ITU Study Group 3
15-18th February 2011

Mobile Network Cost Modelling

Overview of Key Issues and Using a Test Model

AGENDA

1. CASE FOR A UNIFORM CHART OF ACCOUNTS AND COST MODEL
2. OVERVIEW OF PHYSICAL MOBILE NETWORK
3. OVERVIEW OF COSTING METHODOLOGIES
4. OVERVIEW AND DISCUSSION ON AN INDICATIVE COST MODEL -INCYTE CONSULTING'S MOD
5. QUESTIONS

1.CASE FOR A UNIFORM CHART OF ACCOUNTS and COST MODEL

Regulators Should Own The Definitive Cost Model.

- Propriety and exclusivity over the cost model strengthens perception of regulator's independence and supports easier monitoring of operators' compliance with cost application and allocation `wq
- Execution of cost modelling, in practice, by regulators establishes their technical authority to advise and direct.
- Eliminates any incidence of models perched on the periphery of legitimacy, these usually require tedious examination for attestation.
- It is far more efficient to have one model – favours information symmetry and comparability

Regional Advantages of Standard Mobile Cost Model
Regulators and Stakeholders

- Can lend to a repository of costing precedents usable across different jurisdictions.
- *Higher relevance now to cost benchmarking across jurisdictions.*
- *Standard metrics* of cost possible for whole region - efficiency, effectiveness and economy benefits can be gained
- Effective consultations across jurisdictions, stronger regulatory support and solidarity on issues

Regional Advantages of Standard Mobile Cost Model
Operators and Service Providers

- Analysis of service prices will provide insights into varying efficiency of service costs, among operators.
- Easier for regulators to define and uphold consistent treatment of costs among operators.
- Greater perception of fairness and ability to leverage costing information as a deterrent to anti competitive practices.

Items for Comparability and Consistency within LA&C Region

- Costing Principles
- Cost components (Network assets and operating expenses)
- Service costs
- Costs of development
- Regulatory and market competition effectiveness
- Operator performance measurement metrics

Fundamental Regulatory Omission?

- *European Community should develop a **standard cost model** – complete with a **uniform system of accounts** – for all of Europe**.** In this way, each individual NRA could then plug in the relevant costs for its respective country and Europe can move beyond the current country-by-country disputes of even just how to calculate LIRIC." ,*

- *Nearly every publicly-held company has more than one set of books in order to deal with various business exigencies – i.e., a set of books for internal cost allocation; another set of books for the tax collector; and a completely different set of books for the stock analysts. One more set of books is not going to break the bank".*
- ***Phoenix Center Policy Paper Number 8: eEurope Means Nothing Without eEntry: Regulatory Harmonisation, Subsidiarity and the Realisation of the Information Society***
- ***Lawrence J. Spiwak***
- ***(October 2000)***
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Benefits of Uniform Cost Classifications

