

Acronyms in Telecommunications Forecasting

Acronym/ term	Definition	Explanation	Web resources
2.5G	Two and a half Generation (mobile system)	Commonly used term for enhancements in data capabilities and bit rates of 2nd generation systems (GSM, TDMA, etc) like EDGE.	
2SLS	Two Stage Least Squares	A computational method which can be used to calculate instrument variable (IV) estimates. In the first stage, each endogenous covariate in the equation of interest is regressed on all of the exogenous variables in the model, including both exogenous covariates in the equation of interest and the excluded instruments. The predicted values from these regressions are obtained. In the second stage, the regression of interest is estimated as usual, except that in this stage each endogenous covariate is replaced with the predicted values from its first stage model from the first stage.	
3G	Third Generation mobile technology	The generic term for the next generation of wireless mobile communications networks supporting enhanced services like multimedia and video. Most commonly, 3G networks are discussed as graceful enhancements of 2G cellular standards, like eg. GSM. The enhancements include larger bandwidth, more sophisticated compression techniques, and the inclusion of in-building systems. 3G networks will carry data at 144 kb/s, or up to 2 Mb/s from fixed locations. 3G comprises mutually incompatible standards: UMTS FDD and TDD, CDMA2000, TD-CDMA.	
3G+	Third Generation mobile technology +	Term often used for evolvement of the 3G technology, like HSDPA. Another term used is 3.5G.	
3GPP	Third Generation Partnership Project	Group of the standards bodies ARIB and TTC (Japan), CCSA (People's Republic of China), ETSI (Europe), T1 (USA) and TTA (Korea). Established in 1999 with the aim to produce and maintain the specifications for a third generation mobile communications system called UMTS. Note the 3GPP itself is not a standardization organization and that all produced standards must be ratified by a standardization organizations. A permanent project support group called the Mobile Competence Centre (MCC) is in charge of the day-to-day running of 3GPP. The MCC is based at the ETSI headquarters in Sophia Antipolis, France.	http://www.3gpp.org
3SLS	Three Stage Least Squares	A statistical technique to analyze multivariate data. It combines two stage least squares (2SLS) with seemingly unrelated regression (SUR).	
4G	Fourth Generation (mobile system)	Term often used to denote future broadband mobile communications systems or standards with high mobility and bit rates up to 100 Mb/s to follow 3rd generation. Previously often referred to as 'systems beyond 3G' (B3G). The most advanced coming standards are 3GPP's E-UTRA(N)/EPS, often denoted LTE/SAE and the IEEE 802.16m.	
ACA	Adaptive Conjoint Analysis	Conjoint analysis method in which consumers are asked to state their preference between the most important relevant attributes in bundles. It is used when a large number of attributes is needed. Depending on the complexity, up to 30 attributes may be included.	
ADSL	Asymmetric Digital Subscriber Line	A data communications technology that enables faster data transmission over copper telephone lines than a conventional modem can provide. The access utilises the 1.1 MHz band and has the possibility to offer, dependent on subscriber line length, downstream rates of up to 8 Mb/s. Upstream rates start at 64 kb/s and typically reach 256 kb/s but can go as high as 768 kb/s. Specified by ANSI T1.413 and by ITU-T recommendation G.992.1. A version called ADLS Lite providing up to 1.5 Mb/s downstream rates is specified as G.992.2.	http://www.itu.int
ADSL+	Enhanced Asymmetric Digital Subscriber Line	Also called ADSL2+. The access utilises the 2,2 MHz band and has the possibility to offer considerably higher speed than ADSL, up to 25 Mb/s downstream. Specified by by ITU-T in G.992.5.	http://www.itu.int
AIC	Akaikes Information Criterion	A 'goodness of fit' measure for comparing different forecasting models or other statistical models.	

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AOL	America Online	A US-based online service provider, Internet service provider, and media company operated by Time Warner. Based in Dulles, Virginia, with regional branches around the world, it is by far the most successful proprietary online service, with more than 32 million subscribers at one point in the US, Canada, Germany, France, the United Kingdom, Latin America (declared bankrupt in 2004), Japan and formerly Russia. In early 2005, AOL Hong Kong stopped its service. In the fall of 2004, AOL reported total subscribers had dropped to 24 million, a drop of over a quarter of its subscribers. In late 1996, AOL suspended all dialup service within Russia in the face of massive billing fraud, forcing the company into a rare case of full market retreat.	http://www.aol.com/
AR	Autoregressive model	A forecasting model where the dependent variable is related to past values of itself at varying time lags. The model expresses the forecast as a function of previous values.	
ARARMA	Autoregressive Differencing Autoregressive Moving Average Model	ARARMA is a long-memory process that uses a best fit AR model, according to the Akaike Information Criteria (AIC), as a filter to difference series prior to estimating the best fitting ARMA model (by the AIC).	
ARCH	Autoregressive Conditional Heteroskedasticity	An econometric model considering the variance of the current error term to be a function of the variances of the previous time period's error terms. ARCH relates the error variance to the square of a previous period's error. It is employed commonly in modeling financial time series that exhibit time-varying volatility clustering, i.e. periods of swings followed by periods of relative calm. Described by Robert F. Engle in 1982.	http://pages.stern.nyu.edu/~rengle/Garch101.doc
ARIMA	Autoregressive Integrated Moving Average model	Time-series models which are transformed to stationary ARMA models by differencing.	
ARMA	Autoregressive Moving Average model	Time series forecasting models consisting of Autoregressive (AR), Moving average (MA), or a combination of two (ARMA). The forecasts are expressed as a function of previous values of the series (autoregressive terms) and previous error terms (the moving average terms).	
ARMAX	Autoregressive Moving Average eXogenous	An ARMA model with additional exogenous input terms.	
ARPU	Average Revenue Per User	A measure of the revenue generated by one customer phone, pager, etc, per month. The term is used by companies that offer subscription services to clients, for example telephone carriers, Internet Service Providers, and Hosters etc. In mobile telephony, ARPU includes not only the revenues billed to the customer each month for usage, but also the revenue generated from incoming calls, payable within the regulatory interconnection regime.	
ATM	Asynchronous Transfer Mode	A high bandwidth, low-delay, connection-oriented, packet-like switching and multiplexing technique. ATM allocates bandwidth on demand, making it suitable for high-speed connections of voice, data and video services. Access speeds are up to 622 Mb/s and backbone networks currently operate at speeds as high as 2.5 Gb/s. Standardised by ITU-T.	http://www.itu.int
Bass model		A forecasting model in the class of diffusion models. Developed by Frank Bass and describes the process how new products get adopted as an interaction between users and potential users. The model is widely used in forecasting, especially product forecasting and technology forecasting. Mathematically, the basic Bass diffusion is a Riccati equation with constant coefficients.	

