



Roger Steele, CEO Telzed Limited

Roger Steele is an industry expert in both fixed and mobile telecommunications. He has worked on a wide range of international assignments where he uses his broad experience of business issues and technology to help clients. He has advised operators and regulators on strategic policy. Roger has a deep understanding of the financial and operational issues facing operators and he uses this to help with investment and cost-management decisions. His financial modelling is supported by technical and regulatory knowledge. His analytical work has been used to set regulatory-controlled cost-based interconnect prices. Roger has also worked with major end users, procuring communications services, and this provides him with a balanced view of the industry: covering operators, customers and regulators.

Roger's skills and knowledge cover: national/regulatory/business/ broadband strategies, broadband cost analysis, telco accounting systems and charts of accounts, cost modelling including interconnect costing, operator due diligence appraisal, cost and profit analysis, Activity Based Costing, competition/regulatory economics, telco organisation and management, service procurement for large businesses (outsourcing), regulatory affairs, strategy, and an in-depth understanding of a wide range of telecommunications technologies. Roger has been a regular speaker at international conferences on telecoms financial analysis, regulatory affairs and pricing. He has helped regulators develop consultation papers and has provided training and workshops to build skills and knowledge.

Roger Steele was previously a Director at Deloitte Corporate Finance Economic Consulting team and a Director and Practice Leader at Ovum. He has also worked at PA Consulting Group, for BT Syncordia (later Concert) as Equipment Engineering Manager, and also at BT Labs as an Executive Engineer (pioneering optical communications systems in common use today). He also worked as a development Engineer for a venture capital start-up.

R Steele is currently developing a general purpose mobile BU LRIC model for business-scenario and network planning as well as regulatory modelling. It models 2, 3, 4 & 5G in any combination. An intended market is emerging markets where a low-cost model can be used without consulting support. The model is useful for any country. The model is designed to be delivered for the client to adjust to local costs and traffic. Rural coverage is a feature. Costs over time are modelled as well as a Long Run view based upon a specific year.

Telzed: December 2011 to date

Assignments have included:

- Support to the regulator's and the operator's approved Auditor to assess the Regulatory Accounts of a mobile and fixed business. The work examined both the account results but also the methodology, detailed calculations and the supporting input data used. The accounts were checked for compliance with the regulator's guidelines. The work resulted in revised versions and updated Accounts that were then given Audit approval.
- Support to a regulator in discussions on the asset values that should be used in a new separated business that was carrying out a split of the business into legally separated units. Problems were found with the re-valuations and some unusual approaches were found that were subsequently dismissed by the regulator.

- Expert support in a legal case that involved the limited access to services that restricted the ability for a competitor to remain in the market. The expert submission showed that insufficient capacity and unreasonable conditions were, provided forcing the claimant into an untenable business situation.
- Review, for an integrated operator, of Bottom Up LRIC models of fixed and mobile developed by a regulator. Models were unusual as they included retail cost estimates. Unreasonable factors that led to low costs were identified. Some likely errors were defined. Features of existing Top Down model were summarised. Roger provided workshops on the models and risks.
- Leased line cost analysis and pricing assistance for African regulator.
- Mobile data BU LRIC model for African regulator. Mobile data is not commonly regulated, but the model was needed to assist in assessment of the market and whether prices were reasonable. The model shows data-costs differences by 2/3/4G and technical combinations. Voice and SMS were also calculated. Low population coverage and unserved rural areas is an issue in this country (like much of Africa).
- Leased line consultation on prices, markets and costs for Asian regulator. Provided modelling skills and advice for making a Bottom Up model. A price benchmark was carried out.
- New regulatory accounts based on Markets. Public consultation and definition of new Accounting Instructions.
- Report on how copper investments may be dealt with in cost models, regulatory accounts and price controls, for a regulator where fibre to the home is becoming a significant factor.
- Costing and LRIC five day course for EU regulator, adapted Neotelis/Telzed course material with additional features for the South American regulator.
- Costing and LRIC five day course for EU regulator, based on Neotelis course but with additional features for Postal regulation and special breakout sessions. December 2017.
- Five day LRIC training course for TRA Jordan in association with Neotelis 2017.
- Review, analysis and approval of regulatory accounting system for GCC Regulator. 2017/8. A report on trends and investments was included.
- Best Practices in LRIC & costing, July 2018 London. 5 day course.
- Expert Witness inputs to an arbitration on call termination in Middle East. 2017. Roger advised on the use of price asymmetry and how changing call termination prices are often done over a glidepath period. Conducted an Expert hearing with tribunal in 2018, including cross examination by claimant.
- Senior advisor in a major project to develop a new regulatory framework to split the incumbent operator. This considered legal and structural separation to help develop fibre access investments and ultrafast broadband. The outcome was a new regulatory framework and public consultations. 2017/18.
- Review of regulatory accounting design manual and documents for regulator. FAC, CCA and LRIC. 2012 onward. This work examined the accounting manuals and the accounting data was initially delivered by two operators (later just one). Broadband

service costs were examined. Market trends were analysed and implications identified.