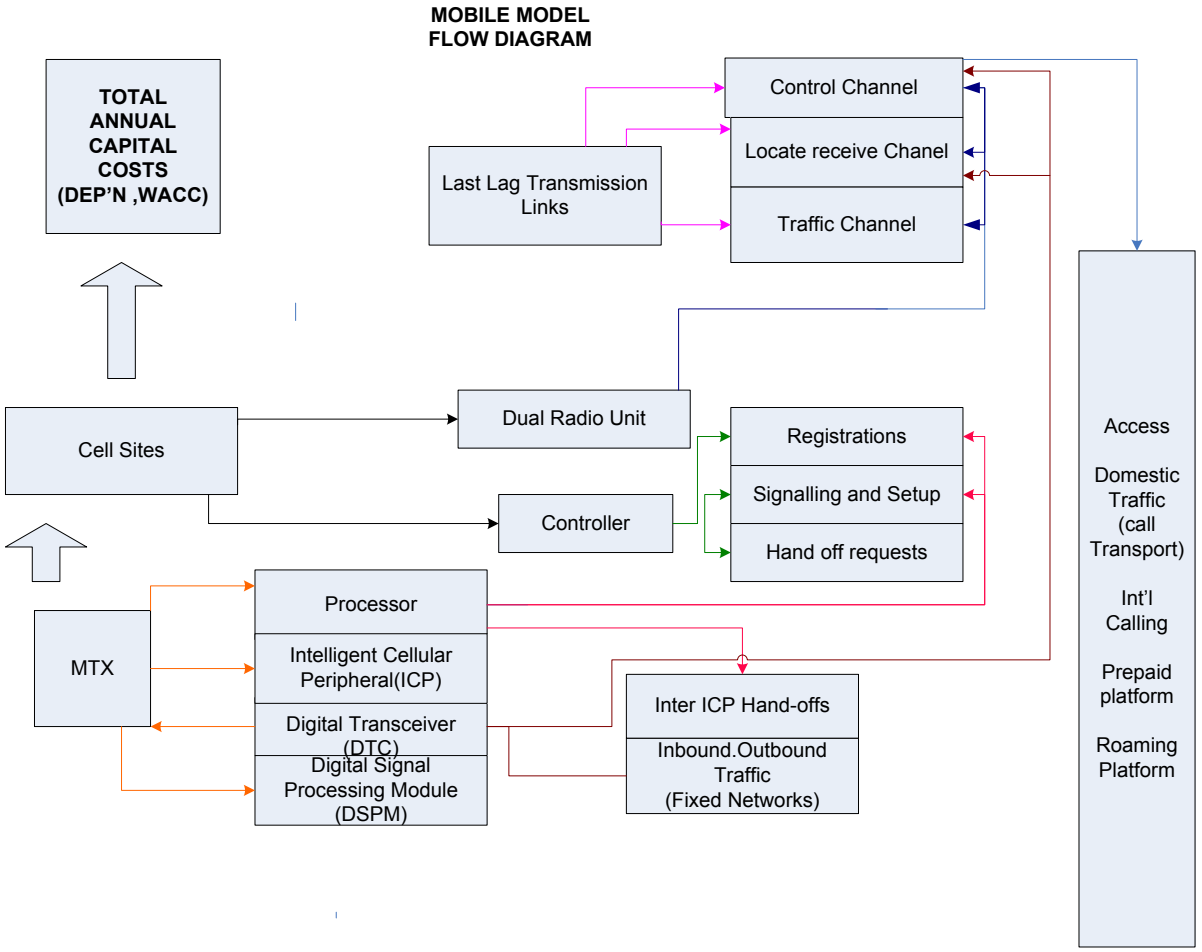
- Robustness – Can be made applicable to any model
- Transparency- easier attestation of costs to activity
- Comparability of information throughout the Region,
- Ability to market goods and services regionally without any ambiguities related to product costs.
- Regulatory economies of scope
- Greater ability by firms to assess product risks re Regional cost effectiveness of their operations
- Greater knowledge exchange between entities, operators, regulators and even stakeholders as terminology and markets become generic throughout the region.

Setbacks of current "Snap shot" Cost Models' Output

- Costs not timely enough to sanction competitive period to period retail pricing.
- Snapshots may not be available at times where significant insight is needed to fairly judge the true condition of an operator's cost.
- An operator can buy time by choosing inopportune times to provide or reveal information.
- The regulator is forced to sanction outdated costs and therefore blur the true relationship between costs and prices as they really exist at that point in time.
- Consumers do not benefit to the extent possible - timely costing makes pricing more relevant.