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BBC	British Broadcasting Corporation	A UK-based broadcasting corporation and the world's largest broadcasting corporation, employing 28,500 people in the United Kingdom alone with an annual budget of more than £4bn/\$8bn. The BBC is a quasi-autonomous public corporation as a public service broadcaster and is run by the BBC Trust. In addition to being the largest broadcasting corporation in the world, it is also the largest newsgathering system by means of its newsgathering operation, BBC Newsgathering, which includes various regional offices, foreign correspondents and agreements with other news services. The BBC reaches more than 200 countries and is available to more than 274 million households. It is therefore also the largest news channel in the world. Its radio services broadcast on a wide variety of wavelengths, making them available to many regions of the world. It also broadcasts news – by radio or over the Internet – in some 33 languages. The BBC was the first national broadcasting organisation, founded on 18 October 1922 as the British Broadcasting Company Ltd. It was subsequently granted a Royal Charter and was made a publicly funded corporation in 1927. The corporation produces programmes and information services, broadcasting globally on television, radio, and the Internet. The stated mission of the BBC is "to inform, educate and entertain" (as laid down by Parliament in the BBC Charter).	http://www.bbc.co.uk/
BIC	Bayesian Information Criterion	A statistical criterion for parametric model selection. BIC is widely used for model identification in time series and linear regression. It can be applied quite widely to any set of maximum likelihood-based models.	
BJ	Box Jenkins methods	An approach to identify and fit autoregressive-integrated-moving average (ARIMA) models to time-series forecasting problems. Defined by statisticians George Box and Gwilym Jenkins in 1970. Commonly used in econometrics.	
Box-Ljung test		A type of statistical test of whether any of a group of autocorrelations of a time series are different from zero. Instead of testing randomness at each distinct lag, it tests the 'overall' randomness based on a number of lags, and is therefore a portmanteau test (whether any of a group of autocorrelations of a time series are different from zero).	
CANAL+		A French premium pay television channel launched in 1984. It is owned by the Canal+ Group, which in turn is owned by Vivendi SA. As Canal+ was launched in new markets the brand has been used in several countries. In the Nordic countries, C More Entertainment, a premium television company, is operating under the banner CANAL+. Originally named CANAL+, it was launched in 1997 by the French pay-TV operator CANAL+ on the DBS platform Canal Digital (owned by Telenor), and subsequently on cable. In 2003, two private equity firms, Baker Capital and Nordic Capital acquired 100 % of CANAL+ Television from the international media conglomerate Vivendi Universal. At the same time Nordic CANAL+ was re-named C More Entertainment, retaining the rights of using the name 'CANAL+'. On 9 February 2005 SBS Broadcasting Group announced the acquisition of C More Entertainment. On 16 June 2008, Swedish TV4 Gruppen announced they had acquired C More Entertainment from German ProSiebenSat.1 Media AG for EUR 320 mill.	http://www.canalplus.fr/ ; http://www.canalplus.se/
CAPEX	Capital expenditure	Expenditures used by a company to acquire or upgrade physical assets such as equipment, property, industrial buildings. In accounting, a capital expenditure is added to an asset account (ie. capitalized), thus increasing the asset's basis.	
CBC	Choice Based Conjoint	Conjoint analysis method in which consumers choose between different complete product bundles. It is used when the relationship between price and other attributes is important and products can be described by relatively few attributes, normally up to 8 (more attributes may be compensated by asking more questions to each respondent or by increasing the number of respondents).	
CCA	Critical Communication Applications		
CD	Compact Disc	An optical disc used to store digital data, originally developed for storing digital audio. A standard compact disc, often known as an audio CD to differentiate it from later variants, stores audio data in a format compliant with the Red Book standard. An audio CD consists of several stereo tracks stored using 16-bit PCM coding at a sampling rate of 44.1 kHz. Standard compact discs have a diameter of 120 mm, though 80-mm versions exist in circular and 'business-card' forms. The 120 mm discs can hold 74 minutes of audio, and versions holding 80 or even 90 minutes have been introduced. The 80-mm discs are used as 'CD-singles' or novelty 'business-card CDs'. They hold about 20 minutes of audio. Compact disc technology was later adapted for use as a data storage device, known as a CD-ROM. The first edition of the Red Book was released in June 1980 by Philips and Sony; it was adopted by the Digital Audio Disc Committee and ratified as IEC 908.	http://www.iec.ch

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CDMA	Code Division Multiple Access	A digital, spread spectrum, packet based access technique generally used in radio systems. Allowing for multiple transmissions to be carried simultaneously on a single wireless channel (same time slot and carrier frequency). This is done by spreading the signal across the frequency band using one of a set of spreading codes such that one user's signal appears as noise/interference for other (non-intentional) receivers. CDMA is used in certain cellular systems, like eg. cdmaOne/IS-95, and is also in 3G systems like UMTS and CDMA2000.	
CELTIC	Cooperation for a European sustained Leadership In Telecommunications	CELTIC is a five years EUREKA cluster project, which started work in November 2003. The initiative is supported by most of the major European players in communication technologies. The main goal of CELTIC is to maintain European competitiveness in telecommunications through collaborative R&D. CELTIC projects are characterised by a holistic approach to telecoms networks, applications, and services. Like all EUREKA cluster projects, CELTIC is open to any kind of project participants from all EUREKA countries.	http://www.celtic-initiative.org/
CLEC	Competitive Local Exchange Carrier	Telephone company that competes with an incumbent local exchange carrier (ILEC). In Europe the term OLO (other licensed operator) is more often used than CLEC.	
COGS	Costs of goods sold	The direct costs attributable to the production of the goods sold by a company. It includes the materials cost used along with the direct labour. It excludes indirect expenses such as distribution costs and sales force costs. The company's gross margin is the revenue minus COGS.	
CONJOINT	Consider Jointly	Market researchers often explain the term Conjoint as a quantitative market research technique in which respondents CONsider JOINTly the features of products and services. More correctly, the word Conjoint comes from 'joined together' (to conjoin). Respondents are asked to rank, rate or choose among multiple products or services. Through statistical analysis of the trade-offs made by the respondents, we can estimate the relative importance of the different attributes of the products/services. Thus, it is also called 'trade-off-analysis'.	
Cross-correlation		A correlation measure between two time-series.	
CRT	Cathode Ray Tube	The cathode ray tube (CRT) is a vacuum tube containing an electron gun (a source of electrons) and a fluorescent screen, with internal or external means to accelerate and deflect the electron beam, used to form images in the form of light emitted from the fluorescent screen. The image may represent electrical waveforms (oscilloscope), pictures (television, computer monitor), radar targets and others. The earliest version of the CRT was invented by the German physicist Ferdinand Braun in 1897 and is also known as the 'Braun tube'.	
CVA	Conjoint Value Analysis	Conjoint analysis method in which consumers are asked to state their preference between two complete product bundles or to rank several bundles. It is used when products can be described by a few attributes, normally up to 6.	
DCE	Discrete Choice Experiment	Discrete choice problems involve choices between two or more discrete alternatives, such as entering or not entering the labor market, or choosing between modes of transport. Such choices contrast with standard consumption models in which the quantity of each good consumed is assumed to be continuously variable.	
Delphi technique/ method		The Delphi method is based on extracting independent forecasts from an expert panel over two or more rounds. The forecasting results and supplementary summaries and perhaps arguments are provided and distributed after each round. The main point with the method is that the views of experts through the process should iterate against a common opinion.	
Diffusion		Evolution of services or innovations through a population. The evolution (aggregated demand) follows a sort of S-curve. The logistic model is one of the relevant models, where the demand is proportional with the number of users who have got the service and proportional with the number of users who have not got the service. The number of new users per year increases rapidly, then after stabilising, decreases as unsatisfied demand for service dies away. Mead and Islam (2001) examine the use of diffusion models for time-series extrapolation.	
Diffusion models		Class of forecasting models for diffusion demand.	

