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Foreword

Today life is truly dominated by readily available and all-pervasive information, communications and entertainment, delivered to wherever we are, usually to our personal device. People now expect ubiquitous access to the world wide web and many couldn't operate their lives without it. Whether booking tickets online, purchasing goods and services, studying, being entertained, working or simply keeping-up with friends through social networking, such technology is central to supporting people's lives.

Most of those enjoying the benefits of this 'information age' would not be aware of the advanced technology in the hand terminals (smart phones, tablets, etc.), but rather assume that communication is provided over some wireless connection, vaguely linked to 'clouds' and the Internet. However, not only is there a wide range of infrastructure – in the form of cell-sites, masts, cables, switches, routers, computer servers and mass storage – but also many companies are involved in the business of providing and operating such resources. This book attempts to explain the complex interplay between the companies and how their businesses operate.

Our focus in this book is on the telecommunications that underpin all Internet, cloud, broadband, mobile and fixed services. We consider how the companies tackle the challenging information and communication technology (ICT) marketplace; how they make a case for investment; and how they operate telecommunications networks and computer server resources. In particular, we have tried to provide a comprehensive introduction to the tools for analysing markets, constructing business cases and providing customer service – all with specific reference to telecommunications.

It is intended that the book will act as a text for undergraduate and graduate degree students. However, we feel sure that many people already working in the industry, or considering joining it, whatever their discipline, will also find our wide-ranging coverage helpful in showing how all the elements of the telecommunications and ICT business fit together.

We have based much of the content on the material used to teach Masters degree students over the last 10 years or so, as well as drawing on our knowledge gained through working within the industry. Our combined experience totals over 80 years, covering planning, strategy, financial management, network development, regulation, working variously for BT, United Nations and the Cabinet Office – and more recently teaching at University College London.

This book forms a companion to Understanding Telecommunications Networks, also in the IET Telecommunications series. Although self-contained, our book examines and extends the various business and commercial aspects of the technologies and networks described in the companion book. We feel that the combination of the two books will give the reader a holistic view of the fascinating world of telecommunications.

ARV and IMM
April 2015

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Abbreviations

1G	1st Generation (mobile network system)
2G	2nd Generation (mobile network system)
3G	3rd Generation (mobile network system)
4G	4th Generation (mobile network system)
5G	5th Generation (mobile network system)
4P's	Product, Place, Price, Promotion
ADSL	Asymmetric Digital Subscriber Line
AON	Activity-On-Node
API	Application Program Interface
Ar	Aggregation ratio
ARPU	Average Revenue per User
ATM	Asynchronous Transfer Mode
AUF	Asset Utilisation Factor
BBC	British Broadcasting Company
BER	Bit Error Rate
BIS	Brought into Service
BORSCHT	Battery, Overload-protection, Ringing, Signalling, Codec, Hybrid, & Test
BSC	Base Station Controller
BSG	Boston Consulting Group
BSP	Burden of Spare Plant
BT	British Telecommunications Plc
BTC	Base Station Controller
CapEx	Capital Expenditure
Cs & Bs	Clicks and Bricks
CAPM	Capital Asset Pricing Model
CDMA	Code Division Multiple Access
CDN	Content Distribution Network
CEO	Chief Executive Officer

CER	Cell Error Ratio
CFO	Chief Financial Officer
CNN	Cable News Network
CP	Communication Provider
CPI	Consumer Price Index
CR	Corporate Responsibility
CRD	Customer-Required-by-Date
CRM	Customer Relationship Management
CSR	Corporate Social Responsibility
CTD	Cell Transfer Delay
CTV	Cable Television
D-side	Distribution-side
DCF	Discounted Cash Flow
DER	Digital Error Rate
DMSU	Digital Main Switching Unit
DNS	Domain Name System
DOS	Denial of Service
DP	Distribution Point
DSC	District Switching Centre
DSLAM	Digital Subscriber Line Access Multiplexer
DT	Deutsche Telecom
E	Erlang (unit of telephone traffic)
EBITDA	Earnings Before Interest, Tax, Depreciation and Amortisation
EFT	Earliest Finishing Time
ELF	Early Life Faults
EPS	Earnings per Share
E-side	Exchange-Side
EST	Earliest Start Times
EU	European Union
ETO	Economic, Technical or Organisational
eTOM	extended Telecommunications Operations Map
FAB	Fulfilment, Assurance and Billing
F&F	Friends and Family
FAQ	Frequently Asked Questions
FCA	The Financial Conduct Authority
FCC	Federal Communications Commission

FD	Finance Director
FDM	Frequency Division Multiplexing
FRIACO	Flat-Rate Internet Access Call Origination
FTTH	Fibre to the Home
FTTO	Fibre to the Office
G/	Gateway
GAAT	Generally Accepted Accounting Standard
GDP	Gross Domestic Product
GOS	Grade of Service
GPRS	General Packet Radio Service
GPS	Global Positioning System
GSC	Group Switching Centre
GSM	Global System for Mobile
HD	High Definition
HFC	Hybrid Fibre-Coax
HLR	Home Location Register
HP	Hewlett Packard
HQ	Head Quarters
HR	Human Resources
HRM	Human Resources Management
HSE	Health and Safety Executive
IaaS	Infrastructure as a Service
ICT	Information and Communication Technology
IDA	Integrated Digital Access
IDV	Degree of Individualism
IFRS	International Financial Reporting Standard
IM	Instant Messaging
IMS	Internet Protocol Multimedia Subsystem
IMSI	International Mobile Subscriber Identity
IN	Intelligent Network
IP	Intellectual Property
IP	Internet Protocol
IPv4	Internet Protocol Version 4
IPv6	Internet Protocol Version 6
IPTV	Internet Protocol Television
IRR	Internal Rate of Return