2. OVERVIEW OF PHYSICAL NETWORK ASSETS

Overview of Mobile Network Assets



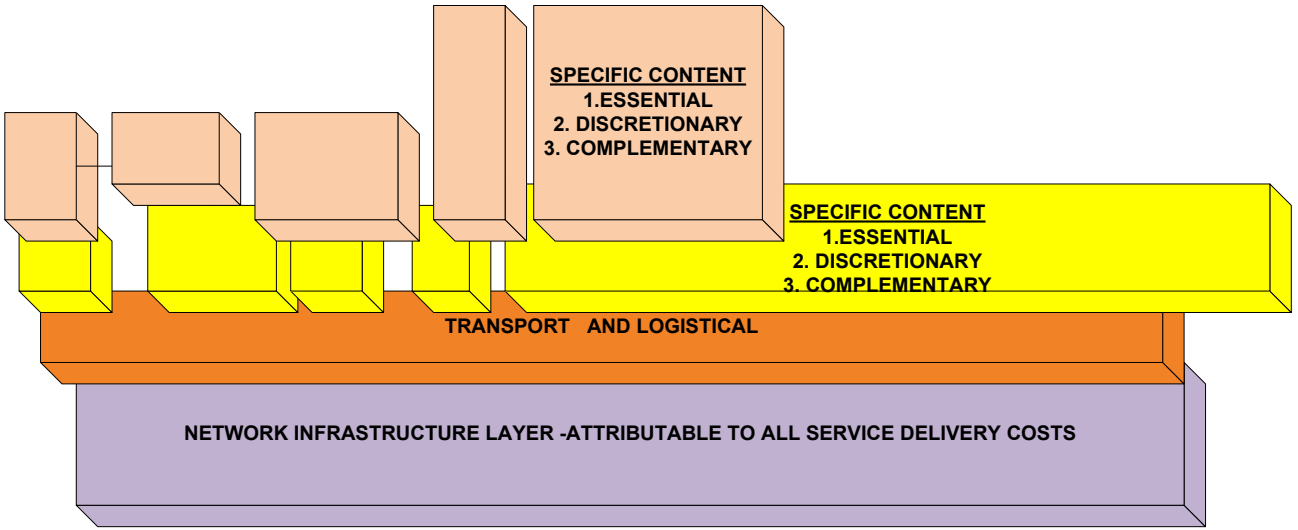
Operating Expenditure – Classified for Costing Purposes

ICT service providers will eventually come to that point of requiring cost information independent of their regulatory needs or requirements, simply to meet the need for having up to date costing information as a competitive pricing tool. When entry barriers fade, as technology becomes cheaper and more accessible the issue of cost efficiency will come to the fore.

Service Cost Causation

IP based Networks(Fixed or mobile)

NGN- LAYERED COST STRUCTURE



3. OVERVIEW OF COSTING METHODOLOGIES

Costing Assumptions

- **Network topology – *Scorched Node vs. Scorched Earth* – network to cost must maintain existing nodes or node layout could be optimised for efficiency.**
- **Bottom Up vs. Top Down – network to cost must be based on actual financial transactions of that network or, based on hypothetical transaction that should be undertaken by an optimal network.**
- **Fully Allocated Cost - method of allocating networks cost to network services, based on cost causation relationships. Activities generate costs (direct and indirect) and these activities are employed in creating services.**

Costing Assumptions

- Fully Allocated Costs (continued)
- "Other" activities support the operations that generate these direct or indirect service related activities – these are called Common costs e.g. finance, HR, CEO, administration.
- These "other" activities are accumulated into cost pools and allocated to individual services, along with the direct and indirect activity costs to arrive at each individual total service costs.
- Allocations based on use of cost drivers (unit of measure that is accountable to or employed by the activity
- Cost of capital component is added to individual service costs to recover costs incurred in financing

Costing Assumptions

Long Run Incremental Costs (generic)