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DOCSIS	Data Over Cable Service Interface Specification	An international standard developed by CableLabs and contributing companies. DOCSIS defines the communications and operation support interface requirements for a data over cable system. It permits the addition of high-speed data transfer to an existing Cable TV (CATV) system. It is employed by many cable television operators to provide Internet access (see cable internet) over their existing hybrid fibre coaxial (HFC) infrastructure. The first DOCSIS specification was version 1.0, issued in March 1997, with revision 1.1 (adding Quality of Service (QoS) capabilities) following in April 1999. Because of increased demand for symmetric services such as IP telephony, DOCSIS was revised to enhance upstream transmission speeds; DOCSIS 2.0 was released in December 2001. Most recently, the specification was revised to significantly increase transmissions speeds (this time both upstream and downstream) and introduce support for Internet Protocol version 6 (IPv6). This version, DOCSIS 3.0, was released in August 2006.	http://www.docsis.org/ ; http://www.cablemodem.com/
DSL	Digital Subscriber Line	A family of technologies that provide a digital connection over the copper wires of the local telephone network. Its origin dates back to 1988, when an engineer at Bell research lab devised a way to carry a digital signal over the unused frequency spectrum. This allows an ordinary phone line to provide digital communication without blocking access to voice services. Bell's management, however, were not enthusiastic about it, as it was not as profitable as renting out a second line for those consumers who preferred to still have access to the phone when dialling out. This changed in the late 1990s when cable companies started marketing broadband Internet access. Realising that most consumers would prefer broadband Internet to a second dial out line, Bell companies rushed out the DSL technology that they had been sitting on for the past decade as an attempt to slow broadband Internet access uptake, to win market share against the cable companies. As of 2004, DSL provides the principal competition to cable modems for providing high speed Internet access to home consumers in Europe and North America. The reach-restraints (line length from Central Office to Subscriber) reduce as data rates increase, with technologies like VDSL providing short-range links (typically 'fibre to the curb' network scenarios). Example DSL technologies (sometimes called xDSL) include: ADSL (Asymmetric Digital Subscriber Line), HDSL (High Bit Rate Digital Subscriber Line), RADSL (Rate Adaptive Digital Subscriber Line), SDSL (Symmetric Digital Subscriber Line, a standardised version of HDSL), VDSL (Very high speed Digital Subscriber Line), G.SHDSL (ITU-T Standardised replacement for early proprietary SDSL).	
Durbin-Watson test		A test statistic used to detect the presence of autocorrelation in the residuals from a regression analysis. It is named after James Durbin and Geoffrey Watson (1950).	
DVD	Digital Versatile Disc	Formerly Digital Video Disc; data storage format released in 1995. The discs have the same physical size as the CD, but the capacity is more than 7 times as high, approx. 4.7 GB on one side. The discs can have dual layers per side, thus a double-sided, dual-layer disc can store approx. 17 GB of data. Used for storing video, sound, computer software and data, games, etc. A single-sided, single-layer disc can store a typical feature film of 130 minutes with 8 different surround quality sound tracks. Available as read-only (DVD-Video, DVD-ROM), Once writable (DVD-R, DVD+R) and re-writable (DVD-RW, DVD+RW, DVD-RAM).	http://www.dvdforum.org
DWDM	Dense Wavelength Division Multiplexing	A carrier class WDM technology that uses expensive, cooled optics and tight spacing between wavelengths of less than a nanometre based on specifications of the International Telecommunication Union (ITU).	http://www.itu.int
EBITDA	Earnings before interest, taxes, depreciation and amortization	A metric that can be used to evaluate a company's profitability. EBITDA = Operating Revenue – Operating Expenses + Other Revenue. EBITDA is not a defined measure according to Generally Accepted Accounting Principles (GAAP), and thus can be calculated however a company wishes.	
ECOSYS	Techno-ECONomics of integrated communication SYSTEMS and services	European research project in the CELTIC programme running from April 2004 to March 2007. The overall objective of ECOSYS was to develop a strategic techno-economic analysis framework, apply it on case studies and draw conclusions and recommendations from that.	http://www.optcomm.di.uoa.gr/ecosys/index.html ; http://www.celtic-initiative.org/Projects/ECOSYS/default.asp
EDI	Electronic Data Interchange	The structured transmission of data between organizations by electronic means. In addition to E-mail; for instance, organizations might replace bills and checks with appropriate EDI messages. It also refers specifically to a family of standards, including the ANSI X12 series.	http://www.itl.nist.gov/fipspubs/fip161-2.htm ; http://www.doli.state.mn.us/edi.html ; http://www.anu.edu.au/people/Roger.Clarke/EC/EDIIntro.html

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EFT	Electronic Fund Transfer	The computer-based systems used to perform financial transactions electronically. The term is used for a number of different concepts: Cardholder-initiated transactions, where a cardholder makes use of a payment card, Direct deposit payroll payments for a business to its employees, possibly via a payroll services company, Direct debit payments from customer to business, where the transaction is initiated by the business with customer permission, Electronic bill payment in online banking, which may be delivered by EFT or paper check, Transactions involving stored value of electronic money, possibly in a private currency, Wire transfer via an international banking network (generally carries a higher fee) and Electronic Benefit Transfer. EFT may be initiated by a cardholder when a payment card such as a credit card or debit card is used. This may take place at an automated teller machine (ATM) or point of sale (POS), or when the card is not present, which covers cards used for mail order, telephone order and internet purchases. Card-based EFT transactions are often covered by the ISO 8583 standard.	http://www.iso.org/iso/catalogue_detail?csnumber=35363
ETSI	European Telecommunication Standards Institute	A non-profit membership organization founded in 1988. The aim is to produce telecommunications standards to be used throughout Europe. The efforts are coordinated with the ITU. Membership is open to any European organization proving an interest in promoting European standards. It was eg. responsible for the making of the GSM standard. The headquarters are situated in Sophia Antipolis, France.	http://www.etsi.org
EUREKA	(Not an acronym)	A pan-European research and development funding and coordination organization. EUREKA aims to coordinate efforts of governments and commercial companies. It does not partake in, for example, military research. EUREKA was established with the Paris Declaration 17 July 1985, and its principles are based on the later Hannover Declaration, subscribed by Ministers on 6 November 1985. At this time of writing (October 2006), EUREKA has 38 full members, including the European Union, represented by the European Commission. Among the 38 members, all the present 27 EU Member States are also members of EUREKA (the last EU Member State of the EU to join EUREKA was Malta, in June 2006). The Russian Federation joined in 1993. EUREKA is not an EU research programme, but an inter-governmental initiative, of which the EU is a member. However, a large cooperation and synergy is sought between EUREKA and the research activities of the EU proper, notably with the EU Framework Programme for Research and Development.	http://www.eureka.be
Extended learning curve model		Forecasting model for product and component costs. The model is an extension of the Learning curve model with the ability to make forecast for product costs.	
FCC	Federal Communication Commission (USA)	An independent United States government agency, directly responsible to US Congress. The FCC was established by the Communications Act of 1934 and is charged with regulating interstate and international communications by radio, television, wire, satellite and cable. The FCC's jurisdiction covers the 50 states, the District of Columbia, and US possessions. The FCC is directed by 5 Commissioners appointed by the President and confirmed by the Senate for 5-year terms, except when filling an unexpired term. The President designates one of the Commissioners to serve as Chairperson. Only three Commissioners may be members of the same political party. None of them can have a financial interest in any Commission-related business. As the chief executive officer of the Commission, the Chairman delegates management and administrative responsibility to the Managing Director. The Commissioners supervise all FCC activities, delegating responsibilities to staff units and Bureaus. The Commission staff is organized by function. There are 6 operating Bureaus and 10 Staff Offices. The Bureaus' responsibilities include: processing applications for licenses and other filings; analyzing complaints; conducting investigations; developing and implementing regulatory programs; and taking part in hearings.	http://www.fcc.gov
Fisher-Pry model		A forecasting model in the class of diffusion models. The model is the same as the Logistic model. See Logistic model.	
FNN	Feed-Forward Neural Network	The simplest type of artificial neural network devised. In this network, the information moves in only one direction, forward, from the input nodes, through the hidden nodes (if any) and to the output nodes. There are no cycles or loops in the network.	
FTTC	Fibre To The Curb (kerb)/ Cabinet	Also known as FTTN (Fibre to the Neighbourhood). A Hybrid Fibre Coax (HFC) network architecture involving an optical fibre which terminates in either a street side or neighbourhood cabinet which converts the signal from optical to electrical. The subscriber connection is either over twisted pair cable or coaxial cable.	