ISC	International Switching Centre
ISDN	Integrated Services Digital Network
ISP	Internet Service Provider
ITIL	The Information Technology Infrastructure Library
ITT	Invitation to Tender
ITU	International Telecommunications Union
ITU-T	International Telecommunication Union – Telecommunications section
IVR	Interactive Voice Response
JD	Job Description
LAN	Local Area Network
LC	Line Card
LDDS	Long Distant Discount Service
LE	Local Exchange
LFT	Latest Finish Time
LoP	Life of Plant
LSP	Label Switched Path
LST	Latest Start Time
LTE	Long-Term Evolution
M&A	Mergers and Acquisitions
MAS	Masculinity versus Femininity
MDF	Main Distribution Frame
MGC	Media Gateway Controller
MMC	The Monopolies and Mergers Commission
MMS	Multimedia Messaging Service
MNO	Mobile Network Operator
MPLS	Multi-Protocol Label Switching
MSC	Main Switching Centre
MSC	Mobile Switching Centre
MSISDN	Mobile Station International Subscriber Directory Number
MSP	Multi-Service Platform
MTTR	Mean Time To Repair
MVNO	Mobile Virtual Network Operator
NFC	Network Field Centres
NGN	Next Generation Network
NHS	National Health Service

NNI	Network-Network Interface
NP	Number Portability
NPV	Net Present Value
NOC	National Operations Centre
NTL	National Transcommunications Limited
NTTP	Network Test and Termination Point
NUF	Network Utilisation Factor
O&M	Operations and Maintenance
Ofcom	The Office of Communications
Oftel	The Office of Telecommunication
Ofgem	The Office of Energy Regulation
Ofwat	The Office of Water Regulation
OFTA	The Office of the Telecommunications Authority
OLO	Other Licenced Operator
OpEx	Operational Expenditure
OSI	Open Systems Interconnection
OSS	Operational Support Systems
OTT	Over-the-Top (Application Provider)
PaaS	Platform as a Service
PABX	Private Automatic Branch Exchange
P&L	Profit and Loss
PC	Personal Computer
PCM	Pulse Code Modulation
PCP	Primary Connection Point
PDA	Personal Digital Assistant
PDH	Plesiochronous Digital Hierarchy
PDI	Power Distance Index
PE	Price Earnings
PERT	Project (or programme) Evaluation and Review Technique
PEST	Political, Economic, Social and Technology
PESTLE	Political, Economic, Social, Technology, Legal and Environmental
PM	Product Manager
PM	Project Manager
POLO	Payments to Other Licenced Operators
PoI	Points of Interconnect

PON	Passive Optical Network
POP	Point of Presence
PR	Public Relations
PSN	Packet Service Node
PSTN	Public Switched Telecommunications Network
PUV	Perceived Use Value
QoE	Quality of Experience
QoS	Quality of Service
R&D	Research and Development
RAN	Radio Access Network
RFI	Request for Information
RPI	Retail Price Index
ROC	Regional Operations Centres
ROCE	Return on Capital Employed
ROLO	Receipts from Other Licenced Operators
ROI	Return on Investment
RONA	Return on Net Assets
RSI	Repetitive Strain Injuries
SaaS	Software as a Service
SCP	Secondary Connection Point
SDH	Synchronous Digital Hierarchy
SIP	Session Initiation Protocol
SLA	Service-level Agreements
SLC	Subscriber Line Card
SMART	Specific, Measureable, Achievable, Relevant, Time-bound
SME	Small and Medium Enterprise
SMS	Short Message Service
SNS	Social Network Service
SS7 or SSno7	Signalling System 7
SSAP	Statement of Standard Accounting Practice
STR	Strategic Telecommunications Review
SWOT	Strengths, Weaknesses, Opportunities, and Threats
T&C	Terms and Conditions
TDM	Time Division Multiplexing
TDR	Test Discount Rate
TE	Trunk Exchange

TE	Telephone Exchange
Telco	Telecommunications Company
TMF	TeleManagement Forum (now known as 'TM forum')
TS16	Time Slot 16
TUPE	Transfer of Undertakings (Protection of Employment)
UAE	United Arab Emirates
UAI	Uncertainty Avoidance Index
UNI	User-Network Interface
USO	Universal Service Obligation
VCA	Value Chain Analysis
VDSL	Very-high-bit-rate Digital Subscriber Line
VLSI	Very Large Scale Integrated
VOIP	Voice Over Internet Protocol
VOLTE	Voice over LTE
VPN	Virtual Private Network
VULA	Virtual Unbundled Local Access
WACC	Weighted Average Cost of Capital
WiMAX	World-wide Interoperability for Microwave Access
WLC	Whole-life Cost
WRULD	Work Related Upper Limb Disorders