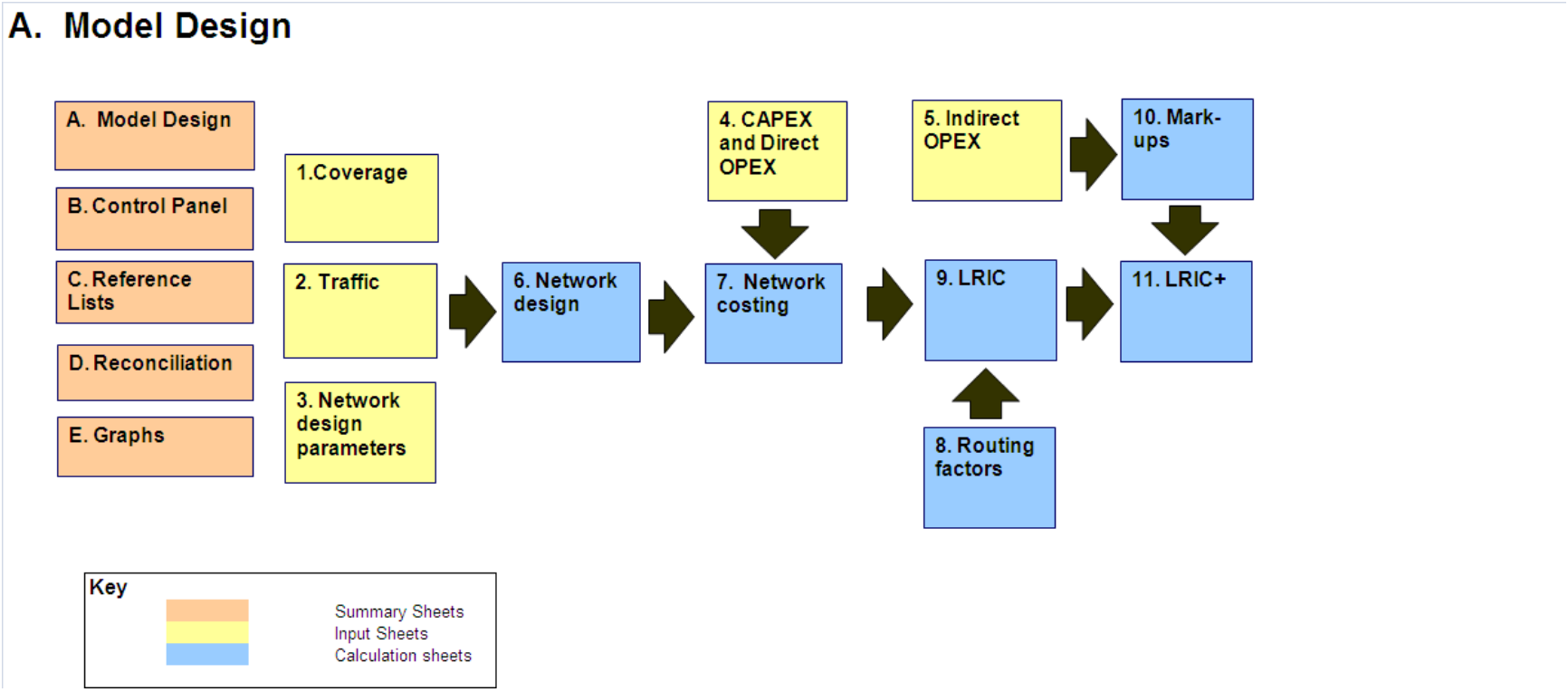
- Using the fully allocated cost profile of the network, costs are aggregated to establish core services i.e. services derived from the legacy network
- Services created using the legacy platform, but attributable the incurring of incremental capital and operating costs are classified as incremental services.
- The long run service outputs of the incremental investment are used as the denominator and the numerator is the incremental investment cost. A contribution to fixed cost is permitted in some cases to arrive at a total service unit cost.
- The underlying assumption is that legacy services are recovering the legacy network costs and additional new services represent an incremental investment . Therefore these services should be accounted for by incremental costs, in some cases with a small contribution to legacy costs.

4.OVERVIEW AND DISCUSSIONS ON THE MODEL

Incyte Consulting – Mobile Cost Model prepared for ITU purposes

- Based on 2G and 3G design
- Capital Investment upgrades and operating costs changes are admissible to the Model
- Routing and other network parameter changes admissible
- Traffic and units of measure for services admissible
- Based on LRIC costing methodology and “bottom up” approach

Cost Model Overview



Cost Model Overview

B. Control Panel

Function:	Present key results and key input assumptions on one sheet to facilitate sensitivity analysis
Inputs:	Base case assumptions and results; sensitivity assumptions
Transfers:	Results of current sensitivity analysis taken from ***11. LRIC+***
Calculations:	Variation between base case and sensitivity
Outputs:	None (other than those transferred in)

B1 Key results

			Sensitivity	Base case	Variation
			Currency Units	Currency units	%
Code	Service	Unit	2011	2011	2011
S01	On Net calls	Voice Minutes	0.219	0.233	-6%
S02	Outgoing Calls to Other Networks	Voice Minutes	0.211	0.239	-11%
S03	Outgoing Calls to International	Voice Minutes	0.260	0.290	-10%
S04	Incoming calls from Other Networks	Voice Minutes	0.084	0.097	-14%
S05	Incoming calls from international	Voice Minutes	0.090	0.103	-13%
S06	Roaming Calls (all types of outbound roaming calls	Voice Minutes	0.231	0.258	-10%
S07	Roaming Calls (all types of inbound roaming calls)	Voice Minutes	0.109	0.125	-13%
S08	Voice mail	Voice Minutes	0.322	0.453	-29%
S09	Calls to Operator	Voice Minutes	0.191	0.216	-11%
S10	Video stream	Video Minutes	1.966	2.120	-7%
S11	Video Call	Video Minutes	3.163	3.370	-6%
S12	MMS on net	MMS	0.128	0.145	-12%
S13	MMS outgoing to other network	MMS	0.083	0.097	-15%
S14	MMS incoming from other network	MMS	0.060	0.072	-17%
S15	SMS on net	SMS	0.001	0.002	-11%
S16	SMS outgoing to other network	SMS	0.001	0.001	-15%
S17	SMS incoming from other network	SMS	0.001	0.001	-17%
S18	WAP (2G internet)	2G Mbytes	1.449	1.622	-11%
S19	WEB (3G internet)	3G Mbytes	1.326	1.456	-9%
S20	Email	3G Mbytes	1.262	1.440	-12%
S21	Games and other apps	3G Mbytes	1.242	1.350	-8%