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FTTH	Fibre To The Home	The installation of optical fibre directly into the subscriber's home. FTTH is also referred to as fibre-to-the-building (FTTB), which includes optical fibre that is installed directly into a home or enterprise.	
FTTN	Fibre To The Node/ Neighbourhood	A Hybrid Fibre Coax (HFC) network architecture involving an optical fibre which terminates in either a street side or neighbourhood cabinet which converts the signal from optical to electrical. The subscriber connection is either over twisted pair cable or coaxial cable.	
FTTP	Fibre To The Premises	Term sometimes used to describe FTTH.	
GDP	Gross Domestic Product	GDP is defined as the total market value of all final goods and services produced within the country in a given period of time (usually a calendar year). GDP is one of the measures of national income and output for a given country's economy. It is also considered the sum of value added at every stage of production (the intermediate stages) of all final goods and services produced within a country in a given period of time, and it is given a money value.	
GLS	Generalized Least Squares	Linear model ($E(Y) = X\beta$) in which one estimates β by, instead of minimizing the sum of squares of the residuals, minimizing a different quadratic form in the residuals.	
GMRAE	Geometric Mean Relative Absolute Error		
GNP	Gross National Product	GNP is defined as the "value of all (final) goods and services produced in one year, plus income earned by its citizens abroad, minus income earned by foreigners in the country". It is a measure of national income used in economics to estimate the welfare of an economy through totalling the value of goods and services produced in an economy. They use a system of national accounting first developed during the 1940s.	
Gompertz model		A forecasting model in the class of diffusion models. The accumulated demand, Y_t , is expressed by $\ln Y_t = \ln M + e - b(t - a)$ where M is the saturation level and a and b are growth parameters.	
GPH	Geweke and Porter-Hudek	Estimation method for long memory time series. Published in: Geweke, J. and Porter-Hudek, S. (1983) The estimation and application of long memory time series models, <i>Journal of Time Series Analysis</i> , 4, 221–38.	
GPON	Gigabit PON	A PON (Passive Optical Network) which extends the BPON (Broadband PON) to support bitrates in excess of 1 Gb/s. It is specified by ITU-T G.984.	www.ponforum.org ; www.itu.int
GPS	Global Positioning System	GPS is a worldwide radio-navigation system formed from a constellation of 24 satellites and their ground stations. GPS uses these 'man-made stars' as reference points to calculate positions accurate to a matter of meters.	http://www.gps.gov/ ; http://www.navcen.uscg.gov/gps/default.htm
GRMSE	Geometric Root Mean Squared Error		
Growth period		The time elapsing from 10 % penetration to 90 % penetration of a product. Growth period is one of the parameters in the extended learning curve model used to forecast product costs.	
G-SG	Gamma-Shifted Gompertz model		
GSM	Global System for Mobile communications	A digital cellular phone technology system that is the predominant system in Europe, but is also used around the world. Development started in 1982 by CEPT and was transferred to the new organisation ETSI in 1988. Originally, the acronym was the group in charge, 'Group Special Mobile', but later the group was renamed SMG. GSM was first deployed in 7 countries in Europe in 1992. It operates in the 900 MHz and 1.8 GHz band in Europe and 1.9 GHz band in North America. GSM defines the entire cellular system, from the air interface to the network nodes and protocols. As of October 2006, there were more than 2.1 billion GSM users in more than 200 countries worldwide. The ubiquity of the GSM standard makes international roaming very common between mobile phone operators which enables phone users to access their services in many other parts of the world as well as their own country. GSM differs significantly from its predecessors in that both signalling and speech channels are digital, which means that it is seen as a second generation (2G) mobile phone system. This fact has also meant that data communication was built into the system from very early on. GSM is an open standard which is currently developed by the 3GPP.	http://www.gsmworld.com/ ; http://www.etsi.org ; http://www.3gpp.org

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HB	Hierarchical Bayes	In decision theory and estimation theory, a Bayes estimator is an estimator or decision rule that maximizes the posterior expected value of a utility function or minimizes the posterior expected value of a loss function (also called posterior expected loss). The hierarchical Bayes method is one of the most important topics in modern Bayesian analysis. It is a powerful tool for expressing rich statistical models that more fully reflect a given problem than a simpler model could. The term 'Bayesian' refers to Thomas Bayes (1702–1761), who proved a special case of what is now called Bayes's theorem.	
HDTV	High Definition Television	Broadcast of television signals with a higher resolution than traditional formats (NTSC, SECAM, PAL) allow. Except for an early analog format in Japan, HDTV is broadcast digitally, and therefore its introduction sometimes coincides with the introduction of digital television (DTV). An HDTV-compatible TV usually uses a 16:9 aspect ratio. The high resolution images (1920 pixels × 1080 lines or 1280 pixels × 720 lines) allow much more detail to be shown compared to analog television or regular DVDs. MPEG-2 is currently used as the compression codec. Like NTSC and PAL, 1920 × 1080 broadcasts generally use interlacing to reduce bandwidth demands. Alternating scan lines are broadcast 50 or 60 times a second, similar to PAL's 50 Hz and NTSC's 60 Hz interlacing. This format is entitled 1080i, or 1080i60. In areas traditionally using PAL 50 Hz, 1080i50 is also used. Progressive scan formats are also used with frame rates up to 60 per second. The 1280 × 720 format in practice is always progressive scan (with the entire frame refreshed each time) and is thus termed 720p.	
HFC	Hybrid Fibre Coax	A network which incorporates optical fiber along with coaxial cable to create a broadband network. It has been commonly employed by cable TV operators since the 1990s.	
Holt's exponential smoothing model		An exponential smoothing model for trends. The model has two smoothing parameters; one for the level and one for the trend. Exponential smoothing refers to a particular type of technique applied to time series data, either to produce smoothed data for presentation, or to make forecasts. Exponential smoothing is commonly applied to financial market and economic data, but it can be used with any discrete set of repeated measurements.	
Holt-Winters Forecasting Model		A seasonal forecasting procedure with more smoothing components than a Simple Exponential Smoothing (SES) model. While SES has one constant that smoothes both the trend and the seasonal components equally, the Holt-Winter's model incorporates three potentially different smoothing constants. The Holt-Winter's model has one smoothing constant to update the level, one for the slope, and one for the seasonal components. This approach is most useful when the seasonal component and the trend component are changing at different paces over time. The three smoothing constants lie somewhere between 0 and 1. If the components change rapidly, large smoothing constants should be considered; for stable components, the smoothing constants should be close to zero.	
HSDPA	High-Speed Downlink Packet Access	Enhancement of the 3G standard UMTS in order to provide higher bit rates on the downlink. The theoretical data rate can reach 14.4 Mb/s. Together with Enhanced Uplink (EUL/HSUPA) the term HSPA is often used.	http://www.3gpp.org
HSPA	High Speed Packet Access	Common term for High Speed Downlink Packet Access (HSDPA) and Enhanced Dedicated Channel (EDCH, often referred to as HSUPA – High Speed Uplink Packet Access), which are enhancements of the 3G standard UMTS to provide higher data rates on both downlink and uplink. The theoretical data rate can reach 14.4 Mb/s on the downlink and 5.6 Mb/s on the uplink.	http://www.3gpp.org
HSUPA	High Speed Uplink Packet Access	Formally named Enhanced Uplink (EUL) by the 3GPP. Enhancement of the 3G standard UMTS in order to provide higher bit rates on the uplink. The term HSUPA was coined by Nokia. The theoretical data rate can reach 11.2 Mb/s (3GPP Rel. 7). Together with HSDPA, the term HSPA is often used.	http://www.3gpp.org
ICT	Information and Communication Technology	The technology required for information processing. In particular the use of electronic computers and computer software to convert, store, protect, process, transmit, and retrieve information from anywhere, anytime.	