- Neotelis LRIC costing course Amsterdam 2017.
- Review of and upgrade of regulatory costing system used for annual account reporting. Roger reviewed and advised the consulting firm which implemented new IT. Updated allocations were introduced. He was included at the request of the operator because of his past experience with the previous system. 2016.
- Broadband strategies paper for ITU. Later followed by a presentation tour in Cairo, Mexico and Tokyo. Paper is on ITU and Telzed web sites.
- Preparation of draft reference offers and consultations with operators. Duct access, transmission and interconnect services each in separate projects. 2015/16/17.
- A comprehensive paper on The Economic Benefits of Broadband and Strategic Options for a regulator. This identified the options and compared the country with case studies from other nations using including GCC and Australasian countries. Technologies were analysed and separation options for the incumbent were defined. The government's national telecom plan was subject to a critical review. A method to compare different approaches to separation was developed, which shows (even today) how different countries' approaches are widely varied. A work plan for moving forward was defined.
- Expert Witness in case related to Access Deficit costs and cost recovery. Also covered Universal Service (USO). Regulatory accounting was also part of the discussions. Roger attended hearings with "hot tub" cross examinations of the experts' evidence.
- Regulatory strategy options and plans for a fixed/mobile operator.
- Expert report for lawyers that examined sub-sea cable pricing for an island economy. This looked at other countries and trends. Alternative cost-based pricing methods were examined and explained. Different LRIC methods were explained and compared.
- Comprehensive report (>150 pages) on regulatory accounting methods. This noted different approaches globally and how diverse needs were met. LRIC and FAC costing methods were discussed and a comprehensive examination of methods and options used globally was included.
- Review of a sophisticated costing system for European fixed/mobile operator. Telzed defined the new IP and broadband services costing and ran workshops for costing teams and CFO levels staff on costing, regulation and LRIC.
- Submission to a ME regulator, for the incumbent operator, concerning BU LRIC model methods that were published in a public consultation.
- Workshop and training on Top Down models for an operator including discussions on how to update pre-existing models.
- Workshop on markets, competition and regulation. Imperial University 2013.
- Review of regulator's bottom up LRIC modelling papers and data requests of fixed and mobile business. The access model was found to be flawed and not suitable for broadband regulation.

- Responses to and meetings with ME regulator in order to get BU LRIC fixed and mobile models developed so that they reflect local circumstances. Advice and analysis was provided to the operator.
- Expert report for a criminal law legal case relating to SMS text fraud and “spoofing.” This identified the dangers, how spoofing is done and how spoofing can be almost untraceable. Reports helped with the legal case being dismissed.
- Submission to ME regulator and presentation, for the incumbent fixed/mobile operator. This report explained why it is unreasonable for the incumbent to make a BU mobile LRIC model as well as TD LRIC models and to deliver Account Separation reports. BU model obligations were lifted.
- Benchmarking and analysis of the prices of interconnection links.
- Examination of wholesale pricing for Number Translation Services (0800 and other special code numbers).
- Conversion of operator’s FAC cost model into MS Access version to confirm functionality and assist with investigations.
- Review of regulatory accounts and costing system. This ME regulator project has included operator meetings, cost model analysis and dispute-issues. The costs and prices of broadband and fibre access services were particular areas that were examined.
- Regulatory accounts public consultation. Issue of consultation papers, analysis of replies and define new Instructions.
- WACC public consultation – issue of the consultation document and analysis of comments. An economic specialist was also subcontracted to Telzed.
- Retail price approval of some complex fixed, mobile, broadband tariff plans for a regulator. A generic retail approval process was defined and the economic and competition impacts were examined in detail. Replicability and margin squeezes were identified as problem areas along with trans-market tariff plans.
- For a European mobile, a response to the regulator’s public consultation on “pure LRIC” termination costing. A response to the bottom up model data requests included include asset re-valuation and analysis of the operational and support costs using analysis of the GL. Network working capital costs were identified.
- Response advice and Expert Witness statement for a major arbitration case relating to mobile termination rates and the history of telecom competition since the 1990s. The work looked at mobile termination rates and regulatory approaches in other countries and the impact on market development. Price discrimination was a key focus point. SIM boxes and competitions issues were examined in a wide-ranging expert submission paper. Attended hearings over three days with cross examinations.
- A 4day workshop for the ITU in Khartoum on telecoms dispute resolution.
- Set up a partnership with Pilbara Group for world-leading ABC systems and financial analysis tools for telcos.
- Licensed user of the QPR CostPerform – a leading telecoms ABC costing and profit system.