Cost Model Overview

B2 Sensitivity analysis

Category	Key assumptions	Unit	Value in sensitivity case	Value in base case
Financial	Pre-tax WACC	%	11.3%	11.3%
	Economic asset life - h/w related	years	8	8
	Economic asset life - s/w related	years	5	5
	Economic asset life - transmission	years	8	8
	Annual asset price trend	% pa	-4%	-5%
	Annual installation/opex cost trend	% pa	0%	0%
	Annual leased line price trends	% pa	-5%	-5%
Technical	Busy day traffic in the busy hour	%	9.0%	9.0%
	Busy days per annum	#	300	300
	Blocking rate	%	2%	2%
	Rural coverage, 2009 (% of Telco actual)	%	100%	100%
	Rural coverage, 2013 (% of Telco forecast)	%	100%	100%
	Average cell radius (% of Telco actuals)	%	100%	100%
Market	Operator market share - subscribers (2009)	%	69%	62%
	Operator market share - subscribers (2013)	%	47%	57%
	Traffic per sub (% of Telco actual, 2009)	%	100%	100%
	Traffic per sub (% of Telco forecast, 2013)	%	100%	100%

	TRX (Transceiver)	TRX	BHE
	BTS (Base station)	BTS	BHE
	BSC (Base station controller)	BSC	BHE
	Node B - 3G network	Node B	BHE
	RNC (Radio Network Controller) - 3G network	RNC	BHE
	MSC (Mobile switching centre)	MSC	Subscribers
	HLR (Home location register)	HLR	Subscribers
	INP (Intelligent network platform)	INP	Subscribers
	SMSC (SMS Control Centre)	SMSC	SMS
	MMSC (MMS Control Centre)	MMSC	MMS
	VMS (voice mail system)	VMS	Subscribers
	NMS (Network management system)	NMS	Subscribers
	WAP (WAP Gateway)	WAP	2G Mbytes
	CMD (Content Management Delivery Platform)	CMD	3G Mbytes
	INT (International Gateway)	INT	Subscribers
	IGW (Interconnect Gateway)	IGW	Subscribers
	WEB (Internet portal)	WEB	3G Mbytes
	MGW (Media Gateway)	MGW	3G Mbytes
	EMS (Email server)	EMS	3G Mbytes
	ADC (Automatic Device Configuration)	ADC	Subscribers
	RAS (Remote Access)	RAS	Subscribers
	USSD (Please call me etc)	USSD	SMS
	IVR (Interactive Voice Response)	IVR	Subscribers
	VSP (Videostreaming platform)	VSP	3G Mbytes
	GGSN (GPRS)	GGSN	2G Mbytes
	SGSN (GPRS)	SGSN	2G Mbytes
	End of list	End	End

smission Links

	Name	Cost driver
	BTS-BSC (Leased fibre, E1)	BHE
	BTS-BSC (E1 microwave)	BHE
	BTS-BSC (STM1 microwave)	BHE
	BSC-MSC (Leased fibre, STM1 and E1)	BHE
	BSC-MSC (VSAT E1 leased)	BHE
	MSC-MSC+ (STM1 and STM16)	BHE
	End of list	End

ices

	Name	Unit	Retail?