Acronym/ term	Definition	Explanation	Web resources
IETF	Internet Engineering Task Force	A large open international community of network designers, operators, vendors, and researchers concerned with the evolution of the Internet architecture and the smooth operation of the Internet. It is open to any interested individual. The technical work of the IETF is done in its working groups, which are organized by topic into several areas (eg. routing, transport, security, etc). Much of the work is handled via mailing lists. The IETF holds meetings three times per year. The IETF working groups are grouped into areas, and managed by Area Directors (AD). The ADs are members of the Internet Engineering Steering Group (IESG). Providing architectural oversight is the Internet Architecture Board (IAB). The IAB also adjudicates appeals when someone complains that the IESG has failed. The IAB and IESG are chartered by the Internet Society (ISOC) for these purposes. The General Area Director also serves as the chair of the IESG and of the IETF, and is an ex-officio member of the IAB. The Internet Assigned Numbers Authority (IANA) is the central coordinator for the assignment of unique parameter values for Internet protocols. The IANA is chartered by the Internet Society (ISOC) to act as the clearinghouse to assign and coordinate the use of numerous Internet protocol parameters. IETF's mission statement is given in IETF RFC 3935.	http://www.ietf.org ; http://tools.ietf.org/html/rfc3935
ILEC	Incumbent Local Exchange Carrier	A telecommunications company that dominates a specific market area.	
ILS	Indirect Least Squares	An approach in econometrics where the coefficients in a system of equations are estimated from the reduced form model using ordinary least squares (OLS). The structural system of equations is transformed into a reduced form first. Once the coefficients are estimated the model is put back into the structural form.	
IMS	IP Multimedia Subsystem	A standardised Next Generation Networking (NGN) architecture for telecom operators that want to provide mobile and fixed multimedia services. It uses a Voice-over-IP (VoIP) implementation based on a 3GPP standardised implementation of SIP, and runs over the standard Internet Protocol (IP). Existing phone systems (both packet-switched and circuit-switched) are supported. IMS was originally defined by an industry forum called 3G.IP (www.3gip.org) formed in 1999. 3G.IP developed the initial IMS architecture, which was brought to 3GPP for industry standardization as part of their standardization work for 3G mobile phone systems in UMTS networks. It first appeared in release 5 (evolution from 2G to 3G networks), when SIP-based multimedia was added. Support for the older GSM and GPRS networks was also provided. 'Early IMS' was defined to allow for IMS implementations that do not yet support all 'Full IMS' requirements. 3GPP2 (a different organisation) based their CDMA2000 Multimedia Domain (MMD) on 3GPP IMS, adding support for CDMA2000.	http://www.3gpp.org ; http://www.ietf.org ; http://www.imsforum.org/
IP	Internet Protocol	A protocol for communication between computers, used as a standard for transmitting data over networks and as the basis for standard Internet protocols. Originally defined in IETF RFC 791.	http://www.ietf.org ; http://tools.ietf.org/html/rfc791
IPBX	Internet Private Branch Exchange	A business telephone system designed to deliver voice over a data network and interoperate with the normal Public Switched Telephone Network (PSTN).	
IPTV	Internet Protocol Television	A system where a digital television service is delivered using the Internet Protocol over a network infrastructure, which may include delivery by a broadband connection.	
IRR	Internal Rate of Return	A capital budgeting method used by firms to decide whether they should make long term investments. The IRR is defined as any discount rate that results in a net present value of zero, and is usually interpreted as the expected return generated by the investment.	
ISDN	Integrated Services Digital Network	A digital telecommunications network that provides end-to-end digital connectivity to support a wide range of services, including voice and non-voice services, to which users have access by a limited set of standard multi-purpose user-network interfaces. The user is offered one or more 64 kb/s B-channels.	http://www.itu.int
IT	Information Technology	See ICT	

Acronym/ term	Definition	Explanation	Web resources
ITS	International Telecommunications Society	An association of professionals in the information, communications, and technology sectors. ITS is an independent, non-aligned and not-for-profit organization with about 400 members worldwide. ITS provides a forum where academic, private sector, and government communities can meet to identify pressing new problems and issues, share research results, and form new relationships and approaches to address outstanding issues. ITS focuses on the evolving applications, services, technology, and infrastructure of the communications, computing, Internet, information content, and related industries. The goal of ITS is to research and analyze issues related to the emergence of a global information society. The organization places particular emphasis on the interrelationships among socioeconomic, technological, legal, regulatory, competitive, organizational, policy, and ethical dimensions of the issues it addresses.	http://www.itsworld.org/
ITU	International Telecommunication Union	On 17 May 1865, the first International Telegraph Convention was signed in Paris by the 20 founding members, and the International Telegraph Union (ITU) was established to facilitate subsequent amendments to this initial agreement. It was renamed the International Telecommunications Union in 1934. From 1948 a UN body with approx. 200 member countries. It is the top forum for discussion and management of technical and administrative aspects of international telecommunications.	http://www.itu.int
ITU-T	International Telecommunication Union – Standardization Sector	A sector of the ITU, whose mission is to ensure an efficient and on-time production of standards (Recommendations) covering all fields of telecommunications. It was created on 1 March 1993, replacing the former International Telegraph and Telephone Consultative Committee (CCITT).	http://www.itu.int/ITU-T/
IV	Instrumental Variables	In statistics, econometrics, epidemiology and related disciplines, the method of instrumental variables (IV) is used to estimate causal relationships when controlled experiments are not feasible. IV methods allow consistent estimation when the explanatory variables (covariates) are correlated with the error terms. Such correlation may occur when the dependent variable causes at least one of the of covariates ('reverse' causation), when there are relevant explanatory variables which are omitted from the model, or when the covariates are subject to measurement error.	
JPY	Japanese Yen	The Japanese currency, 1 JPY (¥) = 1.03 USD (\$) = 0.81 EUR (€) (14.11.08)	
Judgemental forecasting methods		Qualitative forecasting methods where subjective information are integrated to produce the forecasts.	
KRW	South Korean Won	The South Korean currency, 1 KRW = 0.07 USD (\$) = 0.05 EUR (€) (14.11.08)	
LAN	Local Area Network	A network shared by communicating devices, usually on a small geographical area. A system that links together electronic office equipment, such as computers and word processors, and forms a network within an office or building.	
LDAP	Lightweight Directory Access Protocol	A networking protocol for querying and modifying directory services running over TCP/IP. Its current version is LDAPv3, as defined in RFC 3377.	http://www.ietf.org
LE	Large Enterprises		
LLU, LLUB	Local Loop Unbundling	Option to rent only a local loop (eg. copper access line to customer premises) by a non-incumbent operator.	
LM	Lagrange Multiplier	In mathematical optimization, the method of Lagrange multipliers (named after Joseph Louis Lagrange) is a method for finding the maximum/minimum of a function subject to constraints.	
Logistic model		The logistic model expresses the demand as proportional with number of users who have got the service and proportional with the number of users who have not got the service. Let Y_t and M be the saturation level, then the equation $Y_t = M/(1 + ae^{-bt})$ describes the accumulated growth of number of users of the service at time t , where a and b are constants controlling the rate of growth.	
Logit model		Choice model in which the dependent variable is inherently discrete. Dependent variable may be binary (0/1) or multiple.	
LTE	Long Term Evolution	Name of 3GPP's Work Item for standardising the access technology of their 4G mobile broadband standard, Evolved UTRA and UTRAN (E-UTRA(N)). Often used as name of the new system itself. E-UTRA is based on OFDMA technology combined with MIMO to provide end-user peak bitrates up to 200 Mb/s. First tests were performed late 2007 and the first products are expected late 2009.	http://www.3gpp.org

Acronym/ term	Definition	Explanation	Web resources
M2M	Machine To Machine	Data communications between machines. M2M can also mean the family of sensors, middleware, software and applications that help improve efficiency and quality by tying together a myriad of sensors with mission critical applications.	
MAE	Mean Absolute Error	The average error when ignoring signs.	
MAPE	Mean Absolute Percentage Error	The average of all the percentage errors ignoring signs.	
MCMC	Markov Chain Monte Carlo	A class of algorithms for sampling from probability distributions based on constructing a Markov chain that has the desired distribution as its equilibrium distribution. The state of the chain after a large number of steps is then used as a sample from the desired distribution. The quality of the sample improves as a function of the number of steps.	
MIMO	Multiple Input – Multiple Output	MIMO is an antenna technology for wireless communications in which multiple antennas are used at both the source (transmitter) and the destination (receiver). The antennas at each end of the communications circuit are combined to minimize errors and optimize data speed. MIMO is one of several forms of smart antenna technology, the others being MISO (multiple input, single output) and SIMO (single input, multiple output). MIMO technology has aroused interest because of its possible applications in digital television (DTV), wireless local area networks (WLANs), metropolitan area networks (MANs), and mobile communications.	
MIXL	Mixed Logit	A general, statistical model for approximating utility functions. It overcomes the limitations of the standard logit model. The standard logit model has three problems which mixed logit solves. It allows for random taste variation, unrestricted substitution patterns, and correlation in unobserved factors over time. Mixed logit can take any distribution.	
MMS	Multimedia Message Service	MMS – sometimes called Multimedia Messaging System – is a communications technology developed by 3GPP (Third Generation Partnership Project) that allows users to exchange multimedia communications between capable mobile phones and other devices. An extension to the Short Message Service (SMS) protocol, MMS defines a way to send and receive, almost instantaneously, wireless messages that include images, audio, and video clips in addition to text.	http://www.3gpp.org
MNC	Multi-National Company/ Corporation	A company that manages production or delivers services in more than one country. The Dutch East India Company, established in 1602, is usually regarded to the first modern MNC.	
MNL	Multinomial Logit	A regression model which generalizes logistic regression by allowing more than two discrete outcomes. Multinomial logit regression is used when the dependent variable in question is nominal (a set of categories which cannot be ordered in any meaningful way) and consists of more than two categories.	
Monte Carlo method/ simulation		A widely used class of computational algorithms for simulating the behavior of various physical and mathematical systems. They are distinguished from other simulation methods by being stochastic, that is nondeterministic in some manner – usually by using random or pseudo-random numbers – as opposed to deterministic algorithms. Because of the repetition of algorithms and the large number of calculations involved, Monte Carlo is a method suited to calculation using a computer, utilizing many techniques of computer simulation. Monte Carlo methods are especially useful in studying systems with a large number of coupled degrees of freedom.	
MoU	Minutes of Usage		
MPE	Mean Percentage Error	The average of all percentage errors.	
MPLS	Multi Protocol Label Switching	An IETF standard intended for Internet application. MPLS has been developed to speed up the transmission of IP based communications over ATM networks. The system works by adding a much smaller 'label' to a stream of IP datagrams allowing 'MPLS' enabled ATM switches to examine and switch the packet much faster. It is specified in IETF RFC 2702.	www.ietf.org
MSE	Mean Square Error	The sum of the squared forecast errors for each of the observations divided by number of observations.	
MSN	Microsoft Network	A collection of Internet services provided by Microsoft.	http://www.microsoft.com
Naïve models		A model assuming that the evolution will remain as it has been in the past.	