Deloitte: April 2008 - February 2010

At Deloitte, Roger managed and contributed to many jobs including:

- Led a major cost accounting project in ME to deliver cost and profit analysis of the telecom operator's fixed and mobile services (>500 retail products), define LRIC costs and of wholesale services compliant with the regulatory guidelines and create separate regulatory business unit accounts (both commercial retail business units and licensed business units). Implemented the system in Oracle and an ABC system. Every operational and balance sheet account was processed and the treatment specified in detail.
- Created a tool to deliver regulatory accounts, compliant with the national Guidelines. Middle Eastern client.
- Led a team to deliver separate LRIC models of mobile and fixed networks for a Middle Eastern client each linking to two separate accounting systems. Advised on international call by-pass risks, pricing and met with the regulator. Ran workshops with commercial managers on cost and pricing issues and how to use cost data for strategic planning. Entire General Ledger was processed.
- For Middle Eastern client, he helped the client to develop a Next Generation Network cost model and helped them to respond to the regulator.
- For another Middle Eastern client developed a Next Generation Network cost model that defined triple and quad play services. The system covered fixed access (fibre NGA and copper), core legacy and IP, as well as mobile services.
- A report for BT on the cost of mobile termination and how this compares to regulated mobile termination rates (MTR). An econometric regression approach examined the costs of EU mobile operators costs and showed how the costs relate to diverse factors.
- Assistance on a dispute over wholesale leased line charges.
- Due diligence on an island telecom operator for a private equity firm and buyer. Roger led the work examining the effects on the business strategy from competition, regulation and threats from loss in international revenues.
- Workshop for EU fixed/mobile incumbent on NGN costing, pricing and responses to recent EC and national regulatory moves.
- Assistance to EU fixed operator to revise its CCA assets to re-value the access network.
- Developed a paper for the GSMA that examined Next Generation Network issues, economics, regulation and wholesale payments.

Ovum: Consulting Director Sept 2004 to March 2008 & March 2010-December 2011

At Ovum, Roger:

- Led an arbitration response paper where the MTR rates were disputed. The paper showed that price discrimination for termination was quite commonplace and the local

commercially-negotiated MTRs were not out of line with other countries. Two expert witness statements were shown to be flawed.

- Delivered two support projects for ME NRAs covering: WACC consultation, review of accounting manuals, current cost accounting, regulatory accounts, audit procedures, cost model reviews.
- Led a Middle Eastern regulator (CITC) in a major 12 month project to define new retail and wholesale tariff approvals, including development of wholesale costing models and advising on anti- competitive pricing. The work examined the wholesale services and weaknesses in the regime. New retail price processes were defined and a Public Consultation on LRIC methods has been conducted. Top down and bottom up fixed and mobile models have been specified. Lawyers were used as subcontractors on process and compliance issues. The LRIC guidelines are on the Internet and were referenced by the ITU as good practice.
- For Central American operator: a white paper on national economics, competition and lack of sound regulation including poor outcomes for consumers; review of cost models; analysis of termination rates; regulatory strategy and business strategy advice; price benchmarking; review of wholesale leased lines.
- Advised ME regulator on the existing Regulatory Accounts. The level of detail, structure and values were commented on – not sufficient for regulatory purposes even though they complied with Guidelines.
- Started a project to define Markets and Dominance for CITC Saudi.
- Managed the due diligence investigation of a network and IT firm on behalf of a prospective investment bank. The strategy was examined and issues in the business plan were found. The investor withdrew.
- Assisted an EU incumbent operator with a response to competition authorities. Advice and analysis was required to show that a fixed/broadband/mobile triple play package did not cause a price squeeze. Costs, accounts and wholesale process were analysed.
- A mobile cost model that analysed all services, focusing on data. The general ledger was loaded and processed by the model – every account was examined and its treatment specified. This is being used to evaluate retail services, especially data prices.
- He launched joint venture with Pilbara Group. This new system enables retail and regulatory accounting and provides service cost and profit analysis. The accounting techniques were developed by Roger. The system was tested with some EU incumbents to ensure it can replace existing regulatory account reporting tools
- Developed a top down mobile LRIC model for EU mobile operator. The results were used to correct the regulators bottom up model and significantly increased the MTR results. Roger commented on the bottom up model and assisted in discussions with the regulator and its advisors. The entire GL accounts were examined and processed.
- Quality assurance of BU LRIC models for projects in Jordan and Taiwan.
- Developed regulatory submission papers on mobile termination asymmetry and unreasonable use of SIM boxes.