Cost Model Overview

2 Traffic

Function:	Identify traffic volumes by service
Inputs:	Traffic data directly input to this worksheet
Transfers:	Data transferred in from another worksheet
Calculations:	None (other than the outputs)
Outputs:	Traffic volumes combine with ***3. Network Design Parameters*** to produce ***6. Network Design***

2.01 **Billed traffic Telco actual and forecast)**

Code	Service	Millions	2009	2010	2011	2012	2013
S01	On Net calls	Voice Minutes	1,100	1,951	2,756	3,308	3,638
S02	Outgoing Calls to Other Networks	Voice Minutes	135	232	344	402	459
S03	Outgoing Calls to International	Voice Minutes	70	121	177	209	221
S04	Incoming calls from Other Networks	Voice Minutes	175	309	441	524	584
S05	Incoming calls from international	Voice Minutes	90	165	221	254	287
S06	Roaming Calls (all types of outbound roaming calls)	Voice Minutes	1	3	3	4	4
S07	Roaming Calls (all types of inbound roaming calls)	Voice Minutes	1	1	2	2	2
S08	Voice mail	Voice Minutes	8	11	17	22	28
S09	Calls to Operator	Voice Minutes	8	11	17	22	28
S10	Video stream	Video Minutes	40	77	104	130	163
S11	Video Call	Video Minutes	5	11	15	19	23
S12	MMS on net	MMS	30	50	67	84	105
S13	MMS outgoing to other network	MMS	15	16	21	27	33
S14	MMS incoming from other network	MMS	15	16	21	27	33
S15	SMS on net	SMS	800	1,356	1,951	2,315	2,536
S16	SMS outgoing to other network	SMS	45	77	110	121	132
S17	SMS incoming from other network	SMS	15	22	33	39	44
S18	WAP (2G internet)	2G Mbytes	18	19	26	32	40
S19	WEB (3G internet)	3G Mbytes	15	33	85	158	198
S20	Email	3G Mbytes	2	3	7	9	12
S21	Games and other apps	3G Mbytes	2	7	14	20	33
End	End of list	End					

ction:	Service costing calculations for all years
ts:	None
nsfers:	Traffic volumes from ***2. Traffic***
	Total costs of network elements from 7***. Network costs***
ulations:	Allocation of equipment costs by service using routing factors
puts:	Costs per service transferred to ***11. LRIC+*** for inclusion of mark-ups.

Total cost split by service

2009	Service	TRX	BTS	BSC	total annual cost	total volumes	unit cos
					USD	Millions	USD
S01	On Net calls	4139,952	19143,609	4029,313	81360,837	1,231	0.066
S02	Outgoing Calls to Other Networks	391,290	1809,371	380,833	10287,480	151	0.068
S03	Outgoing Calls to International	252,970	1169,764	246,210	6533,632	78	0.083
S04	Incoming calls from Other Networks	272,787	1261,400	265,497	7521,407	196	0.038
S05	Incoming calls from international	152,170	703,651	148,103	4125,154	101	0.041
S06	Roaming Calls (all types of outbound roamir	4,683	21,656	4,558	120,956	2	0.074
S07	Roaming Calls (all types of inbound roaming	1,607	7,433	1,564	43,574	1	0.050
S08	Voice mail	16,437	76,005	15,997	876,079	9	0.098
S09	Calls to Operator	17,555	81,175	17,086	504,725	9	0.056
S10	Video stream	946,752	4377,887	921,450	26198,645	45	0.585
S11	Video Call	236,688	1094,472	230,362	5206,047	6	0.931
S12	MMS on net	47,338	218,894	46,072	1345,709	34	0.040
S13	MMS outgoing to other network	11,834	54,724	11,518	455,300	17	0.027
S14	MMS incoming from other network	11,834	54,724	11,518	470,462	17	0.028
S15	SMS on net	10,732	49,624	10,445	461,677	895	0.001
S16	SMS outgoing to other network	302	1,396	294	21,083	50	0.000
S17	SMS incoming from other network	101	465	98	7,028	17	0.000
S18	WAP (2G internet)	255,623	1182,029	248,791	9353,867	20	0.465
S19	WEB (3G internet)	213,019	985,025	207,326	6915,919	17	0.412
S20	Email	28,403	131,337	27,643	1012,782	2	0.453
S21	Games and other apps	25,846	119,516	25,156	783,785	2	0.385
	Total	**7037.922**	**32544.155**	**6849.837**	**163606.148**		

5. QUESTIONS

Thank you for your time and concentration

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The End