Acronym/ term	Definition	Explanation	Web resources
NGN	Next Generation Network	A network concept that aims at providing a framework to encompass the large variety of existing and emerging protocols and services, facilitate a further evolution of these, decouple the evolution from the underlying network infrastructure and facilitate the interfacing of a plethora of available media. The rationale behind NGN lies founded in paradigm shifts that have been taking place within the technological solutions and the business models in the telecom industry as a whole. The concept is based on IP-technology and is being specified by ITU-T.	www.itu.int
NPV	Net Present Value	Term used when evaluating a business case about the present net value of future investments.	
NRK	Norsk Riks-kringkasting (Norwegian Broadcasting Corporation)	The Norwegian government-owned radio and television public broadcasting company, and the leading media company of Norway. It is a founding member of the European Broadcasting Union. It is financed through a combination of a mandatory annual license fee for each person who is in possession of a TV, and a number of commercial activities such as programme and DVD sales, spin-off products and certain types of sponsorship. NRK was founded in 1933. Based on a model similar to the BBC, and located in Oslo, it was a replacement for privately operated radio stations in the larger cities. NRK initially set out to get coverage over the entire country, and had a monopoly on broadcasting in Norway until the monopoly was gradually dissolved from 1975 onwards.	http://www.nrk.no
NRS	Network Related Services		
NTT docomo	Nippon Telegraph and Telephone – DO COmmuni-cations over the MOBILE network	The predominant mobile phone operator in Japan. The name is also from a phrase dokodemo, meaning 'everywhere' in Japanese. NTT docomo provides phone, video phone, i-mode (internet), and mail (i-mode mail, Short Mail, and SMS) services. NTT docomo was spun off from Nippon Telegraph and Telephone (NTT) in August 1991 to take over the mobile cellular operations. NTT docomo provides 2G (mova) PDC cellular services in 800 MHz and 1.5 GHz bands (total 34 MHz bandwidth), and 3G (FOMA) W-CDMA services in the 2 GHz (UMTS2100) and 800 MHz (UMTS800 (Band VI)) and 1800 MHz (UMTS1800 (Band IX)) bands. Its businesses also include paging and satellite. NTT docomo ended PHS service on 7 January 2008. NTT docomo is a subsidiary of Japan's incumbent telephone operator NTT. The majority of NTT docomo's shares are owned by NTT (which is 31 % to 55 % government-owned). NTT docomo has more than 50 million customers, more than half of Japan's cellular market.	http://www.nttdocomo.com/
O2	Telefónica Europe plc	A European telecommunications company providing both fixed and mobile communication products, usually under the styled brand O2. The company has its origins in the 1990s BT Wireless within BT Group plc and an operator-independent global mobile data business then known as Genie Internet, which was also a subsidiary of BT Group. The companies involved in the demerger of BT's mobile communication business were BT Cellnet, which became O2 UK; Esat Digifone, which became O2 Ireland; Viag Interkom, which became O2 Germany; Telfort, which became O2 Netherlands; Manx Telecom (Isle of Man); O2 Airwave (UK); and Genie Internet, which split into O2 Online and O2 Asia. The demerger took place in 2001, the resultant parent company being named mmo2 plc. A later capital reorganisation in 2005 also saw the name of the company change to O2 plc. The O2 group was acquired by Telefónica in 2006 for 17.7 billion GBP. The company was renamed Telefónica O2 Europe plc, later, in 2008 to Telefónica Europe plc.	http://www.o2.com/
OECD	Organisation for Economic Co-operation and Development	The OECD groups 30 member countries sharing a commitment to democratic government and the market economy. With active relationships with some 70 other countries, NGOs and civil society, it has a global reach. Best known for its publications and its statistics, its work covers economic and social issues from macroeconomics, to trade, education, development and science and innovation. The OECD produces internationally agreed instruments, decisions and recommendations to promote rules of the game in areas where multilateral agreement is necessary for individual countries to make progress in a globalised economy.	http://www.oecd.org
OLS	Ordinary Least Squares	The method of least squares or ordinary least squares is used to solve over-determined systems. Least squares is often applied in statistical contexts, particularly regression analysis. Least squares can be interpreted as a method of fitting data. The best fit in the least-squares sense is that instance of the model for which the sum of squared residuals has its least value, a residual being the difference between an observed value and the value given by the model. The method was first described by Carl Friedrich Gauss around 1794. Least squares corresponds to the maximum likelihood criterion if the experimental errors have a normal distribution and can also be derived as a method of moments estimator.	
OPEX	Operations Expenditure	A company's operational cost in contrast to CAPEX – Capital Expenditure, which is the company's investment cost.	

Acronym/ term	Definition	Explanation	Web resources
Parlay X		Set of Web service APIs for the telephone network (fixed and mobile). It enables software developers to use the capabilities of a underlying network. The APIs are deliberately high level abstractions and designed to be simple to use. An application developer can, for example, invoke a single Web Service request to get the location of a mobile device or initiate a telephone call. The Parlay X Web services are defined jointly by ETSI, the Parlay Group, and the Third Generation Partnership Program (3GPP).	http://www.parlay.org/ ; http://portal.etsi.org/docbox/TISPAN/Open/OSA/ParlayX21.html ; http://portal.etsi.org/docbox/TISPAN/Open/OSA/ParlayX30.html ; http://www.3gpp.org
PABX/PBX	Private (Automatic) Branch Exchange	Also called PBX or Private Business eXchange. A telephone exchange that is owned by a private business, as opposed to one owned by a common carrier or by a telephone company.	
PDA	Personal Digital Assistant	Handheld device that combines computing, telephone/fax, Internet and networking features. A typical PDA can function as a cellular phone, fax sender, Web browser and personal organizer.	
PDH	Plesiochronous Digital Hierarchy	A technology used in telecommunications networks to transport large quantities of data over digital transport equipment such as fibre optic and microwave radio systems. The term plesiochronous is derived from Greek plesio, meaning near, and chronos, time, and refers to the fact that PDH networks run in a state where different parts of the network are almost, but not quite perfectly, synchronised. PDH is now being replaced by SDH (Synchronous Digital Hierarchy) equipment in most telecommunications networks. PDH allows transmission of data streams that are nominally running at the same rate, but allowing some variation on the speed around a nominal rate. The European and American versions of the PDH system differ slightly in the detail of their working, but the principles are the same. The European system is described. The basic data transfer rate is a data stream of 2.048 Mb/s. For speech transmission, this is broken down into 30 x 64 kb/s channels plus 2 x 64 kb/s channels used for signalling and synchronisation. Alternatively, the whole 2 Mb/s may be used for non speech purposes, for example, data transmission.	
Penetration		The percentage of units (eg. persons, households, firms) who has subscribed for a service. Quite often service penetration is calculated for a country. Then the penetration is number of units who have subscribed divided by number total number of units in the country.	
PLC	Product Life Cycle	Product life cycle has to do with the life of a product in the market with respect to business/commercial costs and sales measures. The accumulated sales of a product are assumed to follow an S-shaped curve, growing slowly in the early stages, achieving rapid and sustained growth in the middle stages, slowing up to the mature stage, and then declining. This should help in selecting appropriate forecasting method.	
POTS	Plain Old Telephone Service	A very general term used to describe an ordinary voice telephone service. See also PSTN.	
PPP	Price Per Port/ Price Per Plug	Metric used as a cost/performance indicator for network equipment.	
Price elasticity		Own price elasticity: Percent change in demand when the price increases by 1 %. Cross price elasticity: Percentage increase in the demand for good <i>j</i> when the price of good <i>i</i> increases by 1 %.	
Price-quality discrimination		A firm price-quality discriminates when it sells different quality versions of a product at different prices, where price differences do not reflect differences in costs.	
Product growth period		The time elapsing from 10 % penetration to 90 % penetration of a product. Growth period is one of the parameters in the extended learning curve model used to forecast product costs.	
PSTN	Public Service Telephone Network	Common notation for the conventional analog telephone network.	
QoS	Quality of Service	The "degree of conformance of the service delivered to a user by a provider, with an agreement between them". The agreement is related to the provision/delivery of this service. Defined by EURESCOM project P806 in 1999 and adopted by ITU-T in recommendation E.860.	http://www.itu.int ; http://www.eurescom.de
RAE	Relative Absolute Error	The absolute error of a proposed time-series forecasting model divided by the absolute error of the random walk (no change) model. The RAE is similar to Theil's U2.	