- Developed a top down mobile fully allocated cost (FAC) model to determine mobile termination. All accounts processed.
- Assisted a central European fixed operator in a legal dispute with advice and analysis to determine the past traffic and hence the revenues due to another operator who has commenced major legal proceedings. This was a long running project that has followed Roger to Ovum. Appeared in hearing as expert witness.
- Assisted a fixed operator on an NGN interconnect cost model. The fixed operator was required by the regulator to produce LRIC-based wholesale prices. The job was unusual because the network was 100% NGN based, pioneering the latest IP based technology, making this one of the earliest ever NGN cost-based price determinations.
- Developed submission paper to TRAI on spectrum re-farming costs and national roaming options.
- Specified and developed a cost and revenue allocation tool to enable a Middle Eastern mobile operator to understand its costs and margins, to help manage the business better. The tool helps managers set profit-making prices. The tool uses LRIC techniques to allow future cost levels to be calculated and it included a current cost accounting asset register to allow asset costs to be included in an economically-sensible way. The model produces detailed P&L accounts for each product and tariff plan, and these accounts may be used to measure KPIs for tariff-plan managers.
- Advised a major EU fixed incumbent on its regulatory strategy and options with respect to Next Generation Networks. The work identified arguments and approaches to maximise its legitimate returns.
- Reviewed and commented on changes to bottom up LRIC models in both Sweden and Denmark (several diverse assignments).
- Pricing structure. The operators price discount structure was examined and the potential for any claims of predatory (anti- competitive) pricing were examined - the analysis showed that they could defend their prices if challenged.
- Advised an EU cable TV and telco operator on the risks, regulatory issues, benefits, options and costs if the operators were to become a Virtual Mobile Network Operator (MVNO) in order to sell quadruple play packages. The project delivered top level management business advice to define all the areas and options that need to be addressed in the strategy and business plan. The project delivered comprehensive data sets to allow the client to populate its business model with solid numbers.
- Investigated the regulatory burdens, the market and competition in small EU states to see if it is appropriate to apply the same obligations and remedies that are used in all the major EU countries. Economies of scale, market entry and contestability were examined and recommendation made for modified regulatory actions in these small markets.
- Managed a job to evaluate alternative wireless and mobile technology costs under different demand scenarios, including delivery of "triple play" services.
- Advised an EU mobile operator on MVNO strategies and how to deal with potential regulatory actions.

- Advised an EU mobile operator on creating top down LRIC models to meet the demands for regulatory accounts and account separation. A LRIC model was designed but the regulator was persuaded not to impose such accounts and the implementation work has been delayed.
- Investigated for a ministry the Bottom Up LRIC model used by a Scandinavian regulator to set cost-based tariffs for the fixed network. The work identified errors and questioned some of the economic principles that were used. The work could lead to benefits the client of many millions of €. The assignment included: examination of the model's colo and shared access calculations; plus a benchmark of LLU and shared access prices across Europe.
- Investigated another bottom up LRIC model and the recent changes employed by the regulator. The work noted several errors and weaknesses in the pricing methodology to cope with changing volumes and technology
- Analysed the costs basis of access networks using a benchmarking and econometric approach based on data from 24 US carriers' accounts. The work as used to show the potential ranges for operational costs of access networks. Results were converted for application to Europe. The work will be used by the client to support demands for lower access services.
- Developed reports for a Middle Eastern regulator to help in a dispute between two operators. These concerned: mobile termination fees, billing data, directory enquiry call charges and wholesale leased line prices.

Top down cost model project examples

Projects have included:

- Status review of TD costing system to identify how far it is from meeting the regulator's new accounting obligations
- \$2M SAS ABM fixed and mobile commercial costing project, including CCA and Regulatory Account reporting.
- Reviews of TD CCA /FAC/LRIC models and regulatory accounts – different assignments for two regulators.
- Defined new regulatory accounting requirements (published by ictQATAR).
- CCA LRIC model for ME operator. Roger led the IP and NGA/NGN costing solution.
- Fixed and mobile CCA LRIC/FAC models for ME operator.
- TD CCA FAC model for Danish mobile operator: presented as a response to Regulator's BU model.
- TD CCA model designed for Irish mobile operator.
- Managed development of hybrid TD & BU model for GCC mobile.
- Hybrid TD and business plan model to define mobile data service costs.
- TD model that combined 11 separate accounting systems for international carrier.

- Network model in a major ABC project that defined one of the first Interconnection prices in Europe.
- Various other TD models for operators in Austria (PTA and Maxmobil), Czech Republic (mobile), Luxembourg, Hungary (Fixed), Norway (mobile).

Bottom up cost model project examples

Roger has worked on many cost model projects using bottom up (as well as top down) techniques. Some BU model projects include:

- Review of BU large fixed and mobile models. These were complex tools and even included retail costs. Key assumptions and factors that led to very low costs were identified and recommendations were made on how to respond. This was included in a response paper and revised strategy for dealing with the regulator. 2018
- BU mobile broadband model. 2018.
- Separate BU leased line and transmission models for Asian regulator and African regulator. 2018
- Replies to ME regulator on BU mobile and fixed models.
- Response and presentation to ME regulator on BU and TD models. Regulator then lifted the obligation that incumbent was to make both models.
- QA of Middle Eastern BU mobile model. Roger supplied independent technical review for the Ovum BU modelling team.
- Review of mobile BU mobile models for Asian regulator.
- Review of BU mobile model used in Mexico.
- Critical review of the bottom up mobile model developed by an EU regulator. This was an extension of a project where Ovum developed a top down cost model for the mobile operator. The outcome was that the MTR rates were set very close to the values calculated by the operator.
- Roger managed an Ovum project to review the bottom up mobile model created by the regulator. This work was for the Ministry, as the model was appealed due to some problems that Ovum investigated.
https://www.regjeringen.no/globalassets/upload/sd/vedlegg/telekommunikasjon/2007013969_142384.pdf
- In 2011 Roger completed a cost system for an African mobile operator that used top down costing methods plus bottom up cost data from the business plan to calculate the average service costs from the current date until 2016.
- Roger led one of the first bottom up cost model projects in the EU. He led a combined client and consulting team that developed the bottom up cost model for the fixed access and core network in Denmark. A derived version of this was still in use over 10 years later. In separate projects in later years he reviewed changes and identified errors in the updates.
- Roger led the team that developed the first version on the Swedish bottom up fixed core and access models. Versions of this were in use over 10 years later (PTS web

site). He led public consultations and data requests. He also later commented on changes to the model. The Swedish and Danish BU models pioneered BU techniques.

- In 2008 he managed a project that developed a mobile BU model, that the mobile operator had built, into a working model that included top down data and gave values that could be submitted to the middle eastern regulator. Roger also supplied strategic advice on dealing with the regulator and setting MTR.

Examples of work related to broadband

Broadband projects include:

- Broadband economics and strategic review. Analysis of the national economic benefits and issues to be addressed. The report also examined approaches in a range of countries and reviewed the national broadband plan. A plan of actions was defined for the various stakeholders. The 2014 report (Economic Benefits of Broadband and Strategic Option) was used by ministries and the regulator. A new national plan has since been issued.
- Broadband strategies paper. This paper was published by the ITU. It covered issues, economics and options to enhance the deployment of broadband. “Strategies for the deployment of NGN and NGA in a broadband environment – regulatory and economic aspects” was published on ITU D web site December 2012. Also available on the Telzed web site.
- Presentations for ITU Cairo February 2013, Mexico March 2013 & Tokyo April 2013: “Strategies for the deployment of NGN and NGA in a broadband environment – Regulatory and economic aspects.”
- Presentations for ITU Cairo February 2013, Mexico March 2013 & Tokyo April 2013: “Initiatives to stimulate demand for broadband services and development of local content.”
- Defined method to assess complex price bundles covering regulated and unregulated markets for ME regulator. These are now common in broadband/mobile/TV/fixed line packages.
- Access regulation. Submission to Ofcom UK on the very first local loop unbundling options (with the same proposals as later adopted by Ofcom).
- Broadband service cost analysis. Led the top down accounting analysis techniques used in a number of costing systems. This considered IP network and access fibre and DSL service analysis. Mobile 3G data services have also been analysed using combined business plan and accounting data. Countries included: UAE, Saudi Arabia and South Africa. Roger has presented papers at conferences on NGN costing.
- Reviews of service costing and broadband cost reporting systems. Recent work in Qatar and Bahrain. Roger was the retained expert for the regulators in each country for ~ five years.

Telzed has published papers on: the EC approach to NGA non-discrimination regulation (the flawed EC proposal for the regulation of access fibre and copper); fibre in the loop investment

dangers; and implications of telecom market trends. For these and other papers please see the www.telzed.com web site.

Other previous assignments include:

- Interconnect cost model. Roger managed the creation of a sophisticated top down (ABC-based) interconnection cost model for an EU fixed network operator. This model determined the costs of PSTN calls, leased lines and Interconnect products using a methodology which met the regulatory requirements for LRIC. A new asset register based on current cost accounting techniques was implemented. The model is used to set the interconnect prices.
- Bottom up LRIC models. Roger led a joint team from PA and a group of operators in Denmark. The team produced complex bottom-up models of the incumbent's telephone network in order to determine the cost of the operator's services if it were an efficient modern operator. These models use forward looking Long Run Incremental Costing techniques. He also reviewed and submitted papers on reports and other developments of the model carried out by the regulator and other operators.
- Bottom-up LRIC Models for PTS Sweden. Roger led a joint team from PA and another consulting firm to develop bottom-up models of PSTN, access and co-location services in Sweden. These Long Run Incremental Cost models used costs and technical input data supplied by local telecoms operators and other sources. Roger also led the consultations with the telecoms industry and collected confidential data for the models. He also approved and helped to specify the economic criteria that the models had to meet.
- Profit analysis and pricing tool. Roger led the project to create the financial tool required. This calculates the cost and profit of voice, IP and capacity (leased line type) products, and it supplied data on the network elements' costs, including measures of the spare capacity. Some twenty financial systems and full accounts were processed.
- RIO and cost model review. The work included defining parts of the RIO, identifying missing costs, changing the current cost accounting approach, comparing results with other countries, giving supporting arguments to justify the cost base, identifying the optimum approach to interconnect pricing and proposing avenues for retail pricing.
- Roger led a project to create a top-down Long Run Incremental Cost (LRIC) model for a central European fixed network operator. A cost allocation tool and current cost accounting asset register were delivered within a limited budget and demanding timescale. The results were compliant with the regulatory authority's economic requirements.
- Czech Republic: top down FAC model for mobile operator. Roger developed a top-down cost model for a mobile operator.
- Interconnect and commercial cost model. For a European mobile operator, Roger managed and directed the creation of a fully allocated cost model to determine the cost of mobile services, including Interconnect calls. A novel Access database implementation was developed. Cost of dealers and total price-plan costs were evaluated.

