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

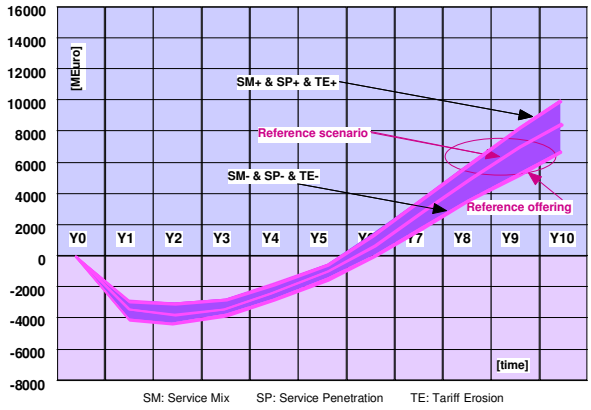


Economics of Mobile Network Deployment – Share of Investments (3/4-a)

	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		

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

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



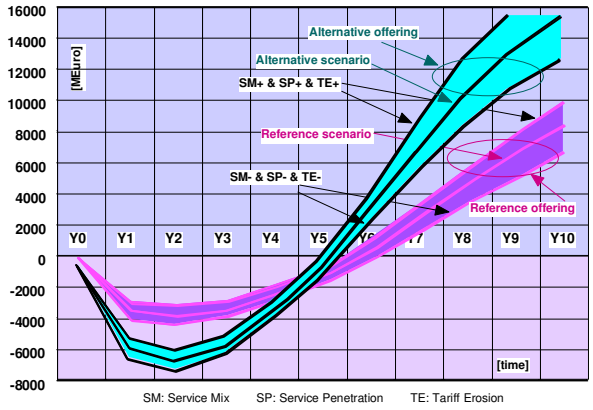
Economics of Mobile Network Deployment – Sensitivity Analysis (4/4-a)

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

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

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/*

Thank you for your attention