Acronym/ term	Definition	Explanation	Web resources
RAS	Remote Access Service	Any combination of hardware and software to enable the remote access to tools or information that reside on a network of IT devices. RAS was originally a service provided by Windows NT which allows most of the services which would be available on a network to be accessed over a modem link. The service includes support for dialup and logon, and then presents the same network interface as the normal network.	
Richard's model		Also called Richard's curve, the generalized logistic curve or function is a widely-used and flexible sigmoid function for growth modelling. Published in: Richards, F.J. (1959) A flexible growth function for empirical use. <i>J. Exp. Bot.</i> , 10, 290–300.	
RMSE	Root Mean Squared Error	The squared root or mean squared error, see MSE.	
ROA	Real Options Analysis	An analysis method applying mathematical techniques found in financial options to assess the best course of action to be taken when faced with a real-life decision. It takes into account uncertainty about the future evolution of the parameters that determine the value of the project, and the management's ability to respond to the evolution of these parameters. The uncertainty is modelled as the volatility of the project value, and the management's ability to respond is modelled as an option to contract, abandon, expand or extend the project.	
ROI	Return on Investment	The ratio of money gained or lost, whether realized or unrealized, on an investment relative to the amount of money invested.	
SAC	Subscriber Acquisition Cost		
SAS	Statistical Analysis System	An integrated system of software products provided by SAS Institute.	http://www.sas.com
Saturation level		The maximum units or number of members of a population who may adopt a service. Experience shows that knowledge and market insight could be the best basis for estimating the saturation level.	
SDH	Synchronous Digital Hierarchy	SDH (Synchronous Digital Hierarchy) is a standard technology for synchronous data transmission on optical media. It is the international equivalent of North American SONET (Synchronous Optical Network). Both technologies provide faster and less expensive network interconnection than traditional PDH (Plesiochronous Digital Hierarchy) equipment. It is a method of transmitting digital information where the data is packed in containers that are synchronized in time enabling relatively simple modulation and demodulation at the transmitting and receiving ends. The technique is used to carry high capacity information over long distances. SDH uses the following Synchronous Transport Modules (STM) and rates: STM-1 (155 megabits per second), STM-4 (622 Mbps), STM-16 (2.5 gigabits per second), and STM-64 (10 Gb/s). SDH is specified by ITU-T G.707.	
SDP	Service Delivery Platform	A set of components that provide a service's delivery architectures, such as service creation, session control and protocols.	
SES	Simple Exponential Smoothing	Exponential smoothing refers to a particular type of technique applied to time series data, either to produce smoothed data for presentation, or to make forecasts. The time series data themselves are a sequence of observations. The observed phenomenon may be an essentially random process, or it may be an orderly, but noisy, process. SES is a simple, or unweighted, moving average. The smoothed statistic is then just the mean of the last k observations.	
SF	Structural Form	The structural form of a system of equations shows a (vector) function of both endogenous variables (those to be found, unknowns) and the exogenous variables (explanatory or input), like $f(Y,X) = 0$. Y is a vector of endogenous variables, while X is the exogenous variable vector. Solving this system of equations give the reduced form, $Y = g(X)$.	
SIM	Subscriber Identity Module	The SIM is a subscriber identity module for GSM/GPRS subscriptions. In 2G systems the term SIM is used for a dedicated smartcard with subscriber identity information (including security credentials and algorithms). In 3G systems a SIM is an application running on the UICC (smartcard). Although the terms UICC and SIM are often interchanged, UICC refers to the physical card, whereas SIM (in 3G) refers to a single application residing in the UICC that collects GSM/GPRS user subscription information. The corresponding UMTS subscriber application is the USIM (which is always present on a UICC). The SIM provides secure storing of the key identifying a mobile phone service subscriber but also subscription information, preferences and storage of text messages. The equivalence of a SIM in UMTS is a Universal Subscriber Identity Module (USIM). Defined in 3GPP specification series 31.	http://www.3gpp.org/ftp/Specs/html-info/31-series.htm

Acronym/ term	Definition	Explanation	Web resources
SIP	Session Initiation Protocol	An IETF Protocol used to set up voice calls over an IP network. Also the name of the IETF WG developing the protocol. SIP is defined in IETF RFC 3261.	http://www.ietf.org ; http://tools.ietf.org/html/rfc3261
SK Telecom	Sun Kyung Telecom	South Korean mobile telecommunications operator, controlled by the SK Group, one of the country's largest chaebol (a South Korean form of business conglomerate). SK Telecom is a provider of mobile service in Korea, with 50.5 % of the market share as of 2008. It was established in 1984. The company has evolved from a first generation analogue cellular system, to second generation CDMA, then to the world's first third generation synchronized IMT-2000 cellular system. SK Telecom became the world's first to commercialize HSDPA in May 2006. SK Telecom was established in March 1984 under the name Korea Mobile Telecommunications Services Co., but was renamed Korea Mobile Telecommunications Corp. (KMT) in 1988. In 1994 SK Group became KMT's largest shareholder. KMT officially joined the SK Group in 1997 and changed its name to SK Telecom the same year.	http://www.sktelecom.com/
SLA	Service Level Agreement	A contract between a provider and a customer that guaranties specific levels of performance and reliability at a certain cost. This contract should also precisely define what could be penalties and back-up solutions in case of problems. SLA is especially important to define when an important part of your system or activity relies on third party providers. SLA is also a very good approach for services provided internally to your organisation where you should also have a customer approach concern. A definition is found in IETF RFC 3272.	http://www.ietf.org ; http://tools.ietf.org/html/rfc3272
SME	Small and Medium Enterprises	Micro, small and medium-sized enterprises represent 99 % of all enterprises in the European Union. The European Commission published in 2003 a revised definition of SMEs. According to this definition, micro-sized enterprises have less than 10 employees and a turnover less than EUR 2 mill. A small enterprise has less than 50 employees and a turnover of less than EUR 10 mill. Medium-sized enterprises have less than 250 employees and a turnover of less than EUR 50 mill.	http://europa.eu.int/comm/enterprise/enterprise_policy/sme_definition/index_en.htm
SMS	Short Message Service	A means by which short messages can be sent to and from digital cellular phones, pagers and other handheld devices. Alphanumeric messages of up to 160 characters can be supported.	
SOA	Service Oriented Architecture	Methods for systems development and integration where systems group functionality around business processes and package these as interoperable services. SOA also describes IT infrastructure which allows different applications to exchange data with one another as they participate in business processes. SOA separates functions into distinct units, or services, which developers make accessible over a network in order that users can combine and reuse them in the production of business applications. These services communicate with each other by passing data from one service to another, or by coordinating an activity between two or more services.	
SONET	Synchronous Optical Network	A standard for optical telecommunications transport formulated by the Exchange Carriers Standards Association (ECSA) for the American National Standards Institute (ANSI), in ANSI T1.105.	http://www.ansi.org/ ; http://www.iec.org/online/tutorials/sonet/
SUR	Seemingly Unrelated Regression	A technique for analyzing a system of multiple equations with cross-equation parameter restrictions and correlated error terms. It was developed by Arnold Zellner and first published in 1962. An economic model may contain multiple equations which are independent of each other on the surface; they are not estimating the same dependent variable, they have different independent variables, etc. However, if the equations are using the same data, the errors may be correlated across the equations. SUR is an extension of the linear regression model which allows correlated errors between equations.	
Take rate		Proportion between demand and supply. Take rate in an area is the number of units (eg. persons, households, firms) who have subscribed divided by the number of units who have got the offer. The penetration is always less or equal to the take rate. Take rate and adoption rate are identical concepts.	
TCO	Total Cost of Ownership	A financial estimate designed to help consumers and enterprise managers assess direct and indirect costs. TCO is sometimes referred to as total cost of operation.	
TDM	Time Division Multiplex	A type of digital multiplexing in which two or more apparently simultaneous channels are derived from a given frequency spectrum, ie. bit stream, by interleaving pulses representing bits from different channels.	
TDNN	Time-Delay Neural Network		