- Incremental cost model. For an EU mobile operator Roger defined the accounting and financial principles of an Incremental Cost model (which was required by the Regulator for Interconnection costs). The principles were accepted and a detailed implementation specification was drafted
- International operator - financial information and accounts specification. The requirements for cost and profit measures were specified for an international carrier of fibre, voice, capacity and data backbone services. Roger worked with the finance department and product managers to specify the tool and the account structure that will produce cost and profit data on products and on the network.
- Mobile call termination and how it affects 3G. An EU 3G operator was threatened with the imposition of cost-oriented call termination rates for voice calls. The market, technical and financial issues of a 3G operator were identified and compared to the way the proposed voice termination charge had been calculated – using an unrealistic (to 3G) LRIC model based on 2G design assumptions.
- RIO cost orientation. Roger helped an EU fixed operator justify its submission to the regulator. Roger supplied a paper that defined how the RIO-rejection was unfair and mapped out a path that the two sides could follow and so gain agreement.
- Cost model documentation. Roger defined a guide to help the Auditor review a fixed operator's LRIC model that calculates the interconnect service costs. Roger clarified the criteria that need to be met for the model to be cost oriented and how the model met these criteria.
- Due diligence on Asian operator (telephony and cable TV) for private equity firm. Roger investigated and helped to develop a full profit and loss business model of a telephony and broadband operator. He investigated the risks for price reductions and what benefits might accrue if the operator were to be combined with other operator. Roger and the team delivered a report on the cash flows, capital expenditure and likely market impacts on the business. Areas of risk were identified. The model demand inputs were based on national macro economic drivers. The client was able to use the work to place a bid for the operator based on sound analysis.
- Interconnect negotiations. Roger prepared the EU mobile operator for negotiations with the regulator. He gave a presentation to, and carried out robust discussions with the regulator on issues such as the definition of significant market power, the determination of the cost of capital, price squeeze impositions by the regulator, and the relevance of marketing costs to interconnect. The UK MMC report on calls to mobiles was analysed in support of this work.
- Mobile operator MVNO-roaming evaluation. A mobile operator asked Roger to evaluate if a proposed Interconnection service (MVNO) from Sense Communications was technically roaming. Roger's view was that the Interconnection was technically roaming, with some additional features.
- Response to OFTEL on MVNOs. On behalf of a UK mobile operator, Roger led a small team to help the client prepare a response paper to Ofel's consultation on Mobile Virtual Network Operators. The regulatory issues, market economics and impact on the mobile business were evaluated and arguments opposing the mandating of MVNOs were prepared and presented to the MD.

- Response to OFTEL on unbundling. Roger directed and managed the preparation of a response paper to Oftel's consultative paper on local loop unbundling. The paper proposed the same options that Oftel eventually approved.
- Leased line cost modelling for EU PTO. An existing fully allocated cost model was developed by Roger and an additional cost model was created to enable the cost of all national and international leased lines to be determined.
- License application for International Facilities operator. Roger was part of a team that created a successful application for a far eastern operator.
- Response to Regulator on LRIC modelling and accounts. Roger prepared a draft response to the Regulator's paper on LRIC modelling and cost accounting.
- UMTS business plan. Roger worked as part of a large team producing a complex business plan in order to help a consortium prepare for a UK 3G license bid
- Due diligence on Far Eastern operator. Roger carried out a due diligence review of a fixed network operator prior to a major banking investment
- Due diligence on fixed radio access operator. Roger reviewed the network design and operations of a fixed radio access operator, as part of a due diligence project prior to re-financing
- European PTO – defining required financial and technical information to manage the business. Roger managed a project which defined the business and technical data that was required to enable a flexible business costing tool to be implemented. The model was not a technical planning tool but a financial model to extract costs and performance data about different services. The client was able to use the work to define the technical and commercial information it needed to collate in order to cost the main services this enabled the client to plan future IT and financial systems developments. He also co-ordinated parallel projects defining the MIS/EIS/DW requirements and an ABC implementation.
- Managed bandwidth service contract. For a new PTO, Roger prepared a draft contract and schedules for managed bandwidth.
- Scandinavian PTO inputs for business model. Roger provided help on the business plan and cost data for a venture into European-wide international simple resale and backbone voice networking.
- GTO Oman – risk review prior to partial privatisation. Roger advised on the telecoms regulatory structure and sector policy they required.
- Fixed network operator – review of IN business case. Roger managed a project with a European PTO to determine the cost of new Intelligent Network (IN) services.
- RIO draft for EU operator. For the operator Roger managed a project which prepared an initial Reference Interconnection Offer to be given to the Regulator.
- Interconnect pricing advice for EU regulator. Roger provided assistance to a regulator on interconnect pricing methods and issues. This work audited the PTO's model and determined how it could be modified to be more realistic and to enable alternative costing determination methods to be carried out. A new model was created.

In addition to the operator industry related work above Roger has extensive experience working for end users of telecoms services. A few of the many jobs are:

- Supplier assessment for UK government. Roger was engaged to evaluate one of the key suppliers of a wide range of national and international network services to the government.
- Global broadband IP Network Service Procurement. Roger was the UK project manager for an oil company who wished to procure private IP and public internet services for over 20,000 retail sites across the globe. Roger led the supplier discussions and defined the RFP/RFI documents. The work enabled a business strategy to be defined.
- Call centre review for government department. Roger was asked to review the business case and the benefits that a UK government department expected from moving many services to call centres from back offices.
- Head Office IT strategy. Roger defined the IT strategy for the new head office of a chemicals firm.
- Retail Bank - competitive procurement of >£100M p.a .telecom services.
- Credit card company – defining a contract for data services.
- Retail Bank – board level budget for telecoms services.

Career summary

November 2011 - date	CEO Telzed Limited
April 2008 - February 2010	Director Deloitte LLP Economic Consulting
Sept 2004 - Apr 2008, Mar 2010-Nov 2011	Director Consulting & head of regulatory practice, Ovum Ltd, London
Feb 98 - to Aug 2004	Principal Consultant, PA Consulting Group, London.
April 94 - Feb 98	Manager, Deloitte Consulting, London
Manager Oct 91- Apr 94	Equipment engineering manager, BT Syncordia, London

While employed by Syncordia (at the time the leading company in the field of network outsourcing) Roger supervised and managed all testing carried out on a BT reference model. He was the authority for the selection of equipment and configurations before deployment on customer sites or in the backbone network. He managed the programmes of work required to verify new technology.

The management position gave extensive experience of experience of LAN and WAN equipment and services from the supplier's perspective. He has worked on voice network designs and on the service development of video conferencing. Roger also introduced new service definitions for network availability and understandings of SLA figures.

Prior to Syncordia, Roger worked for BT Labs carrying out research and development on optical communications systems. He also worked as an electronics engineer for a hi-tech start-up venture.

Educational qualifications

1977- 1980 University of Glasgow, BSc 1st Hons Electronic Engineering.

1980- 1984 University of Glasgow. PhD Optical Communications.

Publications and conferences

- Papers on: broadband usage, required numbers of mobile sites, broadband strategies and broadband speed. See Telzed web site 2018. These explain the fundamental drivers for cost and how broadband speed, downloads and busy hour usage impact the network. Networks have to cope with these factors and huge growth in the values. The papers show how 4G or 5G cannot replace fixed line broadband in most countries (it can in some and in some there is almost no fixed broadband). This confirmed and linked to work by McKinsey.
- Strategic issues for fixed and mobile broadband. Telzed web site 2017. This is a follow on to the below paper on usage.
- A guide to understanding broadband usage. Telzed web site 2017. This demonstrates the cost drivers and how mobile is unlikely to replace fixed broadband in many countries.
- Analysis of the implications of Ofcom's Strategy. March 2016. On Telzed web site
- Broadband speed and Internet use. Analysis of Akamai data. December 2015. On Telzed web site
- Independent Telzed submission for the Ofcom Strategic Review of Digital Communications, October 2015. On Ofcom and Telzed web site
- Issues and options for BU models, October 2014. Telzed web site
- Four day workshop in Sharm el Sheikh on telecoms costing, March 2014
- Five day LRIC workshops in association with Neotelis in: Amsterdam, Jordan, London, Belgium and Brazil. Most had bespoke elements and the material was extensively developed by Roger.
- Commentary on EC draft Recommendation on NGA costing and non-discrimination (published December 2012). Telzed web site.
- Commentary on the UK Ofcom Communications Market Report 2012. This has points applicable to many countries. Telzed Web site
- Discussion paper: How to build a "Do It Yourself" cost model. Telzed Web site
- ITU Cairo February 2013, Mexico March 2013 & Tokyo April 2013. Strategies for the deployment of NGN and NGA in a broadband environment – Regulatory and economic aspects
- ITU Cairo February 2013, Mexico March 2013 & Tokyo April 2013. Initiatives to stimulate demand for broadband services and development of local content
- "Strategies for the deployment of NGN and NGA in a broadband environment – regulatory and economic aspects." Published on ITU D web site December 2012. Also available on Telzed web site