Acronym/ term	Definition	Explanation	Web resources
TFI	Technology Futures Inc.	A US based consultancy company specializing in technology management, strategy, and forecasting services to a wide variety of commercial, government, and academic organizations. It is based in Austin, Texas.	http://www.tfi.com/
TISPAN	Telecommunication and Internet converged Services and Protocols for Advanced Networking	The ETSI core competence centre for fixed networks and for migration from switched circuit networks to packet-based networks with an architecture that can serve in both. TISPAN is responsible for all aspects of standardisation for present and future converged networks including the NGN (Next Generation Network), and including service aspects, architectural aspects, protocol aspects, QoS studies, security related studies, mobility aspects within fixed networks, using existing and emerging technologies. To a large extent this work is centered around adapting the 3GPP IMS architecture to the TISPAN/NGN environment. TISPAN is structured as a single technical committee, with core competencies, under which there are Working Groups and Project Teams.	http://www.etsi.org; http://portal.etsi.org/tispan
TTFG	Telecommunications Technology Forecasting Group	Industry consortium established to promote the understanding and use of forecasting to predict and support the continuing evolution of the public telecommunications network. Comprised of AT&T, Verizon, Qwest, and Bell Canada.	http://www.tfi.com/rescon/ttfg.html
UMB	Ultra Mobile Broadband	The brand name for a project within 3GPP2 to improve the CDMA2000 mobile phone standard for 4th generation applications and requirements. It is based on OFDMA and MIMO technology. The standard was finalized in late 2007.	http://www.3gpp2.org; http://www.cdg.org/technology/3g_umb.asp
UMTS	Universal Mobile Telecommunication System	The European member of the IMT 2000 family of 3G wireless standards. UMTS supports data rates of 144 kb/s for vehicular traffic, 384 kb/s for pedestrian traffic and up to 2 Mb/s in support of in-building services. The standardisation work began in 1991 by ETSI but was transferred in 1998 to 3GPP as a corporation between Japanese, Chinese, Korean and American organisations. It is based on the use of WCDMA technology and is currently deployed in many European countries. As of November 2008 there are more than 300 million subscribers worldwide (including HSDPA). The first European service opened in 2003. In Japan NTT DoCoMo opened its 'pre-UMTS' service FOMA (Freedom Of Mobile multimedia Access) in 2000. The system operates primarily in the 2.1 GHz band and is capable of carrying multimedia traffic.	http://www.3gpp.org/; http://www.umts-forum.org
VaO	Value of Opportunity	A widely used measure of the potential profit on a specific portfolio of financial assets. For a given portfolio, probability and time horizon, VaO is ('complementary' to VaR) defined as a threshold value such that the probability that the mark-to-market <i>gain</i> on the portfolio over the given time horizon exceeds this value assuming normal markets and no trading.	
VaR	Value at Risk	A widely used measure of the risk of loss on a specific portfolio of financial assets. For a given portfolio, probability and time horizon, VaR is defined as a threshold value such that the probability that the mark-to-market <i>loss</i> on the portfolio over the given time horizon exceeds this value assuming normal markets and no trading.	
VCR	Video Cassette Recorder	The video cassette recorder is a type of video tape recorder that uses removable videotape cassettes containing magnetic tape to record audio and video from a television broadcast so it can be played back later. Most VCRs have their own tuner (for direct TV reception) and a programmable timer (for unattended recording of a certain channel at a particular time). The most common consumer formats were the original 'VCR'-format from Philips which appeared in 1974, and the JVC's VHS (Video Home System), introduced in 1976, which were most successful. The last few years, this market has been totally overtaken by DVD and hard-disk recorders.	
VoIP	Voice over Internet Protocol	VoIP is the routing of voice conversations over the Internet or any other IP-based network. The voice data flows over a general-purpose packet-switched network, instead of traditional dedicated, circuit-switched voice transmission lines. Several standards exist to support VoIP, like H.323 from ITU-T and SIP (IETF RFC 3261).	http://www.itu.int; http://www.ietf.org
WACC	Weighted Average Cost of Capital	The rate that a company is expected to pay to finance its assets. Consequently, WACC is the minimum return that a company must earn on its existing asset base to satisfy its creditors, owners, and other providers of capital.	
WAN	Wide Area Network	A network that provides data communications to a large number of independent users spread over a larger geographic area than that of a LAN (Local Area Network). It may consist of a number of LAN connected together.	

Acronym/ term	Definition	Explanation	Web resources
WAP	Wireless Application Protocol	WAP is an open international standard for applications that use wireless communication, for example Internet access from a mobile phone. WAP was designed to provide services equivalent to a Web browser with some mobile-specific additions, being specifically designed to address the limitations of very small portable devices. It is now the protocol used for the majority of the world's mobile internet sites, otherwise known as wap-sites. The Japanese i-mode system is the other major competing wireless data protocol. The latest version is WAP 2.0. It is specified by the WAP Forum.	http://www.wapforum.org
WCDMA	Wideband Code Division Multiple Access	Modulation and Multiple Access Technique employed by the 3G standard UMTS.	http://www.3gpp.org
Wi-Fi®	Wireless Fidelity	A term for certain types of wireless local area network (WLAN) that use specifications in the 802.11 family. The term Wi-Fi was created by an organization called the Wi-Fi Alliance, which oversees tests that certify product interoperability. A product that passes the alliance tests is given the label 'Wi-Fi certified' (a registered trademark).	http://www.wifialliance.org
WiMaX	Worldwide Interoperability for Microwave Access	A specification for fixed broadband wireless metropolitan access networks (MANs) that use a point-to-multipoint architecture. Based on the IEEE 802.16 WMAN. Published on 8 April 2002, the standard defines the use of bandwidth between the licensed 10 GHz and 66 GHz and between the 2 GHz and 11 GHz (licensed and unlicensed) frequency ranges, and defines a MAC layer that supports multiple physical layer specifications customized for the frequency band of use and their associated regulations. 802.16 supports very high bit rates in both uploading to and downloading from a base station up to a distance of 50 km to handle such services as VoIP, IP connectivity and TDM voice and data.	http://www.ieee802.org/16/ ; http://www.wimaxforum.org/
WLAN	Wireless Local Area Network	This is a generic term covering a multitude of technologies providing local area networking via a radio link. Examples of WLAN technologies include Wi-Fi (Wireless Fidelity), 802.11b and 802.11a, HiperLAN, Bluetooth and IrDA (Infrared Data Association). A WLAN access point (AP) usually has a range of 20–300 m. A WLAN may consist of several APs and may or may not be connected to Internet.	
WTP	Willingness To Pay	An economic term which refers to the value of a good to a person as what they are willing to pay, sacrifice or exchange for it. WTP is the maximum monetary amount that an individual would pay to obtain a good.	