- ITU/BDT Arab Regional Workshop on “Dispute Resolution in ICT” Khartoum, Sudan 1-4 April, 2012
- Commentary papers on EC Questionnaire 2011 and EC policy statement 2012. Telzed Web site
- “One page to manage a telecom business” – a method to help with high level strategic monitoring and strategy plans. Feb 2012, Telzed Web site
- “Dangers of fibre investment in the local loop.” This paper warns of the dangers of the wrong strategy to fibre in the loop pricing and investment (a theme that Roger has talked about in conference papers and in discussion groups). Feb 2012, Telzed Web site
- Securing accurate cost and profit forecasts for new products and services, IIR December 2011, London
- Modernising the ABC cost model from the classic top down approach to help define future costs over time. IIR Vienna June 2011. Also conference chairman
- 4 day workshop. Sharm El Sheikh, November 2010 on NGN costs and regulation
- “Assessing the costing and pricing of NGA services” IIR conference December 2010 London. Also panel member. Workshop on NGN delivered
- “Separating your accounts for NGN.” IIR conference regulatory Accounts and costing May 2010. Also conference Chairman
- “Regulatory challenges and the future of telecommunications regulation in the Middle East” TMF conference Dubai March 2009
- “Wholesale NGN charging alternatives” ITU Seminar on tariff policies, tariff models and methodologies for the determination of costs of services provided with NGN. Geneva Sept 2008
- “Wholesale NGN charging - an alternative view” IIR regulatory cost modelling and accounting Vienna May 2008
- “Modelling Services on a Next Generation Network to Enable the Accurate Allocation of Network Costs” IIR cost and profit London December 2007
- “Assessing the impact of Implementing cost based services and interconnection on incumbents, new entrants prices and competition” IIR Telecoms Cost Accounting Dubai October 2007
- “Determining the optimum structure and level of detail for separate accounts” IIR Telecoms Cost Accounting Dubai October 2007
- “Costing and Pricing Methodologies” IIR Telecommunications Law and Regulations in the Middle East 2007, Dubai September 2007
- NGN regulation, costing and technology: two separate 3-day workshops delivered in Singapore (basic then advanced) 2006/7

- “Cost allocation in an NGN environment” presented at IRG Round table Biel/Bienne Switzerland September 2006. Also panel chairman
- Applying Price Squeeze tests and developing arguments for price squeeze investigations” B Lane & R Steele, Presented at IIR Regulatory Cost Accounting & Reporting in Telecoms, Vienna July 2006
- Conference Chairman NGN Conference London June 2006
- Co facilitator of Ovum NGN workshop to operators and regulators in Hong Kong June 2006
- “Allocating Costs and Revenues to Calculate the Profitability of VoIP. IIR Allocating Costs & Calculating Profitability in Telecoms.” December 2005
- Panel chairman at Carriers World CEE Budapest November 2005. Session on outsourced service supply in CEE
- “Allocating Costs and Revenues to Calculate the Profitability of VoIP.” IIR Allocating Costs & Calculating Profitability in Telecoms.” December 2005.
- “The regulatory and economic challenges presented by the changing telecom market” by R Steele, S Abate and B Lane, Biel Switzerland Sept 2005
- “Pricing for Profits” by R Steele and K Wermig published in ITU Geneva newspaper Telecoms World July 2003. <http://www.itudaily.com/new/printarticle.asp?articleid=3103091>
- Practical techniques for applying bottom up LRIC to interconnect for reliable future cost projections. Global Interconnection Forum September 2002, Cannes.
- Reducing Interconnection costs by using Least Cost Routing (LCR) without jeopardizing QoS. Global Interconnection Forum September 2002, Cannes.
- Creating the information needed to set profit-making prices. IBC Mobile Pricing Masterclass. June 2002 London.
- Setting Prices to Stay in Business. 7th Tarifica Pricing Congress May 2002 London.
- Forecasting the Revenues and Costs Generated by Interconnect Traffic Over Your Network. Global Interconnection Forum for Telecoms, Barcelona September 1998.
- Cost Allocation for Interconnect. Strategic Cost Management in Telecoms, London June 1998.
- Workshop: LRIC modelling for fixed-mobile and mobile-fixed interconnection and business planning. Vision in Business workshop, London November 2002.
- Workshop: Bottom up LRIC modelling for IP services. IP Network Costing conference. Vision in Business, London July 2001.

- How to maximise the revenue potential from IP services through balanced costs and prices. . IP Network Costing conference. Vision in Business, London July 2001.
- Bundling and Pricing Voice and Data Services to Target Corporate Customers. IIR Competitive Telecoms Pricing conference March 2001, Portugal.
- Using cost data to determine the optimum points of interconnection. Global Interconnection Forum 2000, Brussels.
- How to Allocate Costs to Leased Line and Access Products. Vision in Business. Network Costing in Telecoms June 